HB

46

MAY 1 1991

REPRESENTATIVE TOM MOYER

DISTRICT 19 • 119 N. CUSHMAN ST., SUITE 203 • FAIRBANKS, AK 99701 • (907) 456-3161
International Trade & Tourism, Chair • State Affairs, Vice Chair • Resources, Member

MEMORANDUM

To: Senator Drue Pearce
Chair, Senate Labor and Commerce Committee

May 1, 1991

From: Representative Tom Moyer TGM

Re: HB46, Creating the Alaska Aerospace Development Corp.

The state House today unanimously approved HB46 and pending referral to your committee, I would appreciate you scheduling the bill for a hearing as soon as possible due to the short time remaining in the session.

The bill would create an Alaska Aerospace Development Corporation whose purpose is to attract commercial space companies to Alaska. This is a budding new industry which has produced thousands of jobs and millions of dollars in revenue in those states which have active commercial launch operations.

Under the legislation, the corporation would be affiliated with the University of Alaska which manages the Poker Flat research rocket range north of Fairbanks. The bill would preserve the educational and research functions of the Poker Flat range while taking advantage of Poker Flat's unique qualities for commercial operations. Those qualities include geography, lack of a burdensome bureaucracy and a relatively undeveloped facility.

This legislation also has the strong support of the Hickel administration. Several private companies already have approached state officials about launching from Poker Flat.

I am happy to supply additional information as is necessary and will make myself and others available to testify at your convenience.

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REPRESENTATIVE TOM MOYER

DISTRICT 19 • 119 N. CUSHMAN ST., SUITE 203 • FAIRBANKS, AK 99701 • (907) 456-8161

International Trade & Tourism, Chair • State Affairs, Vice Chair • Resources, Member

FACT SHEET

House Bill 46, Alaska Aerospace Development Corporation

• The bill would create the Alaska Aerospace Development Corporation whose purpose is to attract commercial space companies to Alaska and run the commercial side of the Poker Flat rocket range.

• The commercial space industry, worth about $3.6 billion annually, is a budding new industry which has produced thousands of jobs and millions of dollars in revenue in those states which have active commercial launch operations. For example, Virginia has attracted 450 space-related companies which employ more than 10,000. A recent Hawaii study predicted a small commercial operation there could produce up to 1,850 space-related jobs.

• Under HB46, the corporation would be housed in the Department of Commerce and Economic Development and affiliated with the University of Alaska, which manages the Poker Flat research rocket range north of Fairbanks. In operation since 1968, the range currently launches sounding rockets and weather balloons for educational and research purposes.

• The corporation would be managed by a 9-member board, including members from the university with expertise in space, the public and private sector. The corporation would have the ability to issue revenue bonds to finance range improvements. The corporation is modeled after existing Alaska public corporations such as the Alaska Industrial Development and Export Authority and the Alaska State Housing Authority.

• The bill would preserve the educational and research functions of the Poker Flat range while taking advantage of Poker Flat's unique qualities for commercial operations. Those qualities include geography, lack of a burdensome bureaucracy and a relatively undeveloped facility.

• Nearly a dozen private commercial space companies already have approached state officials about launching from Poker Flat.

• The legislation has the strong support of the Hickel administration.

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DIVISION OF LEGAL SERVICES

LEGISLATIVE AFFAIRS AGENCY
STATE OF ALASKA

P.O. Box Y, Juneau, Alaska 99811
(907) 465-3867 or 465-2450
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Court Plaza, Room 500
Mail Stop 3101

MEMORANDUM April 29, 1991

SUBJECT: Sectional Summary (CSHB 46( ), Work Order No. 7-LS0236\P)

TO: Representative Tom Moyer

FROM: Gerald P. Luckhaupt JPL
Legislative Counsel

You have requested a sectional summary of CSHB 46( ), an Act creating the Alaska Aerospace Development Corporation. Be advised that a sectional summary is not an authoritative interpretation of the bill. The bill itself is the best statement of its contents.

Section 1 of the bill provides the short title for the Act.

Section 2 begins the statutory "meat" of the bill by adding a new article, Alaska Aerospace Development Corporation in AS 14.40. In that bill section:

AS 14.40.821 creates the corporation as a public corporation within the Department of Commerce and Economic Development and affiliated with the University of Alaska. This section also provides that the corporation may not be terminated as long as it has outstanding debts.

AS 14.40.826 establishes the board of directors of the corporation with nine members. The public and industry members receive $100 payments for each day of work performed for the corporation, and per diem. All members serve at the pleasure of the governor.

AS 14.40.831 provides that the president of the University of Alaska is the chair of the corporation.

AS 14.40.836 provides for a quorum of the board, procedures for the conduct of its meetings, and appointment of staff.

AS 14.40.841 creates a revolving fund in the corporation for appropriations and funds the corporation may receive and may loan out for development purposes.

AS 14.40.846 provides for the use of actuarial experts by the corporation, the acquisition of insurance, and the establishment of a safety program to reduce the risk of loss.

AS 14.40.851 provides that the Poker Flat Research Range is the territory and launch site for the corporation. This section provides for the addition of territory and additional launch sites.
AS 14.40.856 provides that the corporation shall obtain all of the necessary permits and licenses for operating a commercial spaceport.
AS 14.40.861 lists the purposes for which the corporation was created.
AS 14.40.866 lists the powers and duties of the corporation, including the powers to borrow, to operate space-related facilities, to acquire land by eminent domain (this provision is identical to AS 18.55.100(a)(6)), to contract, to construct and operate support facilities, to charge fees and rents, and to become a foreign trade zone. The corporation is required to prepare an annual report of operations and issue personnel rules.
AS 14.40.871 provides for the adoption of rules by the corporation and further provides that the Administrative Procedure Act (AS 44.62) does not apply to the actions of the corporation, except in the public meetings area.
AS 14.40.876 provides that the corporation may act within a municipality as if the action being undertaken was outside of a municipality.
AS 14.40.881 provides for the confidentiality of trade secrets and other information furnished to the corporation.
AS 14.40.886 provides that a proposed construction project of $1,000,000 or more must be submitted to the legislature for its disapproval.
AS 14.40.891 provides for the issuance of bonds.
AS 14.40.896 provides that the bonds of the corporation may be made payable from the revenues of a particular project or projects, from the corporation's revenue generally, or solely from rents, fees, and other revenue received by the corporation and that security and collateral may be provided by the corporation.
AS 14.40.899 provides that the bonds of the corporation are not government obligation bonds or debts of the state or any agency of the state, including the University of Alaska.
AS 14.40.902 provides procedures for the issuance of bonds.
AS 14.40.906 provides that the bonds of the corporation are issued for an essential public purpose and are tax-exempt.
AS 14.40.908 provides that the corporation shall retain the services of a financial advisor with respect to its sale of bonds.
AS 14.40.912 provides additional powers to the corporation in connection with incurring debt or issuing bonds.
AS 14.40.916 provides that a person who is owed a debt, or the performance of an obligation or duty, may bring suit for injunction or mandamus against the corporation.
AS 14.40.921 provides that the corporation may confer certain rights by contract regarding a default by the corporation on its obligations.

AS 14.40.926 provides that the real property of the corporation may not be executed upon to satisfy a judgment but does not prevent contractual remedies against real property for satisfaction of a contract.
AS 14.40.931 provides that the corporation may enter into agreements with the federal government.
AS 14.40.936 provides that the corporation, and property of the corporation, are exempt from state and local taxation.
AS 14.40.941 provides for the disposal of surplus property of the corporation.
AS 14.40.946 provides that any public body may loan money or property to or enter into agreements with the corporation.
AS 14.40.951 provides for the creation of a reserve fund for deposit and payment of obligations of the corporation.
AS 14.40.956 provides that the corporation may seek the cooperation and assistance of the Alaska Industrial Development and Export Authority and the Alaska Municipal Bond Bank Authority in issuing its bonds and also provides those authorities may purchase and market the bonds of the corporation.
AS 14.40.961 provides that the Commissioner of Revenue shall invest excess funds of the corporation.
AS 14.40.966 provides that bonds of the corporation are legal investments.
AS 14.40.990 provides definitions.

Section 3 amends AS 24.20.201(a) and provides specific authority for the legislative budget and audit committee to provide for annual audits of the corporation as is provided for the Alaska Housing Finance Corporation and the Alaska Industrial Development and Export Authority.

Section 4 provides an exemption from municipal sales and use taxes provided in Section 5.

Section 5 amends AS 29.45.650 to provide that a municipality may not levy or collect a sales or use tax on property to be utilized for space-related activities.

Section 6 amends AS 36.30.015 to provide that the corporation must issue regulations to govern procurement.

Section 7 provides that the corporation is not an "agency" for purposes of AS 36.30, the procurement code.

Section 8 amends AS 37.05.146 to provide that receipt of funds managed by the agency are program receipts.

Section 9 amends AS 38.05.810 by providing that the commissioner of natural resources shall lease land to the corporation for space-related activities.

