

MINDing business

Boeing honors its top innovators, whose ideas are crucial to the company's long-term success

By Cindy Naucler Glickert

At this very moment, people in Boeing are working on the latest breakthroughs in science and finding new ways to replicate previous ideas. These innovative thinkers are supporting the company's growth, productivity and long-term success with new ideas that sharpen Boeing's competitive edge.

Each year, Boeing honors its top innovators. At the 2009 Boeing Special Invention Awards and Technical Replication Awards regional ceremonies, held in September and October, 93 employees were honored for their recently patented inventions or innovative replications of previous inventions.

"Each of these innovators truly represents the best in striving to find new ways, chart new courses and inspire others," said Martha Ries, Intellectual Property Management vice president. This organization sponsors the annual Special Invention Awards program and is responsible for teaming with employees to identify, protect and leverage the company's intellectual property. "These inventions enhance Boeing's product performance, improve productivity, increase safety, reduce costs and enable new business opportunities," Ries said.

This year marked the debut of the Technical Replication Awards. This honor recognizes Boeing inventors for replicating the most successful innovations and implementing them on other programs—which drives product and process improvements.

"It takes both the technical invention and the understanding of common requirements to replicate a solution," said Amy Buhrig, director of the Boeing Enterprise Technology Strategy and executive sponsor of the Technical Replication Awards. "The efforts of these technical replicators to collaborate and inspire others bolsters our competitive advantage." ■

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Meet some of Boeing's top innovators in the following pages.

2009 honorees and their innovations

NORTHWEST REGION

SPECIAL INVENTION AWARDS

David L. Allen, Edward J. Porisch, Mary Ann T. Nakasone, Bruce K. Pollock and Kent Loving: *Multi-Network Aircraft Communication Systems and Methods*

David W. Massy-Greene, Hai Nguyen and John B. Sims: *Method and Apparatus for Loading Software Aircraft Parts*

James T. Farricker, Garry G. Herzberg, Paul S. Stout and Joshua A. Taylor: *Router for Establishing Connectivity Between a Client Device and On-Board Systems of an Airplane*

Kevin S. Callahan, Trevor M. Laib and Bradley J. Mitchell: *Cut to Fit Powered Seat Track Cover*

James N. Buttrick Jr., Roger A. Gage, Darrell D. Jones and Theodore M. Boyd-Davis: *Methods and Apparatus for Track Members Having a Neutral-Axis Rack*

David F. Topping: *Linked Aircraft Reliability and Solution Analysis System and Method*

David S. Kinney, John B. Maggiore, James L. Millar and Sean A. Newsum: *Method and Apparatus for Obtaining Vehicle Data*

Lawrence S. Baum, Molly L. Boose and John H. Boose: *Intelligent Graphics Plug Map System and Method of Use*

Timothy Aldrich: *The Security Monitoring Infrastructure System; Method and Systems for Anomaly Detection Using Internet Protocol Traffic Conversion Data*

Richard H. Bossi, Gary E. Georgeson, Hong H. Tat, Michael D. Fogarty and Stanley W. Richardson: *Hybrid Inspection System and Method Employing Both Air-Coupled and Liquid-Coupled Transducers*

James R. Underbrink: *System and Method for Adaptable Aperture Planar Phased Array*

Michael D. Fogarty, Gary E. Georgeson, Lyle R. Deobald and Daniel J. Wright: *System and Method for In-Situ Monitoring of Composite Materials*

Norman J. Englund and John S. Finigan: *Compliant Coupling Force Control System*

Kevin E. Clark, Richard K. Johnson, Jon P. Michel and Michael L. Gilbertson: *Clamp for Securing an Object to a Structure*

TECHNICAL REPLICATION AWARDS

James N. Buttrick Jr., Todd M. Harris, Barry Faulkner and Edward E. Feikert: *Flex Track Drilling Applications*

Arlene Brown, Russell J. Heeter, James T. Iwamoto and Diane L. Heidlebaugh: *Lightweight Expanded Aluminum Foil*

MIDWEST REGION

SPECIAL INVENTION AWARDS

Steven J. Miener and Kevin L. Brown: *Illuminated Optical Inspection Prism Apparatus*

Christopher S. Huskamp: *Method and Apparatus for Direct Manufacturing Temperature Control*

Peter A. Derenski and Kevin Julian Chang: *Aerial Refueling Receptacle Raised Fairing Marking*

