

**1995**  
*Rotary  
National  
Award for  
Space Achievement*

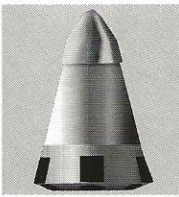
*Chuncheon*

In 1961, we sent a man.  
In 1981, we sent a crew.  
In 1997, we'll send our future.

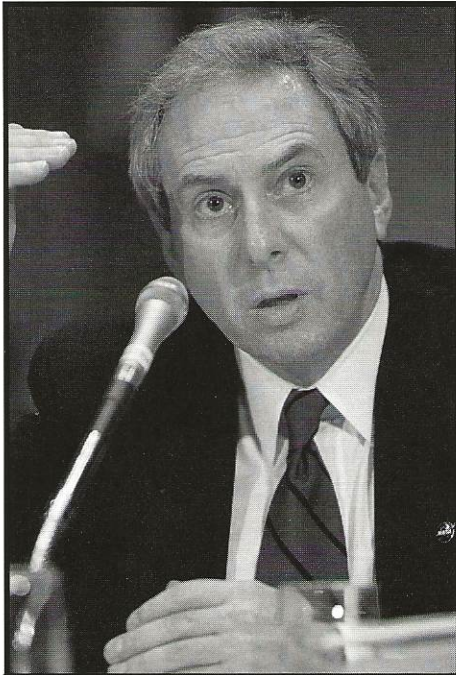


We have sung to them. We have wished upon them.  
We have toiled and played and dreamed beneath them. Now we go to live among them.  
This year, as we celebrate America's 100th manned space mission,  
we take our first step into the rest of the universe.  
The Space Station. Continue the Voyage.

 **Rockwell**



## THE NATIONAL SPACE TROPHY RECIPIENT



**Daniel S. Goldin**

NASA Administrator Daniel S. Goldin is the recipient of the 1995 Rotary National Award for Space Achievement. Mr. Goldin was selected for this honor for his passionate leadership and fiscally responsible management of the best space program in the world.

A native of New York City, Mr. Goldin received his degree in mechanical engineering in 1962 from the City College of New York. He began his professional career that same year as a research scientist at NASA's Lewis Research Center in Cleveland.

After five years, Mr. Goldin moved to California to work for TRW. During 25 years with TRW, he successfully managed the development and production of advanced spacecraft, technologies, and space science instruments, and rose to the position of Vice President and General Manager of the TRW Space & Technology Group in Redondo Beach, California.

Mr. Goldin became the ninth NASA Administrator in April 1992. His first initiative was to bring NASA's budget under control. He created a series of management teams to find ways to operate programs 'faster, better, and cheaper' without compromising safety.

Mr. Goldin described his first budget submittal as Administrator as, "a fiscal declaration of independence from the old ways of doing business." By April 1993, NASA's five-year spending plan had been reduced by \$15 billion, the equivalent of saving an entire year's funding. "It simply was not feasible for us to continue spending at the rate we were going," Goldin said at the time.

To make the Agency more businesslike, Mr. Goldin launched a series of procurement and management reforms. He simplified and expedited procedures for awarding contracts, instituted a "yellow light" system for programs experiencing cost overruns, expanded contracting opportunities for small and disadvantaged businesses, and set up independent panels to insure cost and schedule estimates are as accurate as possible.

Under Goldin, the Discovery Program, whose goal is to reduce planetary probe development times to less than three years, and mission costs to less than \$150 million, was inaugurated. This is a marked departure for NASA whose planetary programs normally require at least a decade and hundreds of millions of dollars.

In 1993, the Space Station program was approved by a one-vote margin in the House of Representatives. Mr. Goldin had already been asked to redesign Space Station *Freedom* to significantly cut costs without sacrificing meaningful capabilities. He formed a team which worked intensively to identify a series of less expensive options. Overall, Goldin's team cut the life cycle costs by \$15 billion.

*In a statement to the House in April 1994, Goldin said, "I am pleased to report to you that we are just where we should be on the Space Station. We have stuck with our plan, met our target dates. The bottom line? The Space Station is right on track."*

*Continued - see Goldin, page 15*



**The National Space Trophy** -- Just as the crystal of The National Space Trophy captures the light within, so do the actions of humans exploring space capture and inspire others to strive for great achievements. Made entirely of lead crystal, the seven-foot, 500-pound, conical column rises like a graceful rocket above a base that is reminiscent of exhaust clouds or the frozen moons of some distant world. A thin white line spirals around the column, etching our pathway to the stars, drawing our attention to the bubble of air in the tip of the cone -- a bubble as fragile and beautiful as human life, shining with the bright light of hope and dreams for the future.

*The National Space Trophy was designed by Steuben Glass of New York. It will be on permanent display at Space Center Houston soon after this year's event.*

# One of our expanding markets.



Space. It's our largest business segment. And an expanding one.

At Thiokol, we produce solid rocket motors for the Space Shuttle program, and we're expanding our range of motors for commercial launch vehicles throughout the world.

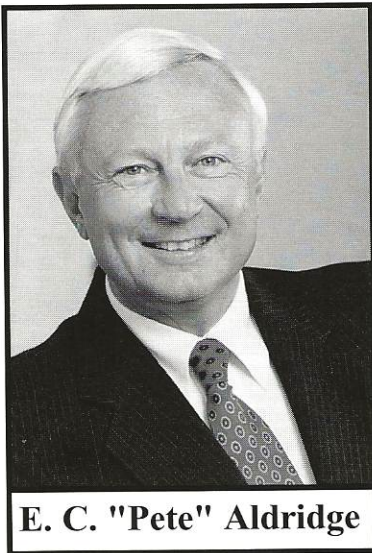
Our business plan involves a commitment to develop safe and reliable motors that meet the demands of tomorrow's launch vehicle projects.

*The people of Thiokol salute Dan Goldin for his determined commitment and lasting contributions to the nation's space effort.*

**THIOKOL**  
SPACE • DEFENSE • FASTENING SYSTEMS



## FEATURED SPEAKER



**E. C. "Pete" Aldridge**

The Rotary National Award for Space Achievement Foundation is pleased to welcome Mr. Edward C. "Pete" Aldridge Jr., the 1994 recipient of the National Space Trophy, as our featured speaker.

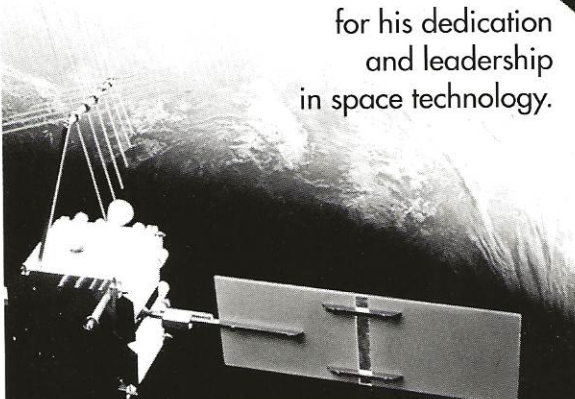
As Secretary of the Air Force during the Reagan Administration, Mr. Aldridge persuaded NASA, the military, and Congress of the need to compliment the Shuttle with a line of expendable launch vehicles. His foresight proved vital to continuing launch activity after the *Challenger* accident.


Mr. Aldridge developed the first comprehensive space policy for the Air Force. He traveled to every U.S. operated military space facility in the world. He was the senior official activating the Air Force Space Command in Colorado Springs, and the Air Force Space Technology Center (now Phillips Laboratory) in New Mexico. For 7-1/2 years, Mr. Aldridge headed the previously classified National Reconnaissance Office, managing the country's military reconnaissance assets. He underwent training to become a Shuttle payload specialist for a mission from Vandenberg Air Force Base that was canceled following the *Challenger* accident.

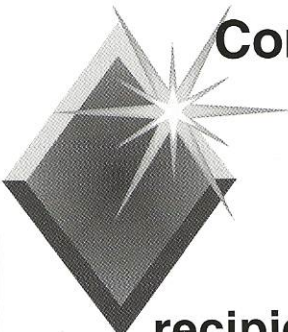
From 1988 to 1992, Mr. Aldridge was President of McDonnell Douglas Electronic Systems Company. He is currently President and CEO of The Aerospace Corporation, a nonprofit organization dedicated to the objective application of science and technology toward the solution of critical national problems. He is also a member of the Rotary National Award for Space Achievement's Board of Advisors.