Section 10 amends AS 39.25.110 to provide that employees of the corporation are in the exempt service.

Section 11 amends AS 39.50.200(b) to include the corporation within the reach of the conflict of interest provisions of AS 39.50.

Section 12 amends AS 44.99.200(b) to provide that the board of the corporation may choose to have a publication of the corporation produced at other than a state-operated facility.

Section 13 amends AS 44.99.400 to provide that the corporation is a state agency for purposes of acquiring or holding a copyright.

Section 14 provides for staggered initial appointments to the board of directors of the corporation.

Section 15 provides an effective date.

GPL:pl
91-314.plm

Enclosure

FISCAL NOTE

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. CSHB46(ITT

Revision Date:
Title: Creating AK Aerospace Development Corporation
Sponsor: Moyer
Requestor: ITT

Department Affected: University of Alaska
BRU: ALL
Component:
Component Serial No. ALL

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY92	FY93	FY94	FY95	FY96	FY97
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL						
REVENUE	0.0	•	•	•	•	•
FUNDING: (Thousands of Dollars)						
GENERAL FUND						
FEDERAL FUNDS						
OTHER						
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0
POSITIONS:						
FULL-TIME						
PART-TIME						
TEMPORARY						

Estimate of current year impact:

ANALYSIS: (Attach a separate page if necessary.)

SEE ATTACHED

Prepared by: Brian Rogers
Division: Vice President for Finance
Phone: 474-7448
Date: 3/7/91

Approved by: Brian Rogers, Vice President for Finance
Agency: University of Alaska
Date: 3/7/91

Distribution (by preparer): Legislative Finance, Legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

Rev 10/90

Fiscal Note - Bill #CSHB 46 (ITT) Analysis

Creation of the Alaska Aerospace Development Corporation will not entail new costs by the University of Alaska. Any costs of university participation in meetings with the corporation will be borne from existing funds.

Depending on the success of the Alaska Aerospace Development Corporation in attracting new aerospace related businesses to use the Poker Flat Research Range, the university may receive revenues to support operation of the research range in fiscal '93 and thereafter. Until the corporation is operational, however, the university has no way of knowing what those revenues may be.

FISCAL NOTE

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. HB 46

Revision Date: _____ Department Affected: Administration

Title: An act creating the Alaska Spaceport Authority BRU: Risk Management

Component: _____

Sponsor: Mover, Koponen

Requestor: Labor & Comm. & Ec. Dev. COMPONENT SERIAL NO. [ ][ ][ ][ ]

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES	0	0	0	0	0	0
TRAVEL	0	0	0	0	0	0
CONTRACTUAL	0	0	0	0	0	0
SUPPLIES	0	0	0	0	0	0
EQUIPMENT	0	0	0	0	0	0
LAND & STRUCTURES	0	0	0	0	0	0
GRANTS, CLAIMS	0	0	0	0	0	0
MISCELLANEOUS	0	0	0	0	0	0
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL	0	0	0	0	0	0
REVENUE	0	0	0	0	0	0

FUNDING: (Thousands of Dollars)

GENERAL FUND	0	0	0	0	0	0
FEDERAL FUNDS	0	0	0	0	0	0
OTHER	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME	0	0	0	0	0	0
TEMPORARY	0	0	0	0	0	0

Estimate of current year impact: Nil.

ANALYSIS: (Attach a separate page if necessary.)
See following page

Prepared By: Don Hitchcock Phone: 465-2180

Division: Risk Management Date: 2-27-91

Approved by Commissioner: Millett Keller

Agency: Department of Administration Date: 2/1/91

Distribution (by preparer): Legislative Finance, Legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

Rev 10/90

1991 LEGISLATION
POSITION PAPER
DEPARTMENT OF ADMINISTRATION

Division Risk Management **Bill Number** HB 46

Bill Title An act creating the Alaska Spaceport Authority

Position Statement: Explain briefly what bill does, its impacts and Department's position, i.e. a) support, b) do not support, c) neutral or d) oppose.

This act creates a new public corporation of the State, with a board of directors, executive director and support staff. It is unclear as to the extent of the increased staffing involved with inherent workers' compensation, general and professional liability exposures.

It is mentioned that the authority will procure and maintain insurance coverage for liability that may arise as a consequence of its activities, and its buildings, structures and other facilities against loss. Again there is no indication of the extent of such facilities, although we would presume they would approach Risk Management for such coverages as it is more economical to participate in the self insurance program operated by Risk Management.

Casualty risks (workers' compensation, general, auto and professional liability) could be picked up as part of the standard assessment on the Department of Commerce's monthly payroll. All other coverages would be billed on a direct RSA basis (property, aviation, etc.)

Our position is neutral — this is only a reminder that insurance costs could be involved depending on Alaska Space Port Authority activity.

APPROVED:

Director Donald Hitchcock **Division** Risk Management
print name

Signature _____ **Date** 2/27/91

Commissioner Millett Keller

Signature _____ **Date** _____

(For more information, call Barbara Pritchett 465-2200) Rev. 1/23/91

FISCAL NOTE

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. CSHB 46

Revision Date: _____ Department Affected: Commerce & Economic Dev.

Title: Establishing the Alaska Aerospace Development Corporation

BRU: Alaska Aerospace Development Corporation

Component: _____

Sponsor: Rep. Moyer

Requestor: Rep. Moyer

COMPONENT SERIAL NO. | | | | |

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES	126.4					
TRAVEL	37.6					
CONTRACTUAL	118.0					
SUPPLIES	1.5					
EQUIPMENT	19.0					
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	302.5	*	*	*	*	*
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND	302.5					
FEDERAL FUNDS						
OTHER Corp. Rec.		*	*	*	*	*
TOTAL	302.5	*	*	*	*	*

POSITIONS:

FULL-TIME	2					
PART-TIME						
TEMPORARY						

Estimate of current year impact: _____

ANALYSIS: (Attach a separate page if necessary.) Assumes the AADC will become effective July 1, 1991. Initial year would be funded from the general fund.

*Subsequent years will be funded from corporate receipts of the AADC revolving fund. Since this is a new organization, it is not possible to predict annual costs beyond FY 92.

Prepared By: Guy Bell, Director Phone: 465-2587

Division: Administrative Services Date: _____

Approved by Commissioner: Glenn A. Olds

Agency: Department of Commerce & Economic Development Date: _____

Distribution (by preparer): Legislative Finance, Legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

FISCAL NOTE - CSHB 46

ALASKA AEROSPACE DEVELOPMENT CORPORATION

Personal Services:		$126.4
Executive Director (26A)	$ 90.1	
Secretary I (10B)	$ 36.3	
Travel:		$ 37.6
Executive Director	$ 20.0	
Board (4 meetings/year)	$ 12.0	
Honorarium/Stipend	$ 5.6	
Contractual:		$118.0
Office Space (500 sq. ft. @ $2.00/ft)	$ 12.0	
Professional Services (bond counsel engineering, actuarial, etc.)	$100.0	
Utilities (phones, other)	$ 6.0	
Supplies:		$ 1.5
Office Supplies	$ 1.5	
Equipment:		$ 19.0
Telecopier	$ 3.0	
Computer/Word Processing	$ 10.0	
Furniture	$ 6.0	
FY 92 TOTAL		$302.5

9111D

ANC TIMES 5/3/91

Legislators seek authority for space industry

By MATT KOHLMAN
ASSOCIATED PRESS

JUNEAU — The House has endorsed the creation of a state "spaceport authority" to develop a commercial space industry in Alaska.

The measure would create the Alaska Aerospace Development Corp. with the goal of attracting business to the state and preserving the educational and research functions of the Poker Flat Research Range north of Fairbanks.

House Bill 46, approved without opposition Wednesday, was sent to the Senate for further consideration.

"It's one small step for the Legislature and one giant step for Alaska," said Rep. Tom Moyer, D-Fairbanks and prime sponsor.

Legislators said the bill was met with some skepticism when first introduced.

"I took my share of ribbing," Moyer said. "This is not science fiction. There really is potential that Poker Flat will get us into the microsat industry."

Rep. Bert Sharp said the measure has developed significantly from the original version.

"Some with tongue in cheek called it the pie-in-the-sky bill. The facts are, this could create a dessert even more palatable than Prudhoe Bay," said Sharp, R-Fairbanks. "This legislation makes a positive statement on Alaska's willingness to become a partner in new industries."

Supporters of the bill say nearly a dozen companies are interested in commercial space launches from the nation's only civilian launching pad.

Support for the measure comes alongside the rise in commercial satellite launches into low orbit. Better technology has produced small-payload "microsatellites" that cost less than $5 million each to launch.

The 5,200-acre Poker Flat range was built in 1968 by scientists at the University of Alaska Geophysical Institute to fire small rockets carrying instruments that could study the northern lights.

Moyer said Poker Flat has the advantage of launching rockets into a polar orbit, which allows satellites to "see" the entire earth.