Dennis K. McCarthy and Daniel D. Wilke: *Automated Damage Assessment, Report, and Disposition*

Charles E. Goodman and William B. Hayes: *Methods and Apparatus for Analyzing Flutter Test Data Using Damped Sine Curve Fitting; Method and Apparatus for Evaluating Data Representing a Plurality of Excitations of Sensors*

Thomas A. Zientek: *Uploaded Lift Offset Rotor System for a Helicopter*

Brian D. Laughlin: *MIN/MAZ Inventory Control System and Associated Method and Computer Program Product*

TECHNICAL REPLICATION AWARDS

Jeffrey A. Johnson, Michael J. Moss, Kathryn R. Flaspohler, Dan Harrington, Lorne M. Mitchell, Andrew W. Krisby, Brian W. Fuesz, Darrell R. Bearce and Erik N. Auger: *Analytic Framework for Network Enabled Systems*

Edward E. Feikert, (and honored in Northwest Region awards: James N. Buttrick Jr., Todd M. Harris and Barry Faulkner): *Flex Track Drilling Applications*

SOUTHWEST

SPECIAL INVENTION AWARDS

Kevin Julian Chang (and honored in the Midwest Region awards: Peter A. Derenski): *Aerial Refueling Receptacle Raised Fairing Marking*

Roger W. Clark, David J. Manley, Arvin Shmilovich and Yoram Yadlin: *System for Aerodynamic Flows and Associated Method, and the Lift Augmentation System and Associated Method*

Eric T. Burke, Michael E. Haws and Scott Kiefer: *System Diagnostic Utility*

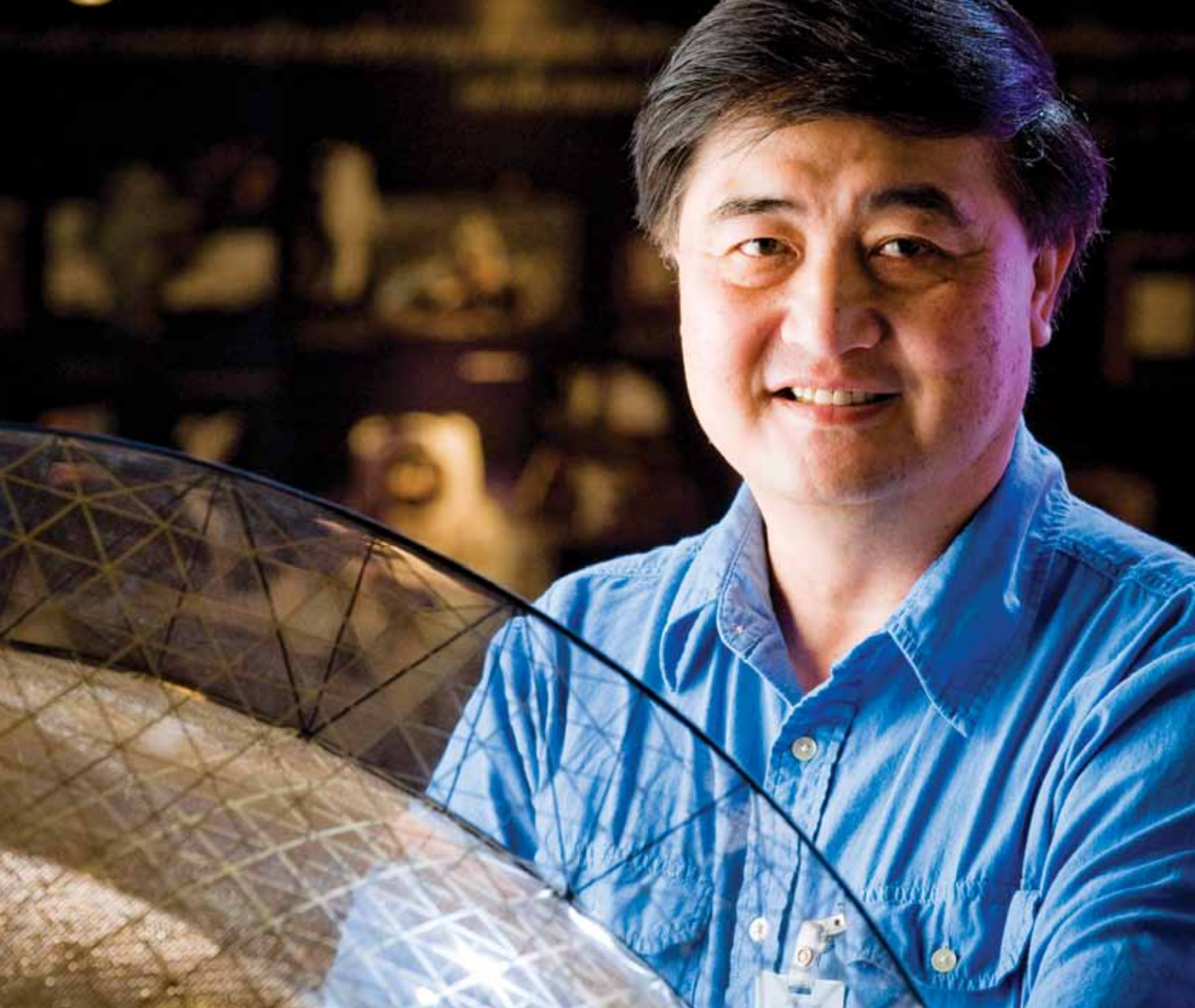
Che-Hang Charles Ih: *Dynamic Modeling Technique for the Deployment of Large Satellite Antennas*

