Commercial Space Transportation Advisory Committee
October 19, 2000
MEETING MINUTES

COMSTAC Chair, Livingston Holder, convened the meeting at 8:16 a.m., and welcomed COMSTAC members and guests. He began the meeting by recognizing the work of Mike Izzo on the May 2000 Commercial Geostationary Launch Demand Model, noting that Mr. Izzo had left Lockheed Martin during the summer to take a new position. Chairman Holder also welcomed and recognized the work of Henry Minami, (The Boeing Company), who has served as the secretary for the Technology and Innovation Working Group for several years and who has made a significant contribution to the annual Commercial Spacecraft Mission Model. Chairman Holder then introduced the first speaker, Joseph Hawkins, Deputy Associate Administrator for Commercial Space Transportation, who reported on the activities of the Federal Aviation Administration's (FAA) Associate Administrator for Commercial Space Transportation (AST).

Report on AST Activities

Mr. Hawkins reported on the increase of AST's budget for FY 2001 from 6.8 million dollars to 12 million dollars. He also introduced Ms. Laura Rine, recently hired as an aeronautical engineer in AST's Licensing and Safety Division. He then discussed the milestones for several commercial space transportation regulations which have occurred recently, including:

- The publication of two final regulations on September 19, 2000: ***Commercial Space Transportation Reusable Launch Vehicle and Reentry Licensing Regulations*** and ***Financial Responsibility Requirements for Licensed Reentry Activities***; and

- The imminent publication of the ***Final Rule on Licensing and Safety Requirements for Operation of a Launch Site***[1] and the Notice of Proposed Rulemaking on Licensing and Safety Requirements for Commercial Launches.

Mr. Hawkins reported that there were 12 licensed launches for FY 2000, down from 17 in the last fiscal year, primarily due to a number of launch failures and the failure of LEO communication systems to perform as expected in the world market.

Commercial Launch Legislative Update

Jean Toal Eisen, Professional Staff Member, Senate Committee on Commerce, Science, and Transportation, provided the legislative update to the Committee, reporting that HR 2607, the Commercial Space Competitiveness Act, was sent to the President and that it included an extension to the year 2004 for commercial launch indemnification. She also reported that the NASA Authorization Bill had been passed for the first time since FY93, and that the Veterans Administration/Housing and Urban Development Appropriations Bill would soon pass and would provide funding for the Space Launch Initiative.

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[1] Final Rule: ***Licensing and Safety Requirements for Operation of a Launch Site***, published on October 19, 2000.

COMSTAC member, Steve Flajser inquired about the legislation introduced by Senator Breaux and whether Congress was looking at other financial support initiatives. Ms. Toal Eisen reported that such initiatives would occur when all parties agree that they are a good idea. Chairman Holder asked who she thought would be the new champions for space activities. She believed that Senator Graham of Florida and Senator Breaux of Louisiana would be in the forefront and that other space leaders would probably be Senators McCain (Arizona), Frist (Tennessee), Burns (Montana), and Stevens (Alaska).

Defense Science Board Task Force Study

Edward "Pete" Aldridge, President and Chief Executive Officer of The Aerospace Corporation, reported on the final results of the Defense Science Board Task Force Study. He noted that it was directed by the Department of Defense in the FY 2000 Defense Authorization Bill to assess the military, civil, and commercial space launch requirements, to examine technical shortcomings at the ranges, to evaluate current and future oversight and range safety arrangements, and to estimate future funding requirements. He said that, although the scope of the study was limited to the Air Force ranges at Cape Canaveral and Vandenberg, the study results would be applicable to any national range. He noted that the Task Force took advantage of the studies recently completed or in progress, including reports by the Range Integrated Product Team and the Space Lift Task Force, the Air Force Space Launch Broad Area Review, the National Launch Capabilities Study, the White House Interagency Review on the Future Management and Uses of U. S. Space Launch Bases and Ranges, the National Research Council's Streamlining Space Launch Range Safety Study, and four others.

Mr. Aldridge discussed the three major contributions of the study:

1) The vision for how the ranges should look and operate in the future:
- A public/private partnership;
- A fee for all users including government;
- Space-centric technology concept;
- Lower operating costs; and
- Contractor-provided launch services after EELV becomes operational.