The institute recently received a $30 million federal grant to upgrade its roads, water, optics and communications systems. But officials say $3.4 million is needed to improve the launch rocket so research and communications satellites could be sent into space.

The authority would issue revenue bonds to pay for improvements to the range. The public corporation would be affiliated with the University of Alaska Fairbanks.

It would be governed by a nine-member board of four university officials, two state officials, a public member, an aerospace expert and a representative of a commercial satellite company.

FORUM

Space industry could be good for Alaska

By REP. TOM MOYER

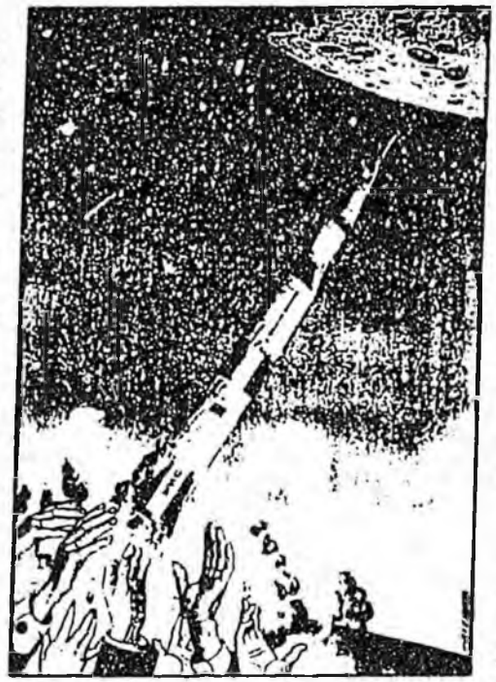
FAIRBANKS — It's predictable that those of us who talk about Alaska launching satellites into space have taken some ribbing. But such a possibility is not science fiction.

The prospects of hundreds of new jobs for Alaskans and additional dollars for the state treasury are not pie in the sky — if Alaska acts now to take advantage of its enormous potential in the commercial space industry.

Alaska is home to the nation's only civilian rocket range — Poker Flat, located about 30 miles north of Fairbanks and founded by the University of Alaska Fairbanks. Since 1969, scientists have launched hundreds of small rockets and weather balloons from this 1,600-acre site, to research everything from the aurora to global climate change.

In recent months, a growing number of commercial space companies have quietly visited Poker Flat to investigate launching sophisticated communications satellites into polar orbit from the range. One company, MicroSat Launch Systems, projects a market demand for seven to 20 launches a year from Poker Flat, with each launch generating more than $150,000 in user fees and requiring up to 60 new employees.

The state of Hawaii, which recognized its potential for cashing in on the commercial space industry two years ago, estimates a small commercial spaceport there would generate an initial 100 to 300 employees,



with up to 1,050 space-related jobs. Virginia, a leader in the U.S. space industry, has attracted 450 space-related businesses which employ 10,000 people. Nationally, the commercial space industry grew from $2.8 billion in 1989 to $3.6 billion last year.

Earlier this year I introduced legislation (House Bill 46) designed to make Alaska a player in this growing industry. The bill would create an Alaska Aerospace Development Corporation whose mission is to attract to Alaska commercial space companies and assist their operations. It also would preserve the important research and educational activities at Poker Flat, which is managed by UAF's Geophysical Institute under contract with NASA.

The most significant development that makes Alaska so attractive for commercial space launches is miniaturization. The new technology permits unmanned spacecraft to be smaller, lighter, cheaper and smarter than ever.

Large satellites of an earlier era weighed 5,000 pounds or more, cost $200 million to build and required huge rockets to push them into space. The new "lightsats" weigh less than 500 pounds, are 10 times cheaper to build and can be launched with 50,000-pound rockets, not much larger than those now in operation at Poker Flat.

The communications giant Motorola, which visited Fairbanks in January, has proposed putting into orbit a constellation of 77 lightsats to relay mobile telephone calls. The company has not yet decided on a launch site.

While there are nearly two dozen launch sites around the world that may be better developed than Poker Flat — from Japan to Brazil to Australia — Alaska enjoys several unique advantages:

• Geography. Alaska is obviously closer to the polar orbit, key for certain types of communications, and therefore it's cheaper to place satellites in that orbit from Alaska. Hawaii, Virginia and Florida also can launch into polar orbit, but require larger booster rockets to push through heavier atmosphere and such an enormous distance.

• Lack of bureaucracy. Commercial vehicles can be launched from military facilities, such as California's Vandenberg Air Force Base, but obtaining the necessary permits can take years and military activities can disrupt launch schedules. Poker Flat's approval process is quick and the new aerospace development corporation would streamline commercial launches.

• Upgrading. Poker Flat recently received a $30 million federal grant to improve its facilities, including the installation of a new tracking system. Through the efforts of Joe Hawkins, an innovative UAF electrical engineering professor, Alaska last month was one of only 14 states to earn federal "Space Grant" status, which means an annual flow of dollars to support student-designed rocket launches.

If we play our cards right, the Last Frontier can be a leader in the Final Frontier.

Tom Moyer, a Democrat, is a freshman representative from Fairbanks District 19 and a lifelong space buff.

FAIRBANKS
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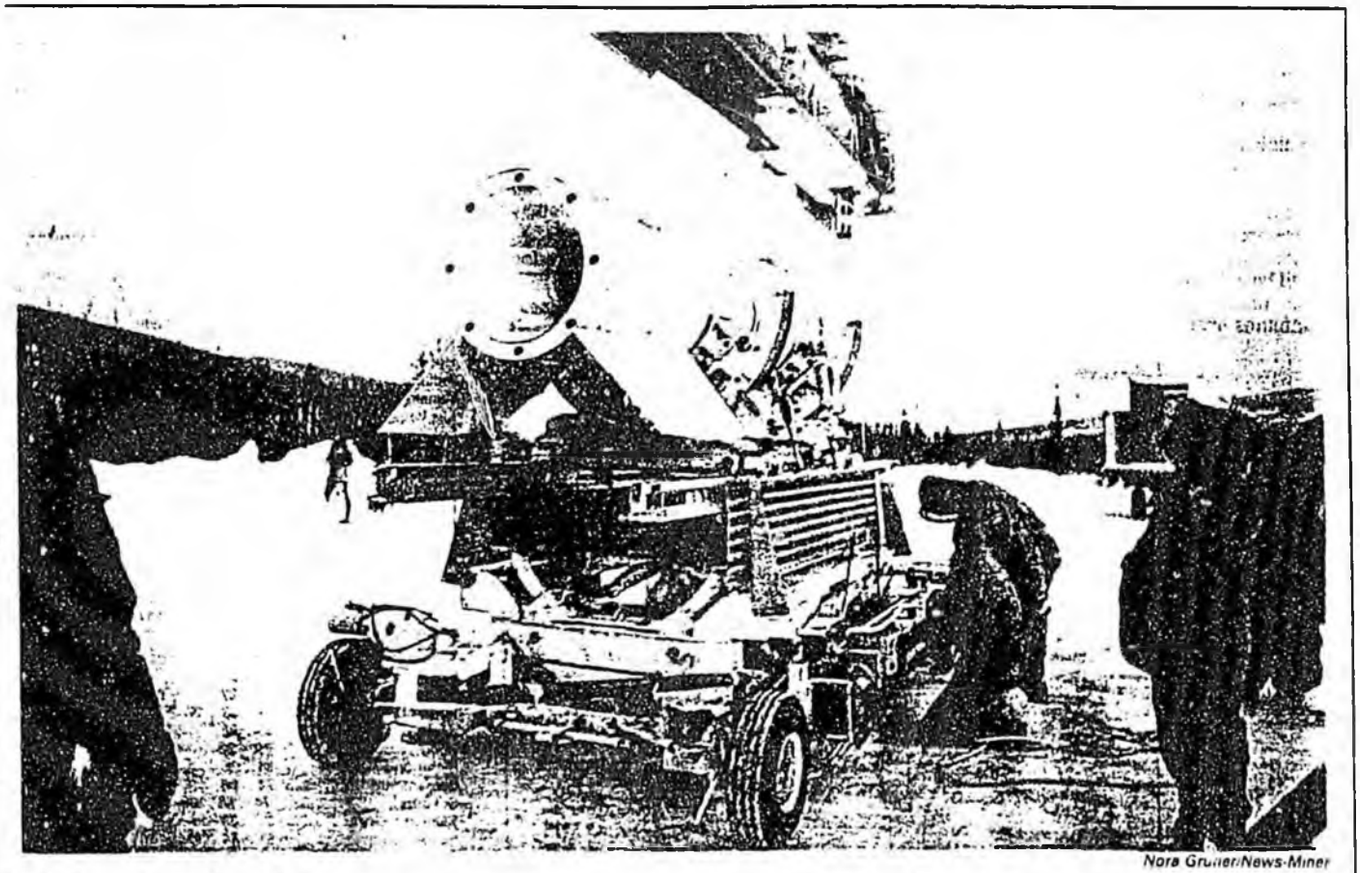
FAIRBANKS, ALASKA, THURSDAY, APRIL 4, 1991



Nora Gruller/News-Miner

READY TO LAUNCH—The assembly crew maneuvers the first stage of a Black Brant XII onto one of five launch pads at Poker Flat in February. At least five companies are interested in using the range for launching satellites.