Steven G. Keener and Cesare Peralta: *Hybrid Fastening System and Associated Method of Fastening*

Jeffrey H. Hunt and Tom Gylys: *Wavefront Correct System, Fiber Gain Medium and Method of Coupling Pump Energy into the Same, and High Speed Beam Steering/Field of View Adjustment*

TECHNICAL REPLICATION AWARD

Gordon E. Letney, Joseph E. Catlin, Herbert H. Kempin, Kerry Hu, Michael A. Cooper, Dave A. White and Timothy M. Force: *LabNet*



Meet the innovator: **Charles Ih**

One of the most vexing challenges in deploying satellites with large antennas is predicting the attitude control performance during antenna deployment once the spacecraft reaches higher Earth orbit. It's impossible to test on the ground. That's why Charles Ih's invention, Dynamic Modeling Technique for Deployment of Large Satellite Antennas, is considered a breakthrough. Ih's invention produces computer-generated high-fidelity models that let engineers precisely predict the performance of a satellite's antenna deployment.

"We used the high-fidelity modeling technique to predict the attitude controller performance before launching the Thuraya D1 satellite, which has a huge L-band antenna, and it was a tremendous success," said Ih, an Integrated Defense Systems Associate Technical Fellow for Space & Intelligence Systems, who is based

in El Segundo, Calif. "Since then, this technology has become a gold standard for modeling the deployment of future, similar Boeing spacecraft because it can be generated quickly and accurately."

Ih's work has had far-reaching impacts on winning and executing subsequent satellite contracts as well as enhancing Boeing's leadership in this competitive industry. He was one of six innovators in the Southwest Region to win the 2009 Special Invention Award. PHOTO: PAUL PINNER/BOEING



Meet the innovator: **James Buttrick**

James Buttrick is the first to point out that many people helped him design the Flex Track Drill. But Buttrick, a Commercial Airplanes Technical Fellow with Materials & Processes Technology in Everett, Wash., led a team in replicating the technology. The device, which has improved safety and quality while saving time and costs, is a portable, automated machine for precisely drilling contoured and flat surfaces of large aircraft structures.

The drill, about the size of a microwave oven, travels on flexible interlocking rails, which are vacuum-attached to the aircraft and can wrap around a fuselage, run across a wing, or traverse contoured aircraft sections. Used first for building parts for the F-15 jet fighter, it has since been replicated for use on 787 Dreamliner wing assembly and vertical fin. It is being developed for implementation on the 777 fuselage.

Key to making the replication a success, he said, was having people such as Mike Vander Wel, who leads the Enterprise Technology Strategy's Manufacturing domain, recognize the technology would bear fruit and support its funding. "Also important was having people who sweat the details—the engineers, programmers and machinists. The replication award is really an acknowledgment of those who made the system a success," Buttrick said.

The Flex Track Drill has resulted in several patents, and the technology has been licensed for sale outside of Boeing, which generates royalties for the company. It was selected as one of four Boeing 2009 Technical Replication Awards. PHOTO: ED TURNER/BOEING

And the winners are...

Dozens of Boeing employees are recognized every year by external technical affiliations for their achievements and contributions to science, technology, engineering and math. Here are those recognized in 2009.