The Aerospace Corporation salutes  
**Dan Goldin**

for his dedication  
and leadership  
in space technology.



 **THE AEROSPACE CORPORATION**



**Congratulations  
to  
Daniel  
Goldin**

**recipient of the 1995  
National Space Trophy**  
for his outstanding  
contributions  
and continuing  
commitment  
to the exploration of space.

**KRUG**  
LIFE SCIENCES  
A KRUG International Company



*Magellan*



*Mars Global Surveyor*

**MARTIN MARIETTA SALUTES  
DANIEL S. GOLDIN**

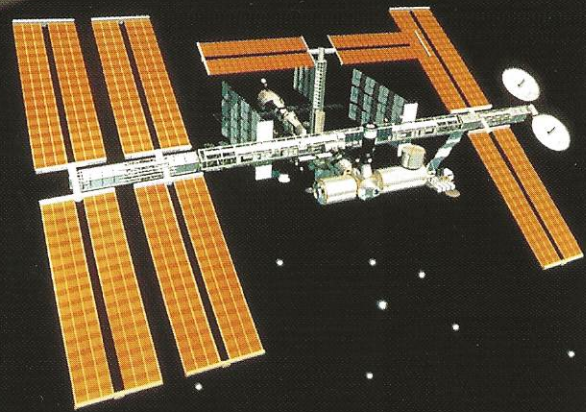
**WITH INTEGRITY, LEADERSHIP AND  
IMAGINATION, ACHIEVEMENT KNOWS  
NO BOUNDARIES**



*Viking*

**MARTIN MARIETTA**

**Loral salutes  
*Dan Goldin*  
recipient of the 9th Annual  
National Space Trophy  
for his outstanding  
contributions to America's  
space program.**

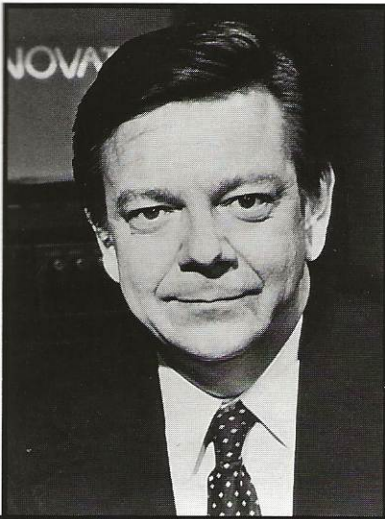


**LORAL**  
Performance is the best strategy.





## MASTER OF CEREMONIES



Jim Hartz

The Rotary National Award for Space Achievement Foundation is delighted to have Mr. Jim Hartz return as the Master of Ceremonies for this year's banquet.

Many people recognize Mr. Hartz from his days as co-host (1974-77) with Barbara Walters of NBC's *Today Show*, but they may not know he has won five Emmy's, the highest honor given for television broadcasting by the National Academy of Television Arts and Sciences, for other work. He earned Emmy awards for his coverage of the *Yom Kippur War* in 1973; for coverage of the Apollo Moon flights; for an expose' on the dangers of materials in children's tents; for a documentary, *Hold for Justice*; and as "Best Anchorman" in Dan Goldin's home town of New York City. He has also won two Ace awards, the highest recognition of the cable industry, for his commentaries on *American Viewpoints*.

During his 35-year career, Mr. Hartz traveled extensively, including a trip (at Mach 3!) where no journalist had gone before: into the stratosphere aboard an SR-71 spy plane. Mr. Hartz had hoped for a trip on the Space Shuttle, but though he qualified as a semi-finalist in the Journalist in Space Project, it was canceled after the *Challenger* accident.

Recently, Mr. Hartz served as guest host on *Entertainment Tonight*, and appeared as himself in the motion picture, *Power*, directed by Sidney Lumel. The PBS science and high technology show for which Mr. Hartz is currently both Host and Chief Correspondent, *Innovation*, has earned two Emmys and the New York Film Festival's Gold Medal Award for Best Science Program.



Providing  
the software  
and services

that are  
helping to shape

America's future in **s p a c e.**

Before It Can End Up Here ...



Congratulations to  
*Dan Goldin,*  
and Best Wishes on  
*International Space Station*  
*Alpha.*

... It Has To Work Down Here.





## PRESENTING THE AWARDS

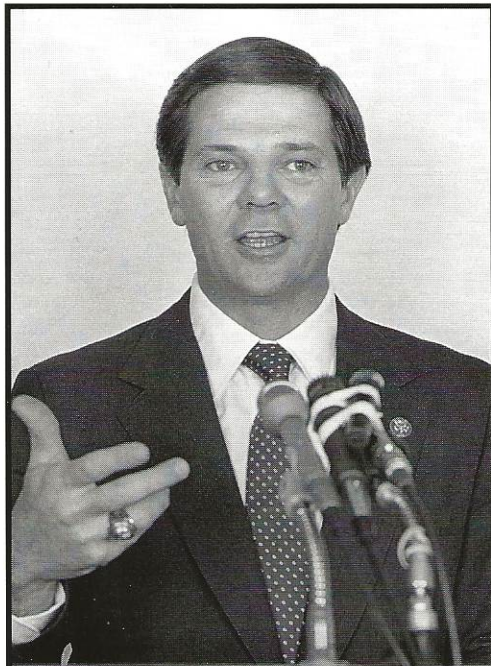


**Dr. Christopher C. Kraft**

It is especially appropriate that this year's two Stellar Awards, for launch vehicle development and spacecraft design, be awarded by the manager of the nation's premier spaceflight project who also served as the first Flight Director, Dr. Christopher Kraft, Jr.

Dr. Kraft entered Federal Service as an engineer with the Langley Aeronautical Laboratory. In 1958, Dr. Kraft was selected as one of the original members of the Space Task Group, established to manage Project Mercury. He personally served as Flight Director for all Mercury missions and many of the Gemini missions, earning numerous awards (including four NASA Distinguished Service Medals, and the Rank of Distinguished Executive by the President of the United States) for his leadership skills. Dr. Kraft directed the design and implementation of the now historic Mission Control Center in Houston and was the Director of the Johnson Space Center for ten years, from 1972 until he retired in 1982.

Even in retirement, Dr. Kraft continues to serve NASA. He is currently leading an independent team to evaluate Shuttle operations at the Johnson, Kennedy, Marshall, and Stennis Space Centers with the intent of recommending a new and more optimum operating structure — with program safety the first priority. Dr. Kraft's team is also reviewing related Space Station activities. The team is expected to complete its work and make recommendations to Administrator Goldin by mid-March.