Poker Flat proves big attraction for more commercial launchings

By WILDA WHITAKER
Staff Writer

Twenty-two years ago, scientists from the University of Alaska Fairbanks dubbed their new atmospheric research station in the Chatanika Valley the Poker Flat Research Range.

The name came from a short story by Bret Harte, "The Outcasts of Poker Flat," about a group of ne'er-do-wells thrown out of a mining camp into a blinding blizzard.

In the years since then, more than 200 scientific experiments have been launched from rockets at Poker Flat. But the range, tucked in a steep valley 30 miles from Fairbanks on the Steese Highway, has remained relatively unnoticed by all but atmospheric scientists.

Those days could be coming to an end with a nationwide push to attract commercial ventures to the range.

Last July, Jack Dillard, formerly a senior engineer at Martin Marietta and vice president of engineers at Dee Howard Co., was hired as the new range manager. Familiar with endeavors in other states to combine government, private industry and academics, Dillard merged his efforts with others at UAF. They started an aggressive campaign to attract more commercial industry to the range.

Recognizing the potential, several state politicians have also hitched their wagons to the commercial satellite star.

In the last five months, Dillard has talked with no less than five companies that are interested in using the range for launching satellites and experiments.

The satellites could help enterprises ranging from telephone communications to game management. The experiments largely would involve product

(See POKER, Page 6)

POKER: Range attracting commercial launching ventures

(Continued from page 1)

research, Dillard said. For example, companies researching medical drugs need gravity-free environments. A 400-foot tower in Europe opened this year that helps experimenters create four to six seconds of near-weightlessness. But the tower is booked for the next four years, he said.

"We can offer at Poker Flat right now, today, about 20 minutes of micro-gravity using sounding rockets," Dillard said.

Outside interests

Bruce Kraselsky, vice president and general counsel for MicroSat Launch Systems Inc., a Washington D.C.-based company, said his firm thinks it might use Poker Flat to launch small rockets for commercial, science and defense missions.

He said the company is not ready to release more information.

"We're interested in Poker Flat, but we are also being pursued by a number of other launch facilities in other states including Virginia, Hawaii and Florida," Kraselsky said.

Kraselsky said Poker Flat would allow his company to launch satellites into a particularly useful kind of orbit without sending rockets over densely populated areas.

"And we like the people up there," Kraselsky said.

According to Rep. Tom Moyer, D-Fairbanks and one of the officials trying to promote commercial ventures, MicroSat expects to launch seven to 20 rockets a year from Poker Flat. With each launch, MicroSat would pay more than $150,000 in user fees. Up to 60 new employees would be needed, Moyer said.

Kraselsky said Moyer's figures are credible. "We are aware of their efforts and I think they're doing their homework," Kraselsky said. "It certainly is in line with our projections."

MicroSat is not the only company considering launching from Alaska.

Mike Schadegg, a senior staff engineer for Sparta, an engineering firm in Laguna Hills, Calif., said experiments involving the Strategic Defense Initiative could be launched from Poker Flat.

Money for the program was reduced, Schadegg said, ... may be reinstated. "Poker Flat was a candidate and it will probably still be a candidate," Schadegg said.

Motorola also considered using Poker Flat to launch 77 satellites that would relay mobile telephone calls. Dillard said Poker Flat couldn't handle that project, and Motorola decided to use a different site.

However, he said, Motorola is still considering Fairbanks to launch backup satellites.

Spreading the word

According to Dillard, Poker Flat faces two obstacles before it can become a viable commercial launch site.

First, Alaska must get the word out. According to Dillard, many commercial ventures could use the range as it is now, if they only knew about it.

Dillard recently returned from Space Expo '91, in Washington D.C., which focused on commercial ventures into space.

"Very few people realized there was a launch facility in Alaska," Dillard said. He said there was great interest expressed in the operation when people found out.

Second, Poker Flat lacks a launch pad capable of sending satellites into orbit around the earth's poles.

Polar orbit allows satellites to "see" the entire earth. Like wrapping a ball of string, the satellite's tracks can cover the entire sphere as it spins below. In contrast, satellites launched from lower latitudes can't orbit the poles and are held closer to the equator. As a result, they can "see" only about 70 percent of the earth, missing the northern and southern areas.

However, putting a satellite into polar orbit requires faster rockets than can be launched from Poker Flat.

That's where the politicians come in.

Gov. Walter Hickel supports building a launch pad capable of hosting a 30,000-pound rocket carrying satellites weighing nine to 300 pounds.

"The governor is supportive of whatever measures he needs to take in order to ensure the Poker Flat facility becomes a viable commercial operation," said Larry Galloway, assistant commissioner of the Department of Commerce and Economic Development.

Hickel's office had earlier discussed a $3.4 million state appropriation to build the launcher, but Galloway said that figure is preliminary.

He said the Alaska Industrial Development and Export Authority expects to prepare a report on what it would take to make Poker Flat a viable commercial operation.

Galloway said he hopes money for the project would come from a loan through AIDEA. The loan would be paid off by the commercial firms paying user fees to a separate authority proposed by Rep. Moyer.

Moyer introduced legislation this year to create a university-affiliated corporation, the Alaska Aerospace Development Corp., to attract commercial ventures. The corporation could issue bonds to improve launch facilities and receive grants or other funds.

Job prospects

Bob Bulmer, chief of operations in the governor's office, said the administration expects 250 new jobs in the first two years after commercial ventures get off the ground. Within a decade, Bulmer said, 10,000 new jobs could arrive.

"Theoretically, in the next 10 years it could mean 10,000 jobs, and that will blow your socks off, but that's a fact of life," Bulmer said.

Bulmer said he based those figures on the assumption that industry to support the commercial launches will move to Fairbanks.

Dillard, manager of the Poker Flat range, said he thinks the estimate is inflated.

"I would certainly hope that would be the case, but it seems like they are a little bit high," Dillard said. He said a $30 million upgrade now in the works will bring five to 10 jobs to Fairbanks.

He declined to speculate on how many jobs a commercial operation would provide. However, rocket fuel would be purchased locally and visiting scientists and technicians would stay in local hotels, he said.

As of Wednesday, the administration claimed a commitment from only one firm—MicroSat.

The firm "definitely wants to come here," said Bulmer.

However, MicroSat officials said Wednesday nothing was firm.

"Until everything is in place they will say that," Bulmer said.

Ten other companies interested in Poker Flat also have contacted the state, Bulmer said.

Galloway and Bulmer plan to tour Poker Flat Friday.

Less regulation

Owned and operated by the University of Alaska Fairbanks Geophysical Institute, Poker Flat is the only civilian rocket range in the United States. Poker Flat runs on contracts with NASA and other federal agencies. It is the only high latitude rocket launch facility available to the Department of Defense and NASA.

If it were to have polar orbit launch capabilities, it would offer several advantages over federally owned launch sites.

The site would have fewer regulations than sites such as Florida's Cape Canaveral and Vandenberg Air Force Base in California.

Another draw to Alaska is a massive upgrade underway at Poker Flat, funded by the federal government.