AMERICAN HELICOPTER SOCIETY

Howard Hughes Award: The Smart Materials Actuated Rotor Technology Team, including Ram Janakiram and Friedrich Straub

Paul E. Haueter Award: Philip Dunford

Harry T. Jensen Award: The Army/Industry Apache Health Monitoring Team, including Hieu Ngo and Perumal Shanthakumaran

Robert L. Lichten Award: Laura Buck

Francois-Xavier Bagnoud Award: Andrew Elliot Augenstein

AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS

Distinguished Service Award: David Knowlen

Fellows: Kevin Bowcutt, Dale Pitt and John Vassberg

Associate Fellows: Kenneth H. Landis, Darby G. Cooper, Michael T. Kezirian, Joseph S. Brinker, Richard Y. Chiang, Marty K. Bradley, Michael L. Drake, Stanley D. Ferguson, Paul M. Vijgen

Technology Pioneer Award: Airborne Laser System Development Team

Network/Information Technology Award (for Philadelphia section): V-22 Network Centric Operations Team

Sustained Service Award: Vera Martinovich

Mechanics and Control of Flight Award: Eugene Lavretsky

Space Operations and Support Award: Tracking Data and Relay Satellite-I Recovery Team

AMERICAN SOCIETY FOR ENGINEERING EDUCATION

Conference for Industry and Education Best Moderator: Terri Morse

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

Computers and Information in Engineering Leadership Award: Rod Dreisbach

Old Guard Early Career Award: Kalan Guiley

AMERICAN SOCIETY FOR TESTING AND MATERIALS

W.T. Cavanaugh Memorial Award: Laura Hitchcock

ASIAN AMERICAN ENGINEER OF THE YEAR

Asian American Engineer of the Year Award: Jae H. Kim, Thomas T. Bui, Jayant D. Patel

ASM INTERNATIONAL—THE MATERIALS INFORMATION SOCIETY

Gold Medal for the Advancement of Research: James McNerney

ASSOCIATION OF OLD CROWS MARINE CORPS OUTSTANDING UNIT AWARD

Program Manager Award: Michael K. Gibbons

BLACK ENGINEER OF THE YEAR AWARDS

Stars and Stripes Award: Leo A. Brooks

Career Achievement in Industry Award: Jim Wigfall

Modern Day Technology Leaders Award: Jamie Haynes, Delano Lewis, Obinna Orjih, Jerry F. Turley

CAREER COMMUNICATIONS

Most Important Blacks in Technology: Joan Robinson-Berry and Jim Wigfall

HISPANIC ENGINEER NATIONAL ACHIEVEMENT AWARDS CONFERENCE

Hall of Fame Inductee: John J. Tracy

The Chairman's Award: Alejandro (Alex) M. Lopez

Community Service: Mina Martinez

Luminary Award: Valerie Perez, Erika Sanchez

Role Models of the Week: Alfredo Rodriguez, Randy Lander

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS

Presidents Special Citation Award (for commitment to promoting diversity in the technical work force, in partnership with IEEE): Boeing

Outstanding Large Company Award (Region 5): Boeing

INSTITUTE OF INDUSTRIAL ENGINEERS

UPS Minority Advancement Award: Majid Abab

Engineering Educator of the Year Award (Puget Sound): Steve Snelling

NATIONAL ORGANIZATION OF GAY AND LESBIAN SCIENTISTS AND TECHNICAL PROFESSIONALS

Engineer Award: Anthony J. Gingiss

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Engineer of the Year Award (Missouri): Stephen A. Hutti

Outstanding Engineering Achievement (Pennsylvania): Philadelphia Wind Tunnel Modernization

ORGANIZATION OF CHINESE AMERICANS

Honoree: Gordon Keh

SAE INTERNATIONAL

Engineering Aerospace Leadership Award: John Tracy

Aerospace Chair Award: Sanford Fleishman, June Ogawa, David Amirehteshami

Franklin W. Kolk Air Transportation Progress Award: Sham S. Hariram, Sharanpal (Paul) Sikand

Marvin Whitlock Award: Sham S. Hariram

Forest R. McFarland Award: David Amirehteshami, Clayton Monk

Technical Standards Board Outstanding Contribution Award: Edward Bayne

SOCIETY OF LOGISTICS ENGINEERS

President's Award for Merit: Harry Fanning II

SOCIETY OF WOMEN ENGINEERS

SWE Achievement Award: Aslaug Haraldsdottir

SWE Fellow: Sandra Postel (retired)