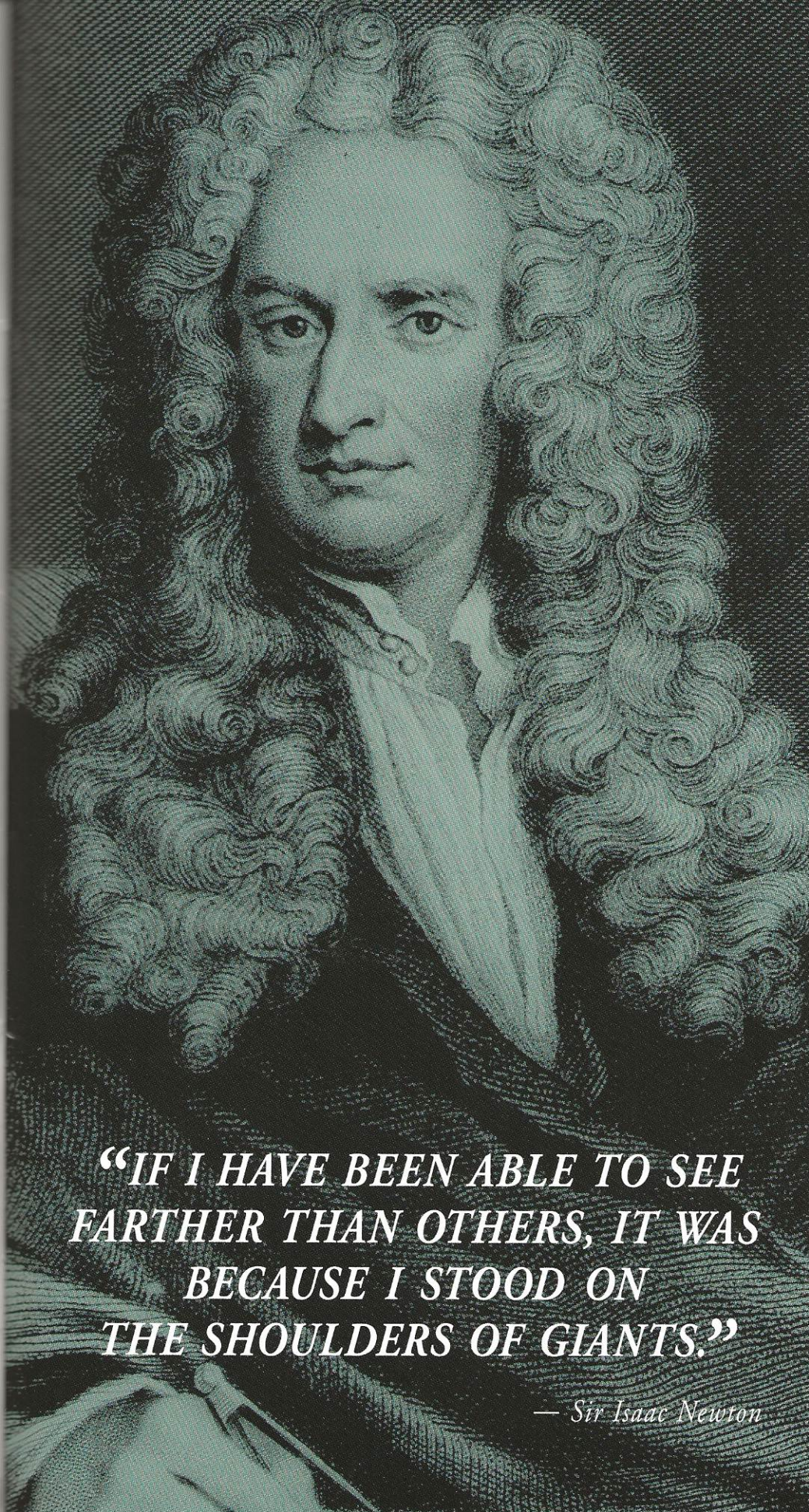
**Congressman Tom DeLay**

The RNASA Foundation is honored to have Congressman Tom DeLay take time from his busy schedule as the new House Majority Whip to present the 1995 National Space Trophy to Mr. Goldin.

Congressman DeLay was elected to a sixth term last November representing a district that includes most of the area surrounding the Johnson Space Center. In December, Rep. DeLay was elected by his colleagues to be Majority Whip, the third ranking leadership position in the 104th Congress.

As a member of the powerful House Appropriations Committee, and member of the Transportation; and the VA, HUD, and Independent Agencies subcommittees, Rep. DeLay continues to be a vocal supporter of the Space Station and NASA. Because the latter subcommittee is responsible for NASA's budget, Rep. DeLay maintains frequent close contact with NASA Administrator Dan Goldin. Rep. DeLay praised the Administrator for his "outstanding executive leadership in pioneering a sea change at NASA, creating a culture that values technological innovation, fiscal accountability, creative management, and workforce diversity."

Rep. DeLay, who believes space research and exploration are of vital importance to the nation, is a member of the Rotary National Award for Space Achievement's Board of Advisors.



***“IF I HAVE BEEN ABLE TO SEE  
FARTHER THAN OTHERS, IT WAS  
BECAUSE I STOOD ON  
THE SHOULDERS OF GIANTS.”***

*— Sir Isaac Newton*

The discoveries of Sir Isaac Newton profoundly affect the way we see and explore our world. Today, the space scientists and engineers at NASA are following the path blazed by Newton and other giants of science, bringing new insight into the workings of the universe.



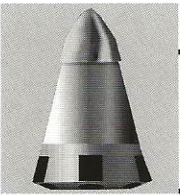
NASA's initiatives – the space shuttle system, international space station, Hubble Space Telescope, and Mission to Planet Earth – are logical steps in this odyssey.

From the hundreds of spacecraft we've orbited to the uncounted and complex space systems we've integrated and managed, Lockheed is proud to be a partner in America's space endeavor. We've been there from the start. Now, and in the future, NASA can rely on Lockheed to bring the benefits of space technology back home.

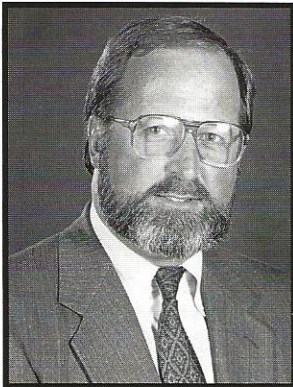


*Making good on  
the promise of space.*

Congratulations Dan Goldin, Winner, 1995 Rotary National Award for Space Achievement.



## THE EXECUTIVE FORUM



**Stephen Gauvain**

The Executive Forum on Space Exploration, held the afternoon prior to each year's Space Awards Banquet, is designed to provide aerospace executives from industry and government an opportunity to exchange ideas and discuss current issues in space exploration with experts in their respective fields.

Panelists are selected from Industry, the Military, and the Administration to assess the current state of America's space program and project plans for the future. Invited members of the aerospace community are encouraged to participate in an open discussion following the panelists' comments.

This year's discussion centers on the theme of reusable launch vehicles: the supporting political environment; management; and technical approaches. This theme is especially pertinent considering NASA recently invited industry to submit designs for two experimental reusable rockets, the X-33 and the smaller X-34.

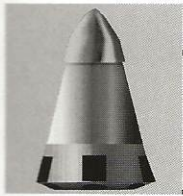
The RNASA Foundation is grateful to Mr. Stephen Gauvain of KTRK-TV Channel 13 (ABC) for offering his exceptional skills again this year as Moderator of the Executive Forum. Mr. Gauvain has successfully moderated every Forum since the program's inception in 1989. "I look forward every year to this chance to learn the latest developments from the people who make the actual decisions. I'm anxious to hear what our panelists will say, because I'm still looking for a way to hitch a ride to space." Mr. Gauvain, who has covered more than 50 Shuttle missions, was a quarter-finalist in NASA's Journalist-in-Space program that was cancelled after the *Challenger* disaster. He is a valued member of the Rotary National Award for Space Achievement's Board of Advisors.



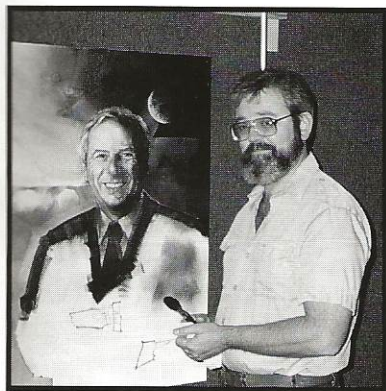
# OUR CONGRATULATIONS TO DAN GOLDIN

 Hernandez  
Engineering Inc.

17625 El Camino Real • Suite 200 • Houston, Texas 77058  
713-280-5159 • Telefax 713-480-7525



## THE COVER



**Alan B. Chinchar**

The original portrait of Mr. Goldin featured on the cover was painted by Alan B. Chinchar. Mr. Chinchar was also the artist for the 1990 National Space Trophy recipient, Dr. Lew Allen, and the 1992 portrait of recipient Lt. Gen. Thomas Stafford, USAF (ret.).

Mr. Chinchar has specialized in aerospace and defense images since 1986 when he was commissioned by NASA to commemorate the launch of STS-26 "Return to Flight." He also designed and painted the logo and poster for the 20th Anniversary of Apollo 11, and the Johnson Space Center's "Achievement Through Excellence" poster series. Mr. Chinchar painted murals for the 50th Anniversary of NASA/Ames Research Center,

and the 1992 NASA pavilion at the Paris Air Show. His 18-foot mural at the Johnson Space Center, "History of America's Manned Spaceflight," is a tribute to America's space program. He recently traveled to Russia as part of the NASA Headquarters Space Artists Exchange Program.