2) The recommendation for improved management at the ranges:
- Secretary of the Air Force-- responsible for all range operations;
- Assistant Secretary for Space-- responsible for day to day operations, policy issues and interfacing with other government agencies and the commercial sector; and
- Air Force Space Command-- ownership of the range and responsible for running the range.

3) The recommendation for the development of the "National Space Launch Ranges Act"
- Eliminates out of date legislation; and
- Codifies the vision.

Mr. Aldridge reported that the study projected approximately 600 million dollars as the cost for operations at Vandenberg and Cape Canaveral over the next 8 years, noting that this amount included Range Standardization and Automation activities but no other modernization. He reported that the study results indicated that the government would continue to be a prominent player at the ranges, that the commercial and government sectors would be equal partners, and stressed the need for flexibility at the ranges, more so than capacity, so that the ranges could accommodate the uncertainties that are characteristics of space launch activities.

Mr. Aldridge discussed briefly future operations for Lockheed Martin's Space Launch Complex (SLC) 41 and Boeing's SLC 37, indicating the contractor-provided services for EELV operations. He also discussed the similarities of the National Highway System and the National Airport System to the national ranges, noting that small airports are a good analogy to the space launch ranges because both have low traffic rates and have to be subsidized.

He reported that the Task Force voted unanimously to adopt the observations in the National Research Committee study (National Science Foundation) that range safety needs updating, including a revision of EWR 127-1; that the Air Force should retain key safety standards and use them more for managing risks; that the Air Force move away from risk avoidance and conform range safety procedures to accepted risk standards, resulting in cost reductions for the Air Force and the users and no compromise of public safety.

Mr. Aldridge reported on the technology recommendations by the Task Force including: installing GPS metric tracking on board the launch vehicle thereby eliminating 11 of the 20 radars at the ranges, and 4 radars for the Shuttle; installing automatic self-destruct systems on board the launch vehicle; and using communications satellites for telemetry with two satellite terminals at each range, thereby eliminating the need for ground communications systems. He pointed out that these technology changes would create a space-centric system, leaving only the launch pads, security systems, and satellite processing facilities. He noted that the study recommends the 2012 time frame for completion, and since GPS and communications satellites can be shared, costs would be lowered to approximately 300 million dollars per year at the ranges. He also noted that the Air Force would have only the responsibility for range safety.

He discussed several major observations:

- Space is recognized in law and policy as a national priority and space launch ranges are "national assets."
- There is inconsistent implementation of policy, e.g., excess capacity.
- There is no approved "vision" for future range operations.
- The Government will continue to be a prominent user.
- The Government is not organized well enough to meet the diverse and growing needs of all users.
- Ranges can meet the launch rate demands, but need more flexibility, stability and predictability.

- EELV will change how the ranges operate in the future.
- New technologies, especially GPS, can increase flexibility and reduce costs.
- Range safety procedures need updating.
- There is sufficient information now to go beyond the Interagency Review and establish a range vision.

COMSTAC member, Lou Gomez, inquired about the applicability of the Task Force recommendations to inland launch facilities. Mr. Aldridge pointed out that the space-centric system recommended by the Task Force would probably be required for reusable launch vehicles (RLVs), which would utilize the inland launch facilities.

COMSTAC member, Russ Turner, asked whether the FAA should have the regulatory role for the ranges. Mr. Aldridge replied that the Air Force would always be responsible for ballistic missile testing, and verifying the flight worthiness of DOD payloads; however the responsibility for range safety will evolve as the operations at the ranges evolve.

COMSTAC member, Jeff Foote asked if the national space bases and ranges would always be considered national assets; Mr. Aldridge replied that they would, especially for national security purposes.

COMSTAC member, Pat Fresh, asked whether the new vision in terms of the importance of the national ranges would ensure that adequate funding is made available. Mr. Aldridge replied that it would take the leadership from the Secretary of the Air Force to ensure the necessary funding.

EELV Update

Lt. Col. Janet Karika, Director of Launch Vehicles, Air Force Program Executive Office for Space, provided an update on the status of the Evolved Expendable Launch Vehicle (EELV). Col. Karika reported that the Air Force is almost halfway through the initial EELV development program, with approximately 75% of funding obligated. She announced the Defense Satellite Communications System (DSCS) launch, the first government launch to be conducted by The Boeing Company, scheduled for the May-June time frame in mid-2002.