Young Engineer of the Year Award (Puget Sound): Kelly Griswold

WOMEN OF COLOR IN TECHNOLOGY

Technologist of the Year Award: Norma Clayton

Professional Achievement Award: Susan Ying

Managerial Leadership Award: Nancy-Kim Yun

Technology All-Stars: Christina Chiu, Grace Jiang, Wanda Robinson, Yun-Ho Sikora, Renita Young

Technology Rising Stars: Madeline Augustin, Anjali Mehra



Meet the innovator: **Molly Boose**

It may be easier to find a needle in a haystack than to navigate an aircraft's electrical system, which can include miles of wiring and thousands of connectors and plugs. That's why Molly Boose and her co-inventors came up with the Intelligent Graphics Plug Map.

"The invention is a software system that uses pattern recognition to automatically understand the pin layout," said Boose, a Technical Fellow with Boeing Research & Technology in Seattle. A technician can easily retrieve information on the proper way to repair wires or fix a broken pin in a plug.

The IG Plug Map can process hundreds of diagrams within minutes, which if done manually would take hundreds of hours. It improves a technician's ability to troubleshoot an electrical problem, saves maintenance time, reduces costs and ultimately improves safety.

"Many problems can be overwhelmingly complex and people may tell you 'it can't be done,'" Boose said. "But I believe if you face a problem by envisioning the solution, you'll find a way.

"Over the past decade, we've submitted 16 intelligent graphics inventions and each time the Intellectual Property Management organization has guided us through the process—coaching us on writing disclosures, instructing us on patent protection rules and even defending several of our patents," she said.

The IG Plug Map is one of 14 inventions in the Northwest Region to receive the Special Invention Award. **PHOTO: ALAN MARTS/BOEING**



Meet the innovator: **Pete Derenski**

As a former U.S. Air Force pilot with more than 5,000 hours of flying, Pete Derenski knows firsthand the challenges of refueling in flight. It's hard enough to line up two airplanes 30 to 40 feet (9 to 12 meters) apart while they're traveling at 400 miles per hour (645 kilometers per hour). But at night?

"So when Julian Chang, my good friend and co-inventor, said there had to be a way to improve an operator's ability to see during nighttime missions, I knew he was onto something," said Derenski, a Boeing Research & Technology Technical Fellow with Human Systems Integration in St. Louis.

Together with Chang, an Integrated Defense Systems C-17 Electrical Systems and Lighting engineer in Long Beach, Calif., Derenski invented the Aerial Refueling Receptacle Raised Fairing Marking Design. The patent-pending invention is a design of lines

painted on an aircraft's raised aerial refueling receptacle that improves a tanker boom operator's depth perception and visual cues during nighttime refueling missions. "We used visual illusions to fool the eye into seeing more of something that was already there," Derenski said.

The invention is one of seven Special Invention Award winners in the Midwest Region. PHOTO: RICHARD RAU/BOEING



Meet the innovators: **Steve Keener and Nick Peralta**

After learning of ergonomics risks associated with repetitively applying the right amount of torque to nuts and bolts, Steve Keener (right) and Cesare “Nick” Peralta made sure the new fastening system they were designing would create a safer work environment for Boeing mechanics. Their invention, the Hybrid Fastening System and Associated Method of Fastening, has helped improve employee safety, strengthened the quality of the fastening work, and greatly reduced costs.

“Our initial objective was just to create a better overall fastening process,” Keener said. “But as we learned of the repetitive-motion problems, a key emphasis became designing a system that would help reduce the risk of repetitive-motion injuries.”

Keener, a Technical Fellow with Boeing Research & Technology in Huntington Beach, Calif., teamed with Peralta, an Integrated Defense Systems C-17 Manufacturing Engineering project

manager in Long Beach, Calif., to invent the system. It won a 2009 Special Invention Award in the Southwest Region.

According to Peralta, the duo strengthened the fasteners by designing a hybrid system that uses a relatively new titanium alloy combined with Boeing’s patented pre-coating process, which enables a higher level of automation. The new hybrid system reduces assembly, repair and rework costs, compared to current threaded-nut installations. Through this system, “The mechanic no longer has to manually torque and re-torque nuts, avoiding injury from repetitive motions,” said Peralta.

The system is being implemented on the C-17. It’s also been adapted for use on the CH-47 and V-22 Osprey helicopter programs. “Now we’re looking for other programs that can benefit,” said Keener, “as well as a potential future technical replication award.” PHOTO: GAIL HANUSA/BOEING