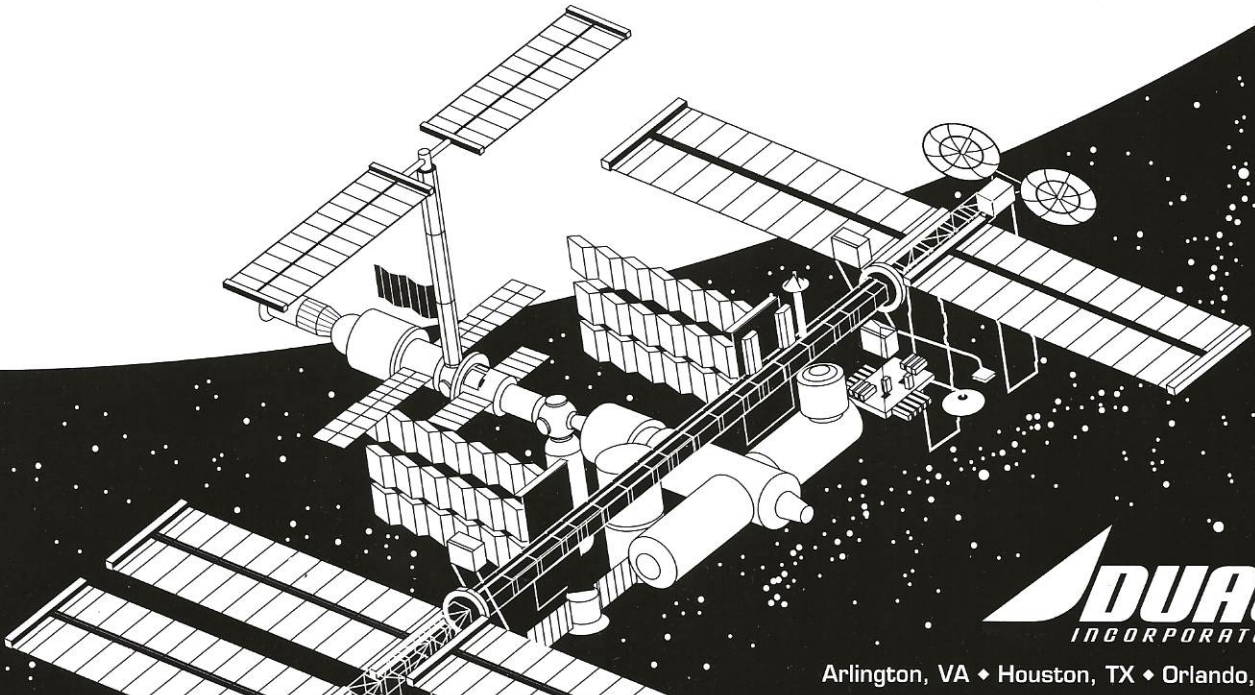
Chinchar's primary studio is located on Ellington Field in Houston's Clear Lake area.

Dynacs Engineering Congratulates  
**NASA Administrator Dan Goldin**  
 and  
 Salutes him for his continued support of  
 Small Minority Owned Firms in our Nation's  
 Space Program



**Dynacs**  
 ENGINEERING CO., INC.

## DUAL Incorporated congratulates NASA Administrator Daniel S. Goldin



**DUAL**  
 INCORPORATED

Arlington, VA ♦ Houston, TX ♦ Orlando, FL

# 1995 Rotary National Award for Space Achievement



The background is a dark space filled with stars. On the left, a satellite with solar panels is visible. In the bottom left, a portion of a space station is shown. In the bottom right, there are several large satellite dishes on a ground surface.

**Reception**

**Welcome**

*Charles H. Hartman  
Chairman, RNASA Foundation*

**Invocation**

*Jerome Bourgeois*

**National Anthem**

*Jerome Bourgeois  
Music by Kurland Street Band Combo*

**Dinner**

**Master of Ceremonies**

*Jim Hartz  
Chairman of the Board, Hartz/Meek International, Inc.*

**Featured Speaker**

*Edward "Pete" Aldridge  
President and Chief Executive Officer, The Aerospace Corporation*

**Presentation of the Stellar Awards**

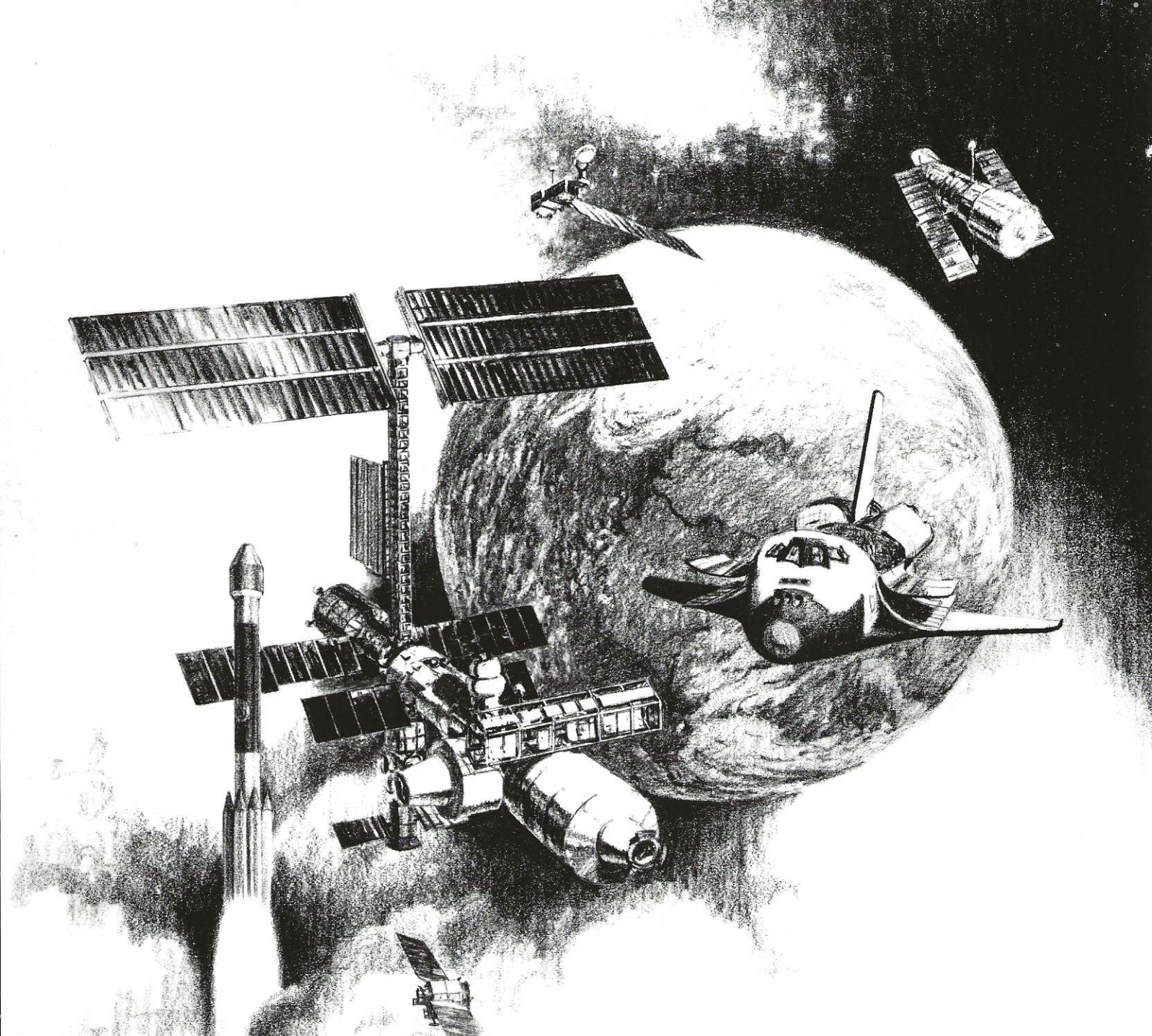
*Dr. Christopher Kraft  
Former Director, Johnson Space Center*