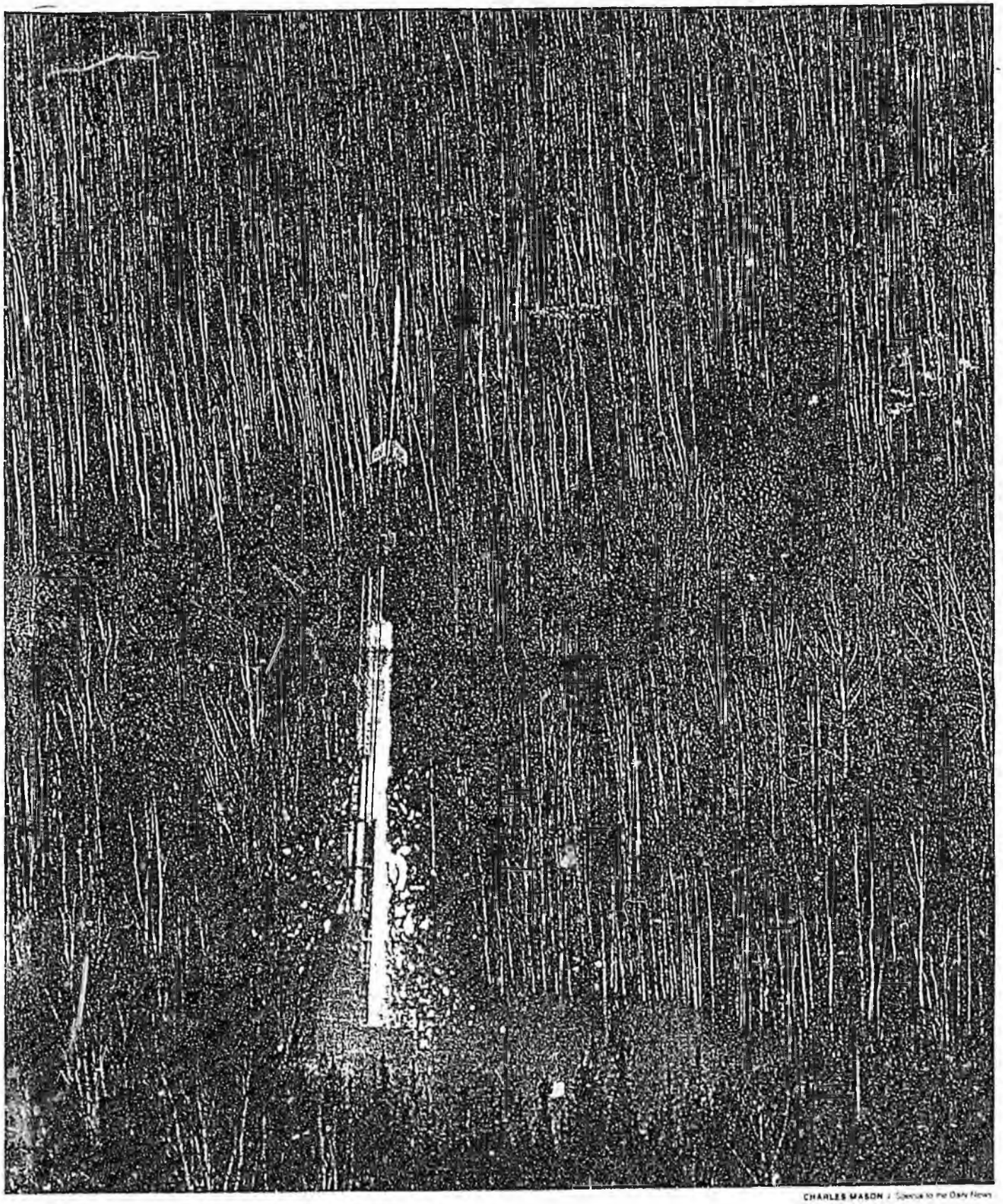
Over the past two years, Sen. Ted Stevens, R-Alaska, has secured $12.5 million to bring the range up to par with other Department of Defense and NASA installations around the world.

The money is the first phase of a three-phase upgrade that will total $30 million, said Jane Robbins, Stevens' press secretary.

Robbins said the Air Force expects to award contracts by May.

Dillard has big dreams for the expanded facility.

"It'll give us a state-of-the-art (launch range) that we hope will attract additional business for research and development and commercial ventures," he said. "It'll give us a place where scientists all around the world will want to come to do different types of research."



CHARLES MASON / Special to the Daily News

A rocket takes off at the Poker Flat launch site near Fairbanks.

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The aurora bc

PORKPIE IN THE SKY

Sen. Ted Stevens has earmarked public funds for studies of the power-generating potential of the northern lights. But where did he get the idea it was even remotely possible?

PAUL SOUDERS / Anchorage Daily News

aurora borealis: "At any time over Fairbanks there's more energy than there is in the whole United States," Stevens says.

By Susan Cohen

This is the tale of a United States senator and the vision he sees in the night sky.

Electrical energy floats high above Alaska, where it is visible as the aurora borealis — a shimmering white, green and crimson curtain. These brilliant northern lights are, in fact, the product of a huge natural generator that produces up to 10 million megawatts of power as particles from the solar wind crash into Earth's magnetic field.

But where others see only the poetry of nature's light show, Alaska Sen. Ted Stevens sees the possibility of someday satisfying the energy needs of the world.

"At any time over Fairbanks there's more energy than there is in the whole United States," Stevens says. "Is it possible for mankind to think of using that energy? I don't think we should abandon the thought."

Stevens certainly hasn't. The Republican senator has used his position as the ranking minority member on the Senate's Defense Appropriations Subcommittee to put money where his dreams are. Citing the possibility of harnessing the energy potential of the aurora borealis, Stevens has secured more than $57 million over the last several years for projects that could benefit both research

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in the upper atmosphere and the relatively small University of Alaska Fairbanks. Together, an enterprising university, a powerful senator and the aurora borealis have generated some sizzling electricity indeed.

But there are some rather substantial problems with harnessing the energy of the aurora. "The senator likes to say there's enough energy floating over Alaska to supply all of North America," says Robert Park, a professor of physics at the University of Maryland who also heads the Washington office of the American Physical Society. "Well, there's also enough energy in the moonlight falling on North America to supply all of North America's energy needs. It's just a matter of collecting all those moonbeams."

And he laughs.

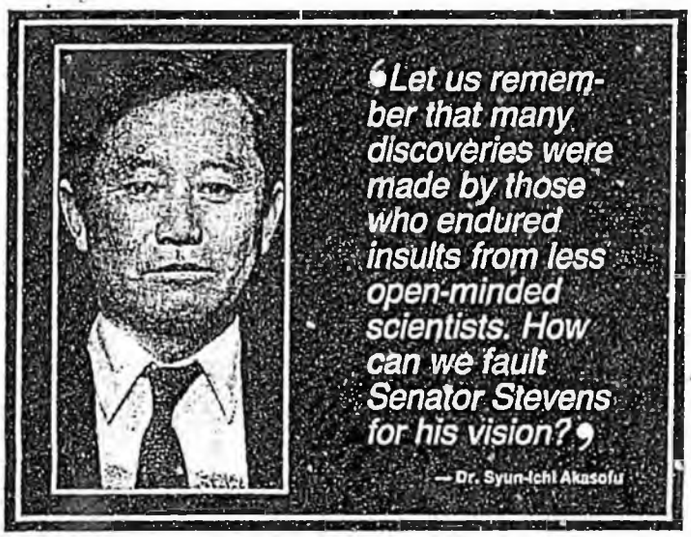
COMMON PRACTICE

Pork-barreling — the traditional congressional practice of shoveling government appropriations to home districts — is such a widely accepted ritual of Washington life that it's not considered newsworthy anymore, unless some naive do-gooder tries to interfere with it. Early in his presidency, for example, Jimmy Carter tried to eliminate a few measly water projects and was very nearly run out of town.

What's been standard practice for dams and roads, however, is relatively new for science. Traditionally, federal agencies like the National Science Foundation and the National Institutes of Health establish panels of academic experts who subject competing scientific projects to rigorous peer review. But in the early 1980s, arguing that peer review is tilted toward big-name institutions and that there is no federal pot of funds for building multimillion-dollar new facilities, a few universities began hiring lobbyists and going directly to individual members of Congress for help. Other academic institutions and even individual researchers became fast learners at this controversial new game, widely called academic pork-barreling.

From $67,000 in the Agriculture Department budget to research the Belgian endive at the University of Massachusetts, to $10 million in the Defense Department budget for a pharmacy college at Drake University, members of Congress increasingly slip "earmarks" for specific scientific projects into huge appropriations bills for agencies that never requested the funding. The projects represent such infinitesimal amounts in bills that can total $300 billion that they are rarely debated — though University of Virginia researcher James Savage calculates that Congress designated around $1 billion for academic pork between 1980 (a year when only about $10 million was earmarked) and 1989 (when a conservative estimate puts the total at more than $200 million).

Robert Rosenzweig, president of the Association of American Universities, says that the practice of seeking funds directly from Congress — once considered beyond the pale by universities — "has exceeded anything I ever imagined in 1983." That's the year Columbia University won a new chemistry building after hiring Cassidy and Associates, a lobbying firm that has made a specialty of representing academic institutions, including the University of Alaska.



These days, Rosenzweig says, university lobbying has "moved from classical to baroque to rococo." He predicts "it will lower the quality of science in this country," not because it won't result in Congress funding some good projects but because "it bypasses every institution of merit review we have developed over the past 40 years to guard against mediocrity."

Congress was especially generous to the University of Alaska, a school with only about 8,000 students, in fiscal 1991 — a year that set an all-time record for academic pork.

Compiling its annual list of what it calls "earmarked" or "unreviewed" projects, the Chronicle of Higher Education found $493 million set aside for specific universities and noted that the true figure might be slightly higher, since such items are often hidden in obscure legislative language and might take years to identify. For the University of Alaska, the Chronicle noted two projects in the Defense Department budget: a new supercomputing center and the continued upgrading of the university's rocket-launching range at Poker Flat. Congress set aside $25 million in fiscal 1991 for the supercomputer and $2.5 million for Poker Flat. The projects would no doubt have remained buried in a long list — sandwiched between the $10 million Energy Department appropriation for a biomedical research facility at the University of Alabama and the $3.75 million in Agriculture Department funds for the Poultry Center of Excellence at the University of Arkansas — if it hadn't been for Stevens' eagerness to share his dream.