Col. Karika reported next that the EELV program was restructured to accommodate Lockheed Martin's elimination of its West Coast pad requirement. She noted that Lockheed Martin transferred their 2 DMSP missions to Boeing, but would complete their Heavy Lift Launch Vehicle, and that because of the restructuring, the Air Force would procure a heavy lift vehicle demonstration launch for Boeing. She also reported that both contractors' development programs were proceeding on schedule -- the program is meeting all performance and cost targets, the qualification program is underway, the manufacturing facilities are up and operating, and the first flight articles are in production. She noted several milestones for Delta IV and Atlas V:

Delta IV:

- the first Common Booster Core (CBC) static test firing at Stennis;
- the first Boeing commercial launch scheduled for November 2001;
- the activation of Space Launch Complex 37 at Cape Canaveral and SLC 6 at Vandenberg;
- the completion of flight hardware, including the booster transportation vessel; and
- initiating the testing for the RS-68 engine.

Atlas V:

- the first commercial launch scheduled for mid-2002;
- the expected completion of SLC 41 at Cape Canaveral;
- the completion of flight hardware, including the Contraves payload fairing; and
- the completion of several tests for the Russian RD-180 engine (RD-180 flew successfully on the May 24th launch of the Atlas III).

Col. Karika concluded her presentation by reporting that both Boeing and Lockheed Martin have completed 24-month mission integration scripts on CD-ROMs which are available on-line.

COMSTAC member, Mike Kelly, inquired whether the RD-180 engine would ever be produced in the United States. Col. Karika replied that there are plans to co-produce the RD-180 in the U.S. and that the licenses to release the technology are currently with the Russian government.

COMSTAC member John Logsdon asked whether the heavy launch payload was the only requirement for West Coast launching. Col. Karika replied that heavy payloads were not the only requirements and that there would be also be medium and intermediate payloads from the West Coast.

COMSTAC member Jeff Foote asked whether the Air Force would procure a demonstration launch for the Lockheed Martin Heavy Lift Launch Vehicle (HLV) and Col. Karika replied that since the rationale for a heavy lift demonstration launch was that there were no commercial launches prior to the Air Force launch, a demonstration launch of the Lockheed Martin HLV would probably be considered.

SPECIAL REPORT
Implementation of the OSTP/NSC Interagency Review on the Future Management and Uses of U.S. Space Launch Bases and Ranges

Victor Villhard, Assistant Director for Space and Aeronautics, White House Office of Science and Technology Policy (OSTP), provided an overview of the results of the Interagency Review for the Future Management and Uses of U.S. Space Launch Bases and Ranges. He discussed some of the conclusions of the Review, noting that the basic legal and policy framework appears to be adequate to support the current level of government and commercial space launch activity; however if the commercial satellite and launch markets continue to grow, the framework will require revisions. He pointed out that the U.S. Government is already sharing substantial responsibilities with the commercial sector, but is pursuing a path to share significantly more responsibilities with spaceports, state governments, and commercial operators in the future.

He reported that the recommendations in the final report highlighted several main points:

- Developing alternative management processes to allow U.S. commercial and government users to have a greater voice in improving operational flexibility;
- Improving the efficiency of range operations;
- Using non-federal funding where appropriate, especially from states and spaceports;
- Maintaining and modernizing the launch bases and ranges and meeting national needs;
- Developing options for replacing the excess capacity construct in the current law to allow more complete federal, state, and industry partnerships to develop;
- Developing common range safety requirements for government or commercial launches at federal and non-federal launch sites, including an enhance FAA/Air Force partnership to formalize respective responsibilities for safety; and
- Developing next-generation range technology to improve safety, increase flexibility and capacity and lower costs for reusable and expendable launches.

He noted that the final report was released on February 8th, and approved by the President on April 6th, adding that the final report on the implementation of the recommendations is scheduled to be completed by the end of 2000. After Mr. Villhard's overview, each agency presented an interim report of its implementation process.

Department of Commerce (DOC)
Greg Finley, Deputy Director, Office of Air and Space Commercialization, provided a report on the Commerce Department's implementation of Recommendation #1. (Department of Transportation shares this implementation responsibility).