**Presentation of the National Space Trophy**

*Honorable Tom DeLay  
Majority Whip, United States House of Representatives*

**Closing**

*Charles H. Hartman*



**Congratulations Dan Goldin**

The vision to see beyond the far horizon

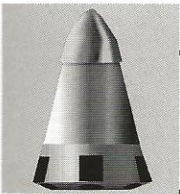
The vigilance to get us there

**TRW**

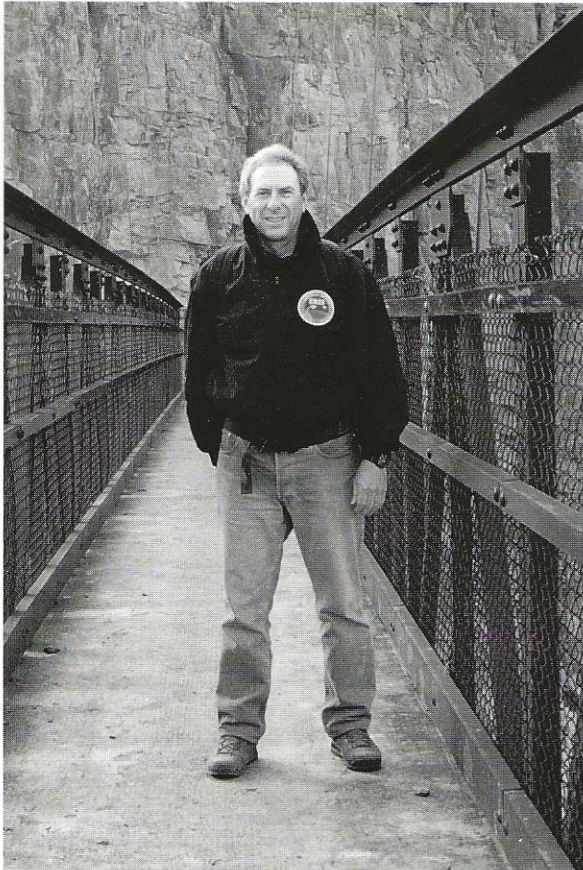
TRW Space & Electronics  
Group

© 1995 TRW Inc.





## ***THE NATIONAL SPACE TROPHY RECIPIENT*** ***continued***



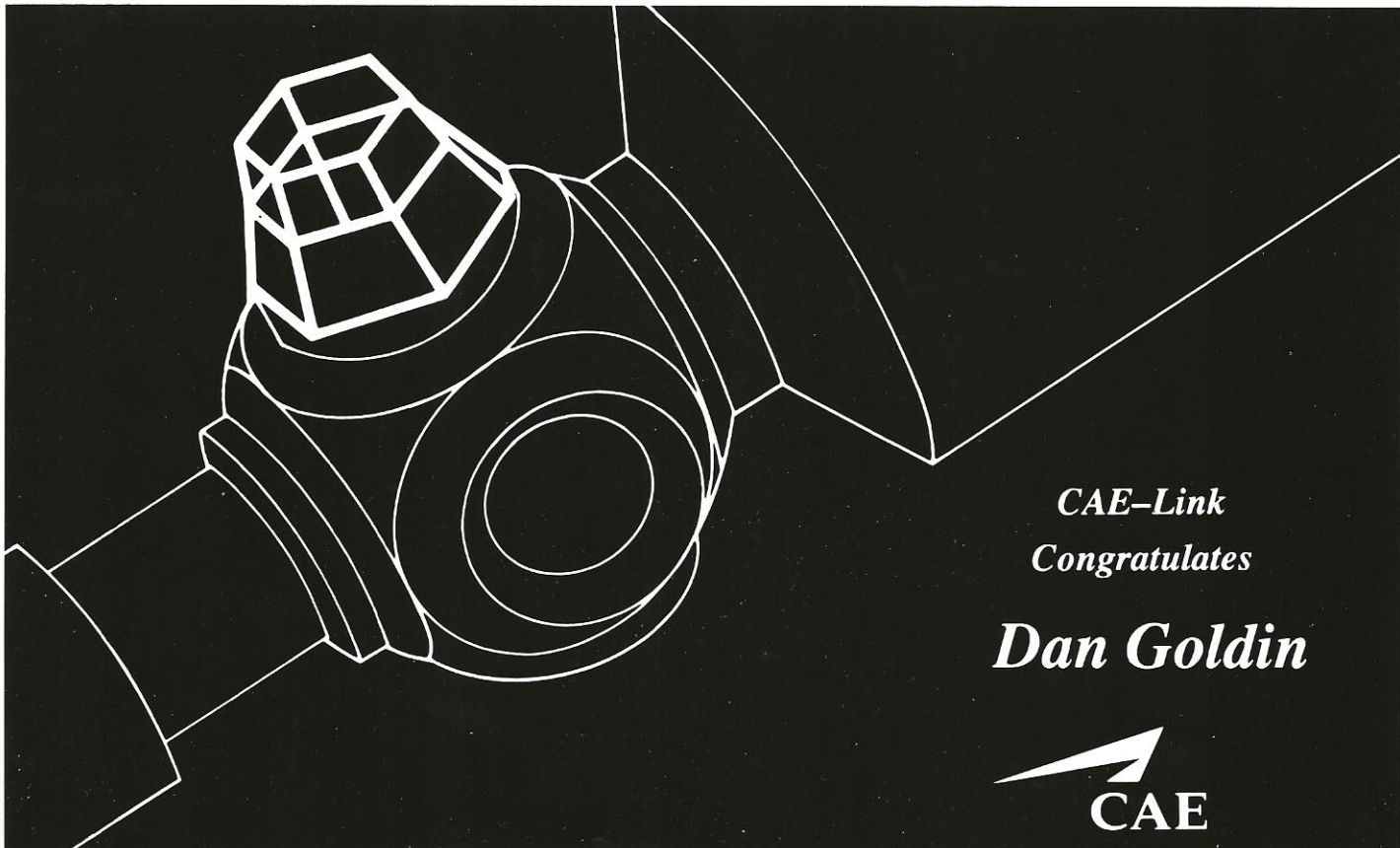
*Goldin, continued from page 1*

A few months later, with the improved design and the addition of Russia as a full partner, the project passed by a 123-vote margin, one of the most remarkable political turn-arounds in recent memory. The *Shuttle/Mir* Space Station precursor missions begin this spring.

Goldin also put in place a series of internal review teams to exhaustively prepare for the Space Shuttle mission in December 1993 to repair the Hubble Space Telescope. The repair work was a brilliant success. Within a few months in the Spring of 1994, the telescope provided the most convincing evidence yet of the existence of black holes and the formation of planets around distant stars.

For these accomplishments and his visionary leadership, the Board of Advisors of the Rotary National Award for Space Achievement Foundation is proud to present the 1995 National Space Trophy to Daniel S. Goldin.

***PHOTO:*** *Dan Goldin takes exploration personally in the Grand Canyon. Photo by his wife, Judith.*



**IT'S NO SECRET.** McDonnell Douglas launch vehicles have been setting the world's performance record for years. With its recent launch record, the Delta II is undeniably the most reliable expendable rocket in the world. And evolutionary upgrades guarantee that Delta remains the best choice.