At a hearing of the Senate Committee on Rules and Administration in June 1990, Stevens defended earmarking and attacked the process of scientific peer review. "I could tell you about the time when the University of Alaska came to me and said it might be possible to bring the aurora to Earth. We might be able to harness the energy in the aurora...," the senator declared, according to a committee transcript of the hearing. "No one in the Department of Defense, no one in the Department of Energy, no one in the executive branch was interested in pursuing it at all. Why? Because it did not come from the good old boy network. So I did just what you say I should not do. I got Congress to earmark the money, and that experiment is going on now. It will cost $10 million to $20 million. If it is successful, it will change the history of the world."

The Rules Committee — on which Stevens is the ranking Republican, just as he is on Defense Appropriations — was debating a change that would have enabled any one senator to block an earmark with a point of order. Sen. Sam Nunn, who chairs the Senate Armed Services Committee, had proposed the change along with Sens. John Danforth and Terry Sanford, arguing that while members of Congress might be qualified to judge a good dam project, most of them wouldn't know one end of a Bunsen burner from the other.

In part because of Stevens' vehement opposition, the proposed rules change died in committee.

'WACKIER THAN MOST'

Looking through the 1991 budget and the congressional record for examples of scientific pork, Robert Park came across one of Stevens' aurora speeches and couldn't believe his luck. The American Physical Society opposes earmarking, and "this just seemed like a particularly egregious example," Park says. "There are plenty of others. This just sounded wackier than most."

It's not that there isn't plenty of power in the skies over Fairbanks, or good reason to study it. There are concentrated currents, called electrojets, that flow in the ionosphere and may sometimes reach millions of amperes. When the electrojet touches Earth, as it sometimes does during magnetic storms, it can knock out telephone cables and power grids.

But this enormous power is normally spread out over many square miles. "The currents — while very, very large — are very, very diffuse in the ionosphere," explains Louis Lanzerotti, a space physicist who studies the impact of the aurora on sophisticated communications systems for AT&T Bell Telephone Laboratories. "The current density ranges from a few amps to perhaps as much as 1,000 amps per square kilometer, but it would still be less than the current density used in a single microwave."

Writing in Science magazine, physicist Paul Selvin calculated that to collect these diffuse currents would take an antenna the length of the distance from Mount

McKinley to Mount Fuji. As for trying to collect them up in the ionosphere, an antenna attempting to orbit within Earth's gravitational pull would soon plummet. There is the alternative of a large metal plate on the ground. "You'd have to almost pave over Alaska in order to tap the current," Lanzerotti says. "If you tap the whole of Alaska, you'd be in great shape, maybe. Then the problem is the electrojet is very ephemeral. Sometimes it's north of Alaska, sometimes it's south." Lanzerotti, who calls the whole energy-retrieval notion "Buck Rogerish," reflects that if any researchers in the relatively small community of space physicists presented such a proposal for peer review, "They'd be the laughingstocks of the community."

So whose bright idea was it? "It was stimulated by a team that came into my office several years ago from UCLA, Pennsylvania and the University of Alaska," says Stevens, who graduated from the University of California-Los Angeles before going on to Harvard law school. "They talked about laser-directed energy, a plate of electricity that could be maneuvered."

In 1988, the director of the University of Alaska's Geophysical Institute, Syun-Ichi Akasofu, made a presentation to Stevens and his staff, along with UCLA physics professor Alfred Wong. At the time, Alaska, UCLA and Penn State were jointly engaged in a three-year project investigating the upper atmosphere and its effects on radio waves. The project, which has evolved into something called HAARP — for High-Frequency Active Auroral Research Project — was then funded by the Office of Naval Research at $800,000 a year. The scientists had achieved some promising results by beaming energy into the ionosphere to create extremely low-frequency waves that can travel long distances and to great depths — perhaps, the hope is, ultimately to communicate with submerged submarines. If they only had a more powerful transmitter, scientists involved in the project thought, they could create more long waves, essentially turning the atmosphere into a giant antenna. "There's a current flowing up there that you can modulate, and make some waves," Wong explains. "Professor Akasofu and myself have never claimed it was a way of taking energy to the ground."

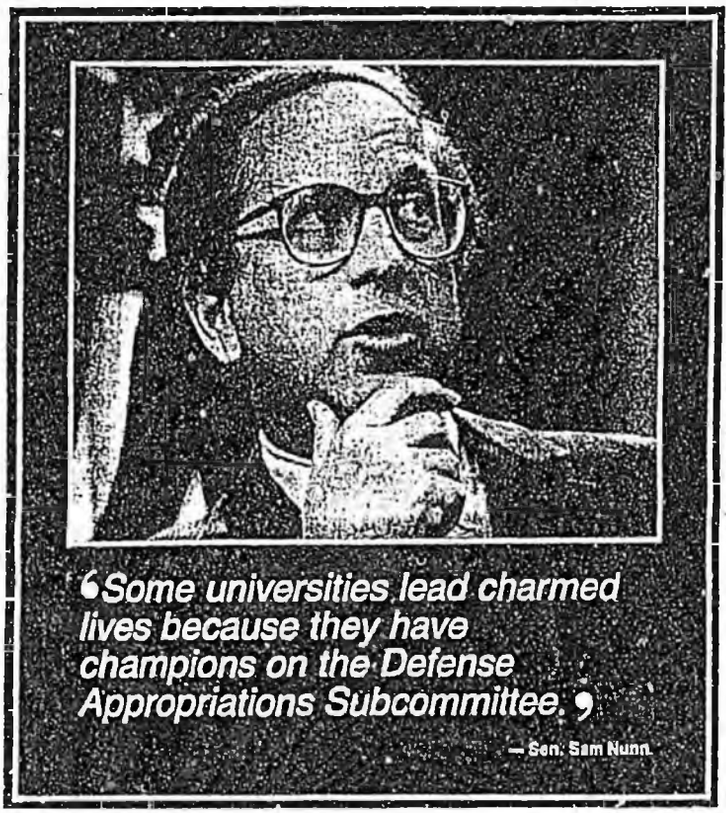
Wong insists that "I don't quite understand, myself" who first suggested that the HAARP project had anything to do with creating domestic energy from the aurora.

"It was Akasofu talking about Poker Flat," he says, referring to the University of Alaska Fairbanks rocket launching range, which is one possible site for the new transmitting facility. "I was talking about this new way to modify the ionosphere."

He remembers Stevens was very interested. "His staff asked questions. I don't want to claim the credit, but that might have stimulated some of his interest."

Wong remains open-minded about the future. "There's a lot of power up there ... floating around all the time. Some people who are clever enough might be able to collect it, just like the solar energy." But he adds, "That has never been our intention in the beginning or even now. It's just that we're trying to find out what's happening up there. We never in any publication point it out. People hear there's energy up there, and they conjecture."

Some space physicists believe Stevens has been helped along in his conjecturing. University of Maryland professor Dennis Papadopoulos arrived at the 1988 meeting late. "They had briefed Senator Stevens before I got there, but I was given some of the view graphs, and this idea (of tapping the aurora's energy) was in some of them. I thought it was unfair to the (scientific) community. I asked Dr. Akasofu, 'Why can't you straighten the senator out?' and he said, 'How can I straighten the senator out?'" Papadopoulos, a strong proponent of HAARP, is still angry at the jeopardy into which he believes the project was placed by being characterized as harnessing the aurora to run toasters. "That's totally flaky ... The people who sold the senator on this idea should know better."



POSITION OF POWER

In fact, wherever the senator got his idea, the High-Frequency Active Auroral Research Project has not suffered because of it, but has thrived. Stevens has employed the notion of sky-powered toasters in a number of ways to send money in the direction of HAARP, auroral research and the University of Alaska.

The Office of Naval Research had no way of funding a major transmitter. Stevens went to the Senate Armed Services Committee, which authorizes broad policy and funding for defense. The Senate report accompanying the defense authorization bill for 1990-91 noted HAARP's benefit for military communications and added: "Long-term research could provide even greater benefit by accessing the tremendous energy embodied in the electrojet current." Stevens could help even more directly from his seat on the Defense Appropriations Subcommittee, which makes the final funding decision. Congress appropriated $10 million for HAARP in fiscal 1990. Bobby Junker, director of mathematical and physical sciences at the Office of Naval Research, says his agency never requested the money: "We learned about it when the appropriations bill came out with these funds in it." Congress appropriated an additional $9 million in 1991.

Papadopoulos, who was involved in HAARP's initial phases, predicts the transmitting facility might cost $30 million by the time it is built. The appropriation specifies that contracts must be allocated on a competitive basis. The Office of Naval Research selected the University of Alaska to act as liaison with the academic community. The facility will be located in Alaska, and the university hopes it will be near Fairbanks, at Poker Flat.

Poker Flat, a university-owned and operated rocket launching facility under contract to NASA, also benefited from Stevens, who has twice taken congressional delegations there.