Recommendation #1: *Propose alternative management structures to allow commercial and government users of the U.S. space launch bases and ranges adequate opportunity to communicate their requirements so they can be actively considered and factored into decisions on improvements and operations with the goals of providing greater user voice and improving operational flexibility.*

Desired Outcomes
- Establish a process for handling commercial requirements, including a Department of Defense (DOD) process to consider commercial requirements and resolve them.
- Improve range operational flexibility.

Status of Desired Outcomes
- Industry's response to Recommendation #1 is the development of a Range Oversight Group to include representatives of launch service providers and the development of working level teams of government and industry representatives who would work together to improve range efficiencies.
- DOC and the Department of Transportation (DOT) and DOC will share the responsibility of collecting and prioritizing industry input for commercial requirements; NASA requirements would be handled through a separate process.
- All requirements would go to DOD for final approval and execution.

Next Steps
- Define the responsibilities and interfaces for the Departments of Commerce and Transportation to present commercial requirements to be reviewed by DOD for possible action.
- Further explore the composition of a management board, consisting of industry and government, and the manner in which comments will be solicited and proposed range improvements considered.

Department of Defense (Air Force)
Col. Stanley Mushaw, Director, Space Policy, Planning and Strategy, Office of the Assistant Secretary for Space, provided a briefing on the notional process for considering commercial, state, and local requirements collected by DOT and DOC, as a result of the implementation of Recommendation #1. He described the process that DOD is proposing to use for considering the commercial requirements, explaining that the requirements would be examined from a technical performance standpoint to determine if they are compatible with already-established DOD requirements; ways that DOD could modify its programming, planning and requirements process to accommodate the changes from the commercial sector if requirements are different; and what DOD would do if requirements are not executable and/or if they require unique funding requirements.

Col. Mushaw explained that commercial requirements should consist of system and subsystem objectives, include key performance parameters and objective and threshhold requirements for meeting industry needs, and should show how it will benefit industry, how important it is to industry and how it will enhance international competitiveness.

Department of Transportation (DOT)

Kelvin Coleman, Senior Project Engineer, FAA/AST, reported on the Department of Transportation's implementation of Recommendation #5. (DOD shares this implementation responsibility).

Recommendation #5: *Develop common range safety requirements for government, civil, and commercial launches at federal and nonfederal launch sites and ensure that FAA resources are commensurate with its statutory requirements and safety responsibilities.*

Desired Outcomes

- Institute common safety requirements.
- Continue to modernize the National Airspace system to account for space launch and reentry through the airspace.
- Ensure appropriate resources commensurate with its statutory requirements and safety responsibilities.
- Enhance the Air Force/FAA partnership on safety for commercial launches in the Air Force/FAA Memorandum of Agreement.

Status of Desired Outcomes

Outcome 1:

- Expected publication of an FAA Notice of Proposed Rulemaking for ***Licensing and Safety Requirements for Launch***[2] and have comments reviewed by the IWG.
- Revision of the Eastern/Western Range 127-1 (EWR 127-1) Safety document by the Air Force with assistance from DOT to be completed by March 2001.

Outcome 2:

- Publication (January 2000) of the Commercial Space Transportation Concept of Operations.
- Development of FAA regulations: the ***Commercial Space Transportation Reusable Launch Vehicle and Reentry Licensing Regulation***[3] and ***Licensing and Safety Requirements for Operation of a Launch Site***[4], which address coordination with Air Traffic Control.

Outcome 3:

- Appropriation of 12 million dollars for FY 2001 for FAA/AST.

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[2] Published on October 25, 2000.
[3] Published as a final rule on September 19, 2000.
[4] Published as a final rule on October 19, 2000.

Outcome 4:

- Enhancement of the FAA/Air Force partnership through the development of a Memorandum of Agreement which spells out the safety roles and responsibilities for each agency and addresses specific terms of reference including launch vehicle operations, range operations, national airspace management, mishap investigations, and an expanded partnership.
- Revision 5 of the MOA was completed on September 9.

Next Steps

Outcome 1:

- Complete the Notice of Proposed Rulemaking comment period and assess comments.
- Complete the revision of EWR 127-1 by March 2001.

Outcome 2:

- Update the Commercial Space Transportation Concept of Operations by January 2001.
- Incorporate commercial space transportation requirements into the FAA's National Airspace System Architecture.