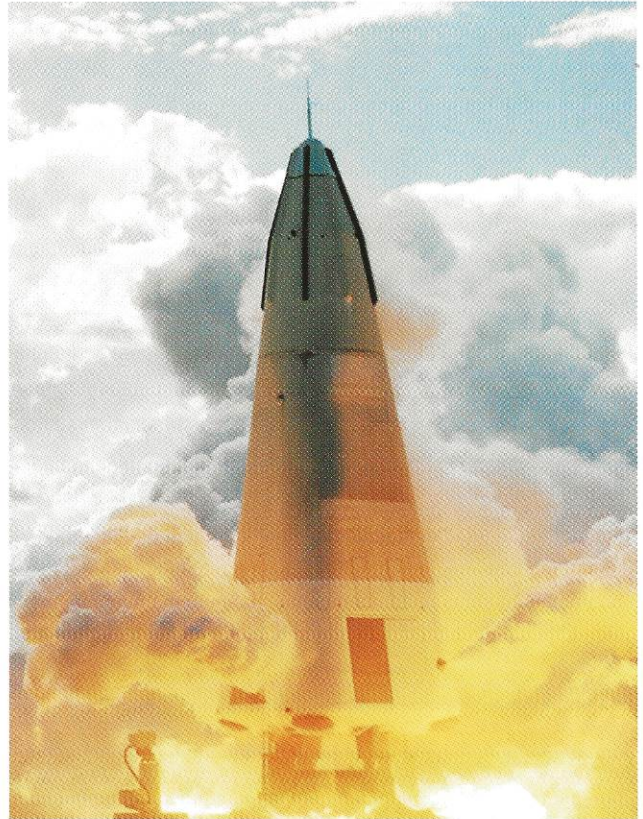
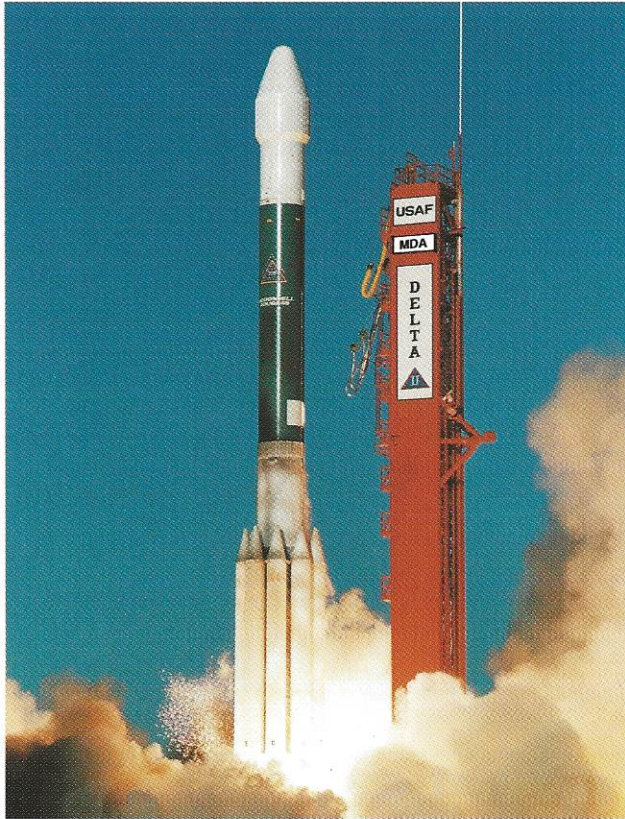
So, it's no surprise to see the newest Delta family

member making history of its own. The Delta Clipper-Experimental begins to confirm totally reusable space transportation. This visionary investment leads to reliable, low-cost flights to and from space.

Success isn't a new word to the Delta family. After all, the record shows we've made a habit of it.

**MCDONNELL DOUGLAS**

*Performance Above and Beyond.*



# NO SECRETS. NO SURPRISES. JUST SUCCESSES.



©1994 McDonnell Douglas Aerospace

**CONGRATULATIONS TO  
DAN GOLDIN AND TO THE  
DELTA CLIPPER TEAM**



## STELLAR AWARD FOR LAUNCH VEHICLE DEVELOPMENT



**Paul Klevatt**

The 1995 Stellar Award for Launch Vehicle Development is being presented to the Delta Clipper Experimental (DC-X) Single-Stage-Rocket-Technology (SSRT) team for their outstanding work in design, construction, and flight demonstration of a prototype reusable rocket.

The DC-X rocket had its genesis in an August 1990, \$12 million design competition called by the Strategic Defense Initiative, now the Ballistic Missile Defense Organization (BMDO). A number of aerospace companies competed in the study, but a year later, BMDO selected McDonnell Douglas's DC-X design as the most promising, and awarded them a \$60 million contract to build it. And that's just what they did, on budget in only two years.

McDonnell Douglas President, Gerald A. Johnston, at White Sands for the second test flight, said it was considered impossible to design and build a rocket that could do what conventional aircraft do: hover like a helicopter, fly laterally, extend landing gear, and land on its tail. But, he said, "We haven't run out of miracles in our business, not by a long shot."

Paul Klevatt, McDonnell Douglas's SSRT Program Manager, praised the many companies that came through on tight schedules with equipment that, in Klevatt's words, "worked perfectly the first time."

It took just three people to operate and fly the DC-X. McDonnell Douglas developed the operational systems which were housed in a trailer behind the bleachers at the White Sands, N.M. test site and also used for tests in California. "This represents a paradigm shift from traditional programs," Klevatt said, "where you have extensive and expensive test outfits at each location."

To save time and money, Klevatt said they also made use of existing equipment like actuators (motorized hinges that open doors and valves) from the Thor missile program and pressure bottles made for the *Challenger* that had been in storage for years. "My merry band of innovative thieves found out about these things," Klevatt said.

But when they needed to control motion inside the propellant tanks, it wasn't immediately obvious what to do. "You say that's not a big deal," Klevatt remarked at a press briefing. "You've seen that before on the Saturn program, and they do it all the time on the Shuttle — but we had to do it quick because those tanks had to be ready in 16 months." So they turned to a material familiar to many model builders, balsa wood. "We had an inch and a quarter of balsa wood internal to the hydrogen tank and got a membrane over it," Klevatt said with a smile. "Believe it or not, that holds the hydrogen real well, and it's very robust."

Perhaps the biggest breakthrough was in the software development. "Any of you familiar with software know it becomes the long pole in the schedule tent," Klevatt said. But the 65,000 lines of code for the DC-X were delivered ahead of schedule in only 13 months.

This was made possible by using Matrix-X, an algorithm toolbox that allows engineers to generate flight code by making selections on a pull-down menu. The DC-X was the first large vehicle to fly using

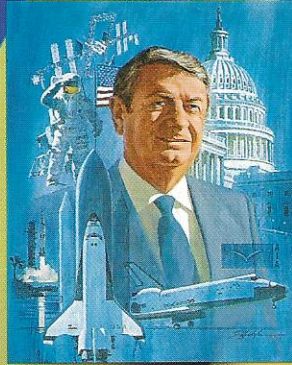
See *Delta Clipper*, page 19



# NATIONAL SPACE TROPHY WINNERS



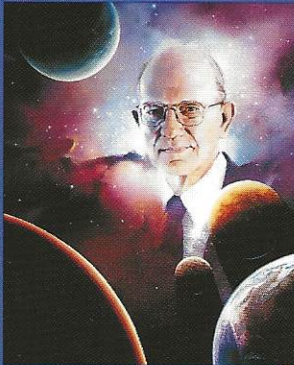
1987 Dr. Maxime Faget



1988 Don Fuqua



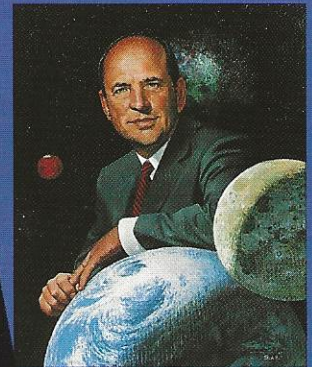
1989 V/Adm. Richard Truly, USN (Ret.)



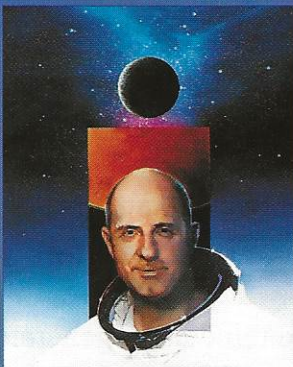
1990 Dr. Lew Allen



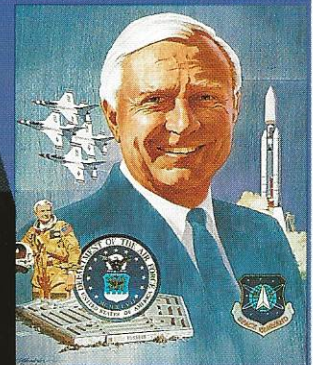
1991 Aaron Cohen



1992 Norman Augustine



1993 Lt./Gen. Thomas Stafford, USAF (Ret.)



1994 E. C. "Pete" Aldridge

Graphic Art by  
Elizabeth Griffiths Lawhead



## *STELLAR AWARD FOR LAUNCH VEHICLE DEVELOPMENT cont.*



*Delta Clipper, continued from page 17*

machine-generated code.