The facility "was always a shoestring operation," according to University of Alaska professor Juan Roederer, who formerly headed the Geophysical Institute and until recently chaired the presidentially appointed Arctic Research Commission. The Geophysical Institute, which uses the range to conduct upper-atmosphere experiments, went to NASA seeking money to upgrade the facility, Roederer says, but "it was very difficult."

With Stevens' help, the Poker Flat upgrade was funded from the Air Force budget. Congress directed the Air Force to spend $10.8 million in 1990 and an additional $2.5 million in 1991, but the Air Force released only $6.7 million before unsuccessfully seeking congressional permission to use the remaining money elsewhere. The university sought Stevens' help once more, this time to transfer the upgrade to NASA, according to Geophysical Institute Associate Director Merritt Helfferich. The NASA budget for fiscal year 1992 contains a provision allowing the space agency to spend up to $10 million upgrading Poker Flat. An additional $10 million is in the 1992 Air Force budget. The state of Alaska now hopes to turn Poker Flat — the only high-latitude rocket range

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on United States soil — into a commercial launching facility.

Then there was the supercomputer.

In August 1990, Stevens went to the Senate floor to once again praise the potential in the sky. "We have in Alaska what I consider to be one of the most exciting research projects that I have ever encountered," he said. "It is the experiments that are going on trying to determine if it is possible to harness the energy of the electrojet for the use of mankind." The experiment, he went on, "has the potential of using a laser beam to be a conductor of this energy back to Earth ... It is an experiment that, when I first heard about it, I thought someone had rewritten a new chapter of Jules Verne."

Stevens then offered an amendment to an energy and water development appropriations bill. It directed the secretary of energy "in cooperation with the University of Alaska Fairbanks" and "with specific reference to the needs for auroral energy research" to determine the type of computing facility needed by the Geophysical Institute and by the Global Change Institute, which the university established that year. In a press release touting this amendment, the senator noted that "while this year's budget is too tight to appropriate the $25 million necessary to buy and operate a new supercomputer for UAF," the amendment "would help lay the groundwork for an appropriation next year." As it turned out, Stevens did not need to wait. Several months later, he found a new pot of money — in defense appropriations.

The Senate Armed Services Committee had authorized the brand-new Strategic Environmental Research Program (SERP) to deal with a wide variety of issues, from cleanups at military installations to global change. The authorization bill including SERP contained no earmarks. By the time SERP showed up in the 1991 Defense Appropriations Bill, however, it included an arctic supercomputer. The report from the Senate Appropriations Committee describing the bill stated that out of the money for SERP (ultimately $150 million), $25 million "shall be available only for the establishment of an Arctic region supercomputing center." The Defense Department was directed to acquire one supercomputer and locate the center "at an institution engaged in Department of Defense research located within the Arctic region." The supercomputer was to aid research on global change but also support such other Defense Department initiatives as "the possible exploitation of the auroral ionospheric electrojet for non-polluting power generation."

The bill went to the Senate-House Defense Appropriations Conference Committee, which stuffed it with new earmarks and then waived both the Competition in Contracting Act and a 1988 law requiring merit review of defense grants to universities. The waivers so infuriated Sen. Nunn, who had authored the 1988 law to protect the defense budget from academic pork-barreling, that he denounced the "extraordinary procedure" on the Senate floor. "Some universities lead charmed lives because they have champions on the Defense Appropriations Subcommittee," Nunn told the Senate. "Evidently these projects are of such questionable value to the Department of Defense that the bill has to exempt these projects from any form of competition or merit review in order to assure their funding."

> "The senator likes to say there's enough energy floating over Alaska to supply all of North America. Well, there's also enough energy in moonlight to supply all of North America's needs. It's just a matter of collecting all those moonbeams."
>
> — physics professor Robert Park

In his press release announcing the passage of the conference report, Stevens said, "It is expected that the University of Alaska Fairbanks ... will be the site of the supercomputer." He added that the installation "would make UAF the arctic research center for global environmental change and auroral energy." Alaska newspapers carried a statement by the university's president that UAF staff and consultants had been working closely with Stevens' office for 18 months.

But the university's joy at the senator's obviously sincere interest in its research was tempered by some uneasiness at his rhetoric. "We were concerned," says Professor Roederer, especially about UAF's reputation among other researchers. After all, representatives of the American Geophysical Union were now calling the notion of harnessing auroral energy "nonsense" when they were feeling kind and "crazy" when they weren't.

Roederer finds Stevens' reference to using a laser to conduct energy back to Earth especially bewildering. "It works the other way. You pump a lot of energy up. You don't take it down." Equally confusing has been the senator's continued insistence that the university is studying how to use the aurora to produce energy. Is it doing such research, he is asked? "No. If it's somehow to convert electric energy that's up there into something usable down here — no. There isn't anything, and I don't think there will be." He says he simply cannot imagine "a practical way" to go about it.

An Alaska newspaper, meanwhile, has dubbed Stevens the "Jules Verne of Alaska."

Soon after Congress approved the supercomputer, Geophysical Institute Director Syun-Ichi Akasofu began circulating documents laying out the history of HAARP and Poker Flat. Akasofu, who for weeks did not return repeated phone calls in connection with this article, noted in his written account that it was the Strategic Defense Initiative Office, at a meeting in 1987, that first presented needs the rocket range couldn't meet. It was suggested, Akasofu explained, that he talk to Stevens because "none of the agencies represented at the meeting were willing to fund the upgrade." He wrote that he hadn't known about the HAARP appropriation until it passed the Senate.

Akasofu, who was born in Japan, has taught at the University of Alaska for almost 30 years and is internationally recognized as a top-flight aurora researcher who broke important new ground beginning with his doctoral thesis, done at the university. He is known as an "institution" on campus and was praised last year by the Fairbanks Daily News-Miner for bringing research dollars into the state and raising more than $1 million from Japanese companies to fund an academic chair.

In a document dated Oct. 31, 1990, Akasofu wrote that Stevens "challenged us during our brainstorming sessions to consider how energy from the aurora might be harnessed." He noted that the solar wind is a plasma and that plasmas must be better understood in order to achieve nuclear fusion. "What the senator means by 'bringing aurora energy down to the ground' is to 'bring the knowledge of auroral research to accelerate fusion energy research,'" Akasofu concluded.

Even those who most admire Akasofu as a scientist find that a rather large extrapolation. "In some very indirect way, if the university learns about plasma in the aurora, it strengthens plasma science and plasma science is the underpinning of fusion research. But I would certainly not spend money on that," says Charles F. Kennel, UCLA professor of space physics. "If I had to spend $10 million to get fusion energy out of the aurora, I wouldn't know how to do that."

Kennel, who calls Akasofu "one of the world's leading experts on the aurora," also doesn't know how the senator got his dream. "The people who believe it's complete idiocy tend to think someone in the science community sold it to him and that we prostituted ourselves. Those who are more generous think the senator found a way to communicate with his constituents." Kennel obviously counts himself among the more generous. "I get the impression he likes his institute of geophysics very much — and it is outstanding. He has a way of communicating with his constituents."

At the end of October, Akasofu issued a new and combative written statement on Poker Flat, HAARP and future energy needs. He stressed that "these are major national projects." He no longer suggested that Stevens really was talking about plasma. This time Akasofu wrote: "Senator Stevens has been concerned about future energy needs and ... believes that all scientists are responsible for finding such an energy source.

Stimulated by the vision of the late German rocket scientist Wernher von Braun, he urged scientists to explore the possibility of collecting the energy carried by the solar wind as one of the possible future energy sources.

"Most of the obvious energy sources have already been explored. Anything left would be considered to be formidably difficult, so much so that less open-minded scientists may well ridicule it at this time. But let us remember that many discoveries were made by those who endured insults from less open-minded scientists. How can we fault Senator Stevens for his vision?"

FIERCE ADVOCATE

Stevens' way of communicating this vision is personal — unlike most of his peers, he likes to return his own phone calls. In responding to questions about his fondness for the University of Alaska, he sounds disbelieving that anyone could fault him for trying to funnel money to his own state. "I am the senator from Alaska," he says with the directness and crustiness for which he is known. (He has a reputation as a fierce advocate for Alaska interests and found himself embroiled in another controversy recently when he got an Alaska airline exempted from a new Federal Aviation Administration safety regulation.)

But Stevens denies circumventing peer review. And he remains unbothered by scientific derision.

"I think I have a smattering of knowledge on that whole subject," he says when asked about the aurora. "A portion of the electrojet comes down to Earth in Alaska. I've said why can't it come down through the conditions that have been created by man. The people involved have said why don't we pursue that."

But he has tempered his description of what is being accomplished toward this dream. All the projects have other uses, he notes. "I haven't put up any money to fulfill my dream yet. I've just helped the university and Poker Flat and HAARP to go forward, hoping the spinoff might be a group that would look into the potential of energy."