Outcome 3:

- Hire additional staff for AST in FY2001.
- Develop FY2002 budget and beyond.

Outcome 4:

- Completion of the FAA/Air Force MOA and signed by the Air Force Secretary for Space and the FAA Administrator by October 31, 2000. (Target)

National Aeronautics and Space Administration (NASA)

Al Sofge, ELV Integration Manager in NASA's Office of Space Flight, reported on NASA's implementation of Recommendation #6.

Recommendation #6: *The Air Force and NASA should develop a plan to examine, explore, and proceed with next-generation range technology development and demonstration, with a focused charter to improve safety, increase flexibility and capacity, and lower costs for reusable and expendable launch vehicles. NASA should designate KSC as a National Center for next-generation RLV range technology development and demonstration, while the U.S. Air Force remains the overarching authority for Eastern and Western Range architecture."*

Desired Outcome

NASA and the Air Force should agree on plans to coordinate, develop, demonstrate the next-generation range technologies and set goals for next-generation range technologies to improve safety, reduce costs by orders of magnitude, support RLV and ELV operations more efficiently, and enable high launch rate operations using next-generation RLVs. The approach needed to do this is to establish a continuous working relationship

concerning advanced range technology development among NASA Kennedy Space Center Advanced Range Technology Team, other NASA centers and facilities, Air Force Space Command (AFSPC), Air Force Material Command (AFMC), and Air Force Research Lab (AFRL)

Status of Desired Outcome

- NASA Kennedy Space Center (KSC), Air Force Space Command, Air Force Material Command and the Assistant Secretary of the Air Force for Space have had discussions addressing technology and goals and have agreed to implement a joint technology development working group, called the Advance Range Technology Working Group (ARTWG).
- The ARTWG charter is being drafted by KSC.
- NASA and the Air Force are also drafting an MOA on technology partnership, which is currently in review at Headquarters Air Force and Headquarters NASA.

Next Steps

- Both the ARTWG charter and the MOA are scheduled to be signed by December 2000.
- A kick-off meeting for the ARTWG is planned for later this year to address the roles and responsibilities and the goals for advanced technology development and a joint technology roadmap.
- NASA is designating KSC as the National Center for RLV Range Technology.

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COMSTAC member Lou Gomez expressed concern that the implementation plans did not address inland launch sites. Mr. Sofge pointed out that the inland launch sites will be considered in the ARTWG, especially since it will be heavily focused on RLV operations.

COMSTAC member John Logsdon asked what were some of the unique commercial requirements. Mr. Villhard provided an example of a requirement for faster turnaround time, specifically 4 hours. He explained that DOD would need to address why 4 hours is important and what are the economic justifications for having a 4-hour turnaround time.

COMSTAC member Mike Kelly asked how commercial requirements would be collected for future commercial markets that don't yet exist. Mr. Villhard said that the IWG used the market forecast developed by COMSTAC and would continue to rely on that source of information for where the commercial launch market is headed.

WORKING GROUP REPORTS

Export Controls Ad Hoc Task Force

The Export Controls Ad Hoc Task Force was co-chaired by COMSTAC Chair, Livingston Holder and Risk Management Working Group Chair, John Vinter. Mr. Holder reported the results of the Task Force. He stated that the group was established as a result of a recommendation by the RLVWG to establish a COMSTAC working group for the issue of export controls at the May 31st COMSTAC meeting. He also reported that the Task Force has conducted its business through a series of weekly Friday teleconferences and agreed upon two products—a letter of support for the 17 proposals under the Defense Trade Security Initiative to the Secretaries of State and Defense from the Secretary of Transportation and a COMSTAC position paper on export controls.

Mr. Holder discussed the following recommendations developed by the Task Force:

- Specific timelines for export control processes which conform to customer expectations and requirements.
- Full and rapid implementation of license consolidation & streamlining for friendly nations: NATO allies, major Non-NATO allies, and other countries as appropriate.
- Reassessment of U.S. Munitions List regarding commercial communications satellites, specifically recommending transfer back to the Commerce Control List as appropriate.
- Development of a process enabling global export license authorization to pre-qualified space insurance underwriters.
- Address funding levels for all U.S. Government export control functions.
- Development of international government-to-government agreements to enable further export exemptions.
- Development of policy that encourages foreign and domestic private investments.
- Periodic review of all U.S. Government functional responsibilities pertaining to export control.