The DC-X completed three flight tests before the initial funding was exhausted in late 1993. The flight envelope had been expanded to subject the vehicle to increasingly higher altitudes, velocities, dynamic pressures, angles of attack, and flight durations. But perhaps even more importantly, the flights of the Buck Rogers' style rocket captured the public's attention and gave them hope that commercial spaceflight might become a reality within their lifetimes.

For several months, the DC-X program was put on hold while Congress reviewed launch vehicle needs and development strategies. In January 1994, while the debates continued, NASA provided almost a million dollars to maintain the DC-X vehicle and ground systems in a readiness state for future flight

testing. In May, McDonnell Douglas received funding from NASA and the Advanced Research Projects Agency to continue the program. On June 20, the DC-X completed a successful flight that lasted 136 seconds, reaching an altitude of 2, 850 feet.

But another test flight on June 27 was cut to only 78 seconds after an explosion of ground equipment at the launch pad ripped a gaping hole in the aeroshell and cracked the liquid hydrogen tank. Following the test, Lt. Col. Jess Sponable, SSRT program manager for BMDO stated, "This anomaly resulted in successful demonstration of several important firsts: executing the autoland sequence demonstrating an 'aircraft-like' abort mode; landing on the gypsum, demonstrating the ability to land future SSTO vehicles virtually anywhere; and demonstrating the system's toughness and robustness, since the DC-X continued to fly despite the aeroshell's damage." Klevatt added, "We are pleased the vehicle returned essentially intact, so that it can be repaired and flown again."

Beginning in April 1995, under an agreement with the NASA Marshall Space Flight Center, McDonnell Douglas will not only repair, but significantly upgrade the DC-X with new components to become the DC-XA. In late 1995, the DC-XA will be transported to White Sands Missile Range, N.M. for ground tests. Flight tests could begin as early as mid-1996.

The DC-X is considered the first step in this country's development of a single-stage-to-orbit space transportation system which promises to lower the cost to orbit and eventually provide public access to space. The Rotary National Award for Space Achievement Foundation salutes the Delta Clipper team's fine accomplishments.

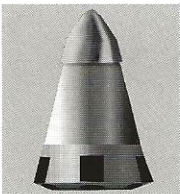
Mr. Paul L. Klevatt, the Director of the DC-X Program for McDonnell Douglas, is accepting the Stellar Award on behalf of the DC-X team.



HONORING DANIEL GOLDIN'S VISION OF  
EXPLORING SPACE AND OCEANEERING  
SPACE SYSTEM'S SUPPORT TO EACH  
SHUTTLE MISSION...



**THERMAL PROTECTION ● ASTRONAUT TOOLS ● ROBOTICS**



## STELLAR AWARD FOR SPACECRAFT DESIGN

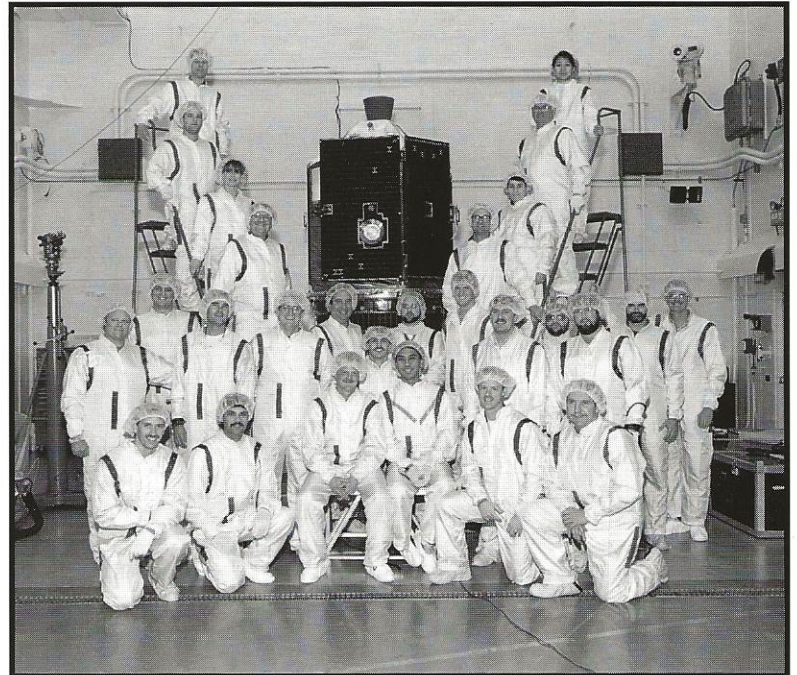


The 1995 Stellar Award for Spacecraft Design and Technology Application is being presented to the *Clementine* Project team for their work in demonstrating the capability to design, develop, and operate a successful and meaningful space mission at low cost.

According to Stuart Nozette, *Clementine* Deputy Mission Director, *Clementine* originated in a Washington, D.C. bar in September 1989. He was talking to Pete Worden (then on the White House National Space Council), and Geoff Tudor (a Congressional staffer). They were discussing NASA's Space Exploration Initiative over drinks, when *Clementine* emerged as a way to flight-qualify recently developed technology and, at the same time, demonstrate to the civilian community the great strides made by the DoD in lower-cost advanced space technology. Nozette outlined the concept on a bar napkin, and suggested the name as a way to discuss the concept. Soon after that, he joined the Lawrence Livermore National Laboratory (LLNL) to pursue the idea.

Meanwhile, NASA Administrator Richard Truly asked the DoD to consider a joint NASA/DoD mission to achieve goals mutually beneficial to both organizations. The Strategic Defense Initiative Organization, now the Ballistic Missile Defense Organization (BMDO), investigated that request. A mission was conceived to test space-based imaging components for the next generation of DoD spacecraft. Using the Moon as a target, *Clementine* would also fulfill a secondary objective, to return valuable new images of the lunar surface.

In January 1992, BMDO selected the Naval Research Laboratory (NRL) to begin a concept study to implement the *Clementine* mission. BMDO and NRL then selected a camera suite from the LLNL and worked out the details of tracking support with NASA's Deep Space Network. NASA provided a science team to help select camera filters of interest to the planetary science community.



Some of the NRL *Clementine* team members pose with the spacecraft in December, 1994.

NRL Photo 94-000082(25)

In March 1992, NRL accepted BMDO's challenge to design, build, test, and fly a satellite for only \$80 million dollars (which included the cost of a Titan II rocket and was only one-fifth the cost of similar programs,) in less than two years -- half the usual time for a project like this.

By December 1992, BMDO, NRL, and LLNL had selected the best available components and technical support from the United States aerospace industry. One piece of hardware was provided by the French Space Agency, CNES. Spacecraft assem

*Continued next page*

**Congratulations Dan Goldin**  
from the world's premiere space  
showcase, Space Center Houston.  
Don't miss the award winning  
"Moonglow: The Clementine  
Collection" currently on exhibit.

**SPACE CENTER**  
HOUSTON



# STELLAR AWARD FOR SPACECRAFT DESIGN

## continued



bly began in May 1993 and was completed by early September.

Late one November evening while *Clementine* was being prepared for testing, a small group of NRL engineers and technicians ordered dinner from a nearby Chinese restaurant. After a well deserved but brief dinner break, Bob Bauldauff, an NRL thermal engineer, opened his fortune cookie to read, "You will soon take a very pleasant and successful trip."

Knowing a vacation was not in his immediate future because of the demands of *Clementine* schedule, Bauldauff decided the prediction was for the spacecraft itself. The words were taped to the spacecraft handling dolly, where they remained for the rest of the spacecraft processing, both at NRL in D.C., and Vandenburg Air Force Base in California. Prior to stacking the spacecraft atop the

Titan II launch vehicle, the words were carefully transferred to the spacecraft, where they remain today.