Technology and Innovation Working Group (TIWG)

TIWG Chair, Bob Cowls, reported on the activities of that group, stating that the working group's primary task is the development of the annual geostationary mission model. He reported that since the May 31st meeting, the TIWG had its 8th meeting with the Air Force EELV Special Program Office in June in El Segundo, CA. He noted that the TIWG also met with the EELV Mission Integration Working Group, a group consisting of commercial and contractor representatives who look at mission integration tasks for EELV. He reported on the Interagency Briefing on the 2000 launch forecasts in July, conducted, by the TIWG, along with AST. He also discussed the future plans for the TIWG, including the initiation of work on the 2001 geostationary mission model update and consideration by the TIWG of a possible study on future markets and launch services supply study.

Chairman Holder suggested that the TIWG consider examining the issue of the interaction of U. S. entities with those of international entities, especially focusing on technology exchanges.

Reusable Launch Vehicle Working Group (RLVWG)

Mike Kelly, RLVWG Chair, reported that the RLVWG had received a briefing from Kelvin Coleman on the infrastructure work for the Space and Air Traffic Management System. He also reported that the working group had established a subcommittee to study passenger indemnification issues to be chaired by Jeff Grayson from Excor. He reported on the status of the RLV site on AST's website and described the working group meeting held on Wednesday, October 18. Mr. Kelly also reported that the RLVWG has taken the action to review the FAA/AST Safety Approval Process.

Risk Management Working Group (RMWG)

John Vinter, chair for the RMWG, noted that the working group was pleased with the four-year extension for commercial launch indemnification and that the group would be monitoring the issue to begin working on another extension after the four years. He stated that the RMWG would probably have additional thoughts on government indemnification through launch and reentry after the working group has a chance to digest the two FAA Final Rules concerning RLV and reentry licensing and financial responsibility. He noted that the RMWG would have a teleconference in November. He also expressed concern regarding the issue of export controls, stating that it is a major impediment for all commercial space activities, pointing out that two-thirds of the market is in Europe and almost 90% of the third-party liability insurance market is in Europe.

Launch Operations and Support Working Group (LOSWG)

Russell Turner, Chair of the LOSWG, summarized some remaining actions that the group is working on as a result of the report released at the May 31st meeting, including an examination of export control issues which deal directly with launch operations and support; spaceport population encroachment; how E_c affects the operators from a vehicle perspective as well as from the perspectives of the spaceport and spaceport operations; government incentives; the internationalization of space operations and what the impact will be; and safety issues for launch vehicles and payloads.

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Wrap Up

COMSTAC Chair, Livingston Holder, made final comments, expressing appreciation to Patricia Smith, FAA's Associate Administrator for Commercial Space Transportation, and to her staff, for outstanding work. Mr. Holder stated that "...COMSTAC has flourished and AST has flourished under your (Ms. Smith's) leadership. I think that you've been extremely forward-looking, extremely innovative, very progressive toward interaction with industry, and I'd just like to express our appreciation for your creativity and energy in this area."

Since there was no new business, the meeting was adjourned at 12:21 p.m., subject to the call of the Chair.

Livingston L. Holder, Jr., Chairman, COMSTAC

ATTENDEES

COMSTAC Members

Livingston Holder, COMSTAC Chairman, The Boeing Company
Mark Bitterman, Orbital Sciences Corporation
Robert Cowls, The Boeing Company
Frank DiBello, SpaceVest
Steven Flajser, Loral Space and Communications, Ltd.
Jeffrey Foote, AlliantTechsystems
Louis Gomez, New Mexico Office of Space Commercialization
Michael Kelly, Kelly Space & Technology, Inc.
John Logsdon, George Washington University
Russell Turner, United Space Alliance
John Vinter, International Space Brokers

FAA/Associate Administrator for Commercial Space Transportation

Patricia G. Smith, Associate Administrator for Commercial Space Transportation
Joseph Hawkins, Deputy Associate Administrator for Commercial Space Transportation
Brenda Parker, COMSTAC Executive Director
Herb Bachner
Kelvin Coleman
Carole Flores
Nikos Himaras
Stewart Jackson
Chuck Kline
Chuck Larsen
Randy Maday
Carl Rappaport
Ken Wong