System level testing was completed near the end of December, and *Clementine* was shipped to Vandenburg on December 30, 1993 to prepare for launch. Some of the NRL *Clementine* team managers and members posed for a "family photo" with the spacecraft on that memorable day. [See photo page 20.] They had put together a sophisticated spacecraft in an astonishingly short period of time.

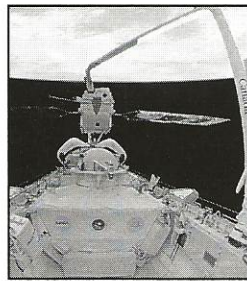
*Clementine* was launched on January 25, 1994, as planned two years before. A few weeks later, it was placed in lunar orbit. By May 3, 1994, *Clementine* had transmitted more than 1.8 million photographs back to Earth, including images of the never-before-photographed lunar south pole which may harbor a source of water for future explorers.

*Clementine* demonstrated the capability of the national laboratories, working in conjunction with the DoD, NASA, industry, and international space organizations, to integrate, execute, and operate low-cost, high-value space exploration missions. The dedicated professionals of the *Clementine* team worked many long days and nights to meet the mission objectives while staying on cost and on schedule, proving that the U.S. can still achieve great things in space.

The Rotary National Award for Space Achievement Foundation salutes the dedication and innovation of the *Clementine* team which led directly to their successful mission. [Article data provided by NRL.]

Mr. Peter G. Wilhelm, Director of the Naval Center for Space Technology, Naval Research Laboratory, is accepting the Stellar Award on behalf of the *Clementine* team: Mr. Paul Regeon, Program Manager; Dr. Donald Horan, Chief Scientist & Flight Operations Director; Mr. Mark Johnson, Electrical Systems Manager; Mr. Peter Lynn, Mechanical Systems Manager; Ms. Patricia Klein, Ground Systems Manager; Mr. H. Charles Merk, Launch Vehicle Integration Manager; Mr. Charles Wilderman, Software Systems Manager. Congratulations to all.

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The Space Center Rotary Club of Houston has always enjoyed a close association with the space program. In 1985, the club established the nonprofit Rotary National Award for Space Achievement Foundation to oversee the administration of an annual awards event to recognize outstanding achievements in space while creating greater public awareness of the benefits of space exploration.

The Foundation enlisted Stueben Glass to create the National Space Trophy (page 2), which was first awarded in March 1987, and selects a noted space artist each year to paint an original portrait (cover) of the award recipient. The Trophy is presented annually to a United States citizen who has made a preeminent contribution to the advancement of America's space program in a space-related field such as research, development, operations, management, program administration, or legislation.

Aerospace corporations, government agencies, professional organizations, and individuals submit nominations for the award. A ballot of finalists is voted upon by the Foundation's National Board of Advisors (page 25), a group of leaders intimately involved in the U.S. space program. The confidential votes of the Advisors are tabulated by an independent accounting firm.

The Foundation's Board of Directors organize and coordinate the event honoring the individual chosen to receive the National Space Trophy. Based on recommendations from the Board of Advisors and others, the Directors also select individuals or groups for recognition via special awards such as this year's two Stellar Awards. The first four Stellar Awards were presented in 1989. Four awards were also given in 1990, 1991, and 1993. The Stellar Awards include a distinctive glass trophy and a certificate of recognition for significant contributions to the nation's space program.

The Foundation is grateful for the enthusiasm and support it has received from the Aerospace Industry, NASA, and the Department of Defense. This support assures the continued recognition of outstanding achievements by United States citizens in the area of space exploration.

# Rotary National Award for Space Achievement

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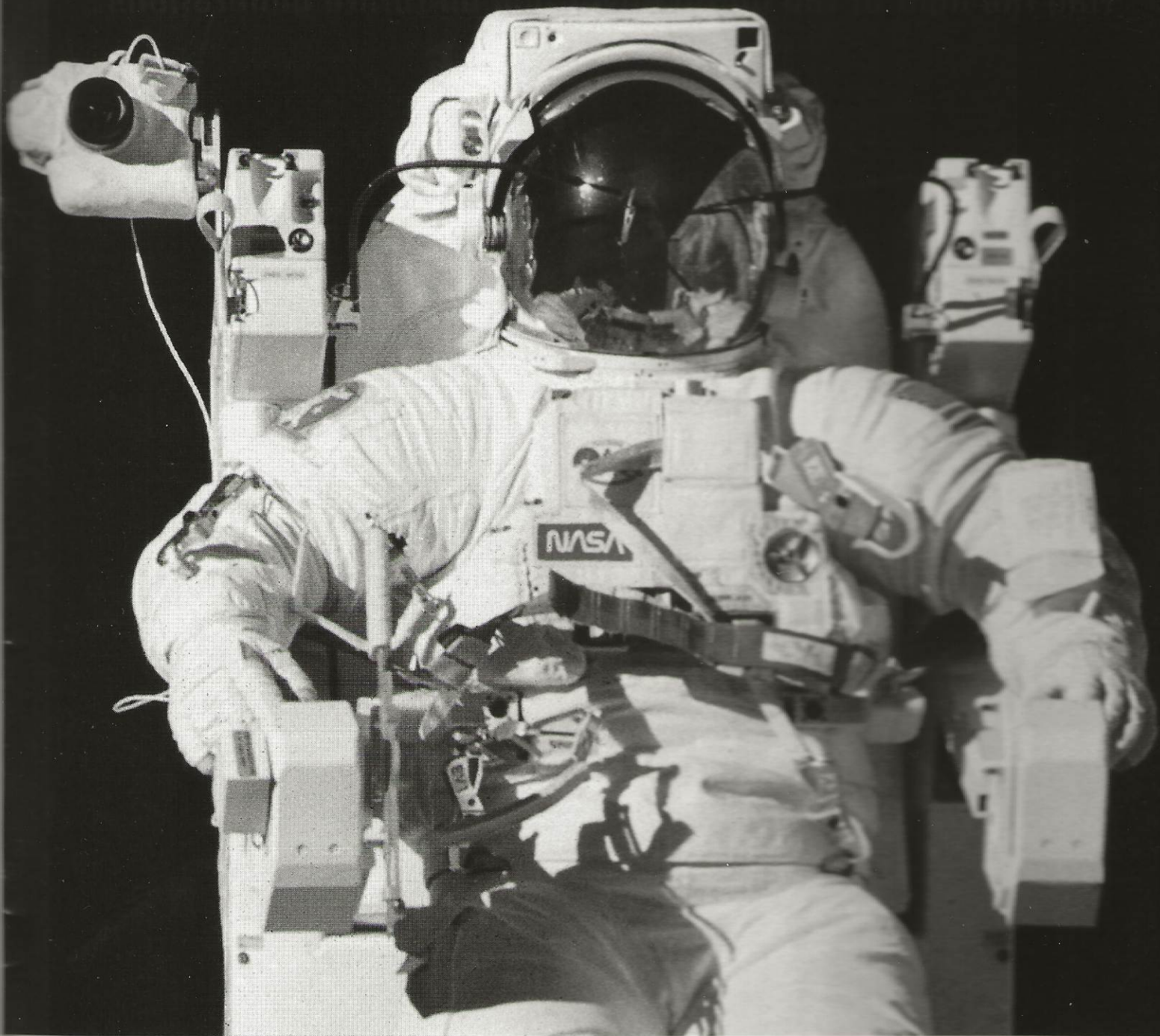
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*Background Photo (upside down) of Venus and the Earthlit Moon, April 1, 1994, as captured by the Clementine startracker.*

Program Book Text & Layout  
by Marianne J. Dyson



*"...there is more to life than TV,  
video games and football. That is not  
what life is about. Life is about  
exploring the unknown and  
understanding things."*

Dan Goldin

**BOEING**

**May the light of the world never dim on future generations.**



Using technology for a better world is the goal of Hughes Space and Communications Company. Working with NASA, Hughes has explored the planets. Now, through the Earth Observing System, NASA is turning its focus on our own planet. Hughes is ready to work with NASA on this most challenging mission, which will give children of the 21st century a brighter future.

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