As for the supercomputer, the money has yet to be released. SERP, which is now called SERDP, the Strategic Environmental Research and Development Program, is just getting under way, and a scientific advisory panel has been established to review proposed projects. "I

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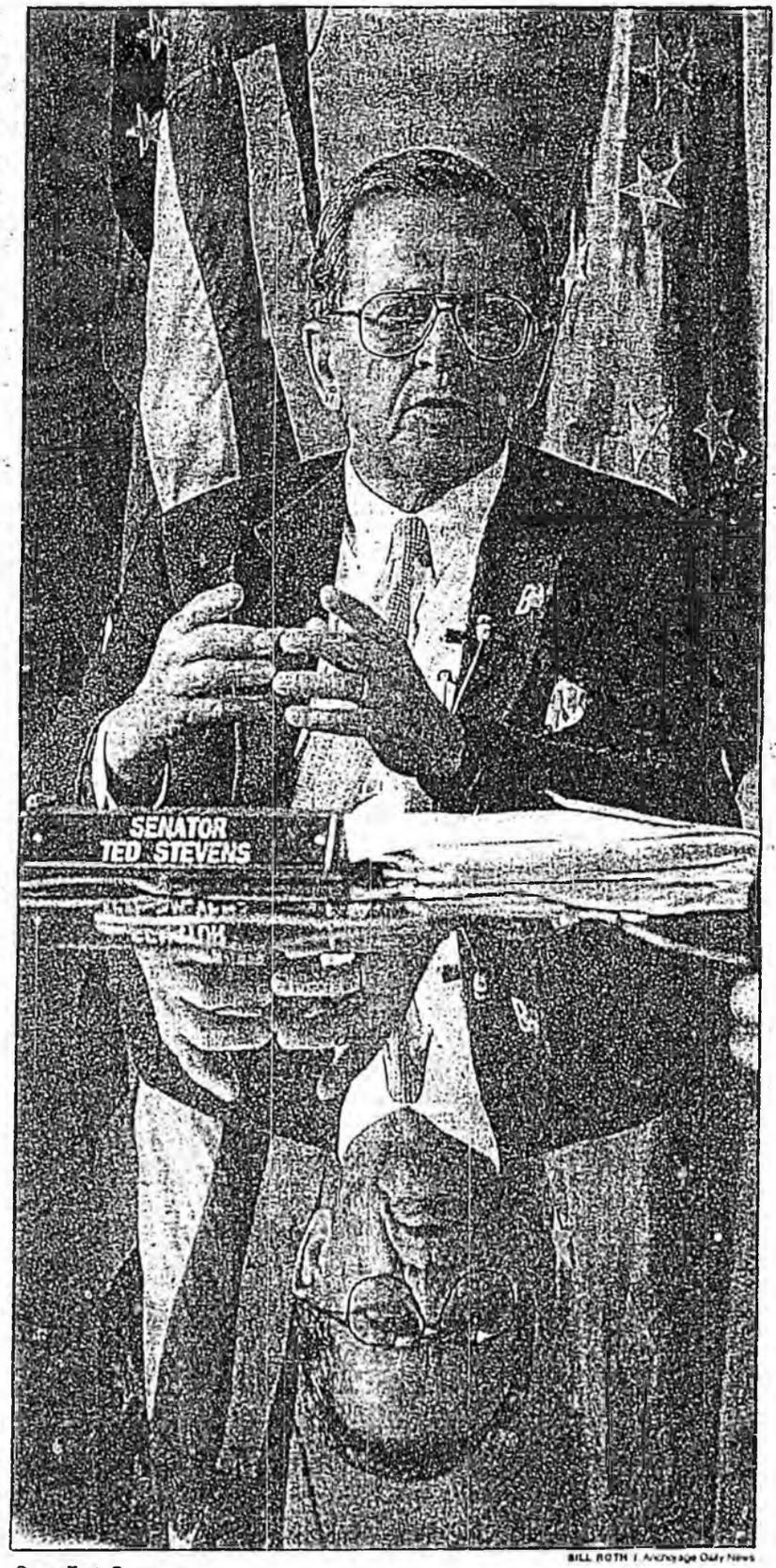

BILL ROTH / Anchorage Daily News

Sen. Ted Stevens

"We have in Alaska what I consider to be one of the most exciting research projects that I have ever encountered . . . It is an experiment that, when I first heard about it, I thought someone had rewritten a new chapter of Jules Verne."

— Sen. Ted Stevens

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have not earmarked any money for the University of Alaska to go around the peer review process; if DOD (the Department of Defense) determines that the supercomputer is needed, it will be released," Stevens says. "I have assisted in making funds available that could be awarded to the University of Alaska by the Department of Defense or NASA if that was their decision."

When the planning body for SERDP met in August, screened proposals and compiled a list of some $170 million in projects considered meritorious enough for its scientific panel to review, the arctic supercomputer did not make the list. But the Senate Appropriations Committee now has made its desire for the project even clearer. The 1992 defense appropriations bill reiterates that $25 million of SERDP's budget could be spent only on the arctic supercomputing center. But this time, because the language was placed in the bill itself rather than just in the accompanying report, the project became mandatory. The committee also asked the director of defense research and engineering to report on an acquisition plan and schedule for the supercomputer by Feb. 15.

At the University of Alaska Fairbanks, Vice Chancellor for Research Luis M. Proenza says "we are as certain as we can be" that the supercomputing center will become a reality. The university already has a building — paid for by the state of Alaska, Proenza points out — to house the supercomputer, which will be used both by federal agencies and the academic community.

UAF is understandably displeased to be singled out as an example of pork-barrel politics. Proenza likes to point out that it is only by virtue of Alaska that the United States is an arctic nation and that promoting interest in the Arctic tends to look the same as promoting the self-interest of Alaska. Interest in the region has indeed increased. In 1984 Congress created the Arctic Research Commission to advise on research needs.

"Many things come our way by evolution of our policy in the Arctic," Proenza says. He states that the university "didn't initiate" either HAARP or the Poker Flat upgrade. The Arctic Research Commission, he says, strongly recommended the upgrade and "also made a recommendation of the serious needs that existed for data and information systems. We helped move that along.

"You might say this is our time of opportunity. There's a confluence here of state and national priorities coming at a time in history," Proenza says. He thinks the country was slow to recognize the value of the Arctic as an early-warning system for global change and that Stevens should be commended for his foresight.

In contrast, Proenza says, the funding system based on peer review favors the Antarctic over the Arctic and is biased against states like Alaska in favor of the West and Northeast. "Money tends to go where money is," Proenza argues. "The need for some kinds of research in the Arctic wouldn't stand a chance in competition. In this regard, Senator Stevens is ahead of his time, and I'm sure the nation will thank him at some point."

Arctic Research Commission Executive Director Philip Johnson takes a somewhat different view of the subject. The commission did recommend the upgrading of Poker Flat, says Johnson, who recalls that "the University of Alaska in their brochuremanship on the Hill *used* that recommendation." But, Johnson adds, "the supercomputer does not relate to that (the Arctic Research Commission's support of a Poker Flat upgrade) at all. I don't think any of our recommendations could relate to that except in the most general way.

"The supercomputer, as I understand it, was entirely a University of Alaska initiative," he says. "Every major university would like to have access to a supercomputer. It's one of the toys of the future you'd like to have. How it plays a role in this aurora borealis business is beyond my comprehension."

Even if arctic research required a supercomputer, Johnson notes, it wouldn't have to be in Fairbanks. A computer at Ohio State University, for example, could be dialed from Moscow — or from the University of Alaska. "I would not anticipate the University of Alaska could fully utilize a supercomputer of the size they're talking about," he says.

Johnson also disputes Proenza's assertion that research in Antarctica is funded at the expense of arctic research. "I wouldn't want to support that argument. There may be a feeling when you're as far away as Alaska that the world doesn't pay enough attention." (It's worth noting that the University of Alaska Fairbanks' own literature brags that, on a per-researcher basis, it receives more National Science Foundation funding than any other university in the United States.)

Still, Johnson is not unsympathetic. "We are not advocating end runs around the peer review process, so why are they happening?" he asks. "There's a climate because the research equipment's in short supply in university after university. Those entrepreneurs in the research community who have a pathway to the political process plead this, and there's some legitimacy." Universities that play the pork-barrel game not only plead equipment shortages but point out that even if they wanted to go through peer review, almost no federal money has been set aside to build scientific facilities.

In the end, the lesson of the aurora borealis tale is not that Stevens' interest won't result in good science. The lesson, say the critics of academic pork, is that when projects are funded based only on a member of Congress' understanding, there's no protection from bad science. Earmarks are rarely debated, yet often commit agencies to years of ongoing funding. (The National Science Foundation's supercomputing centers, for example, cost more than $20 million a year each to operate.)

"I believe this is a perfect example of what happens when you allow programs to be funded by earmarks on the floor of Congress," says the American Physical Society's Robert Park. "The strength of American science is built on the peer review process. When you try to circumvent expert analysis by inserting things on the floor of Congress, it's bound to lead to wastefulness." Park points out that half a dozen universities "a lot larger and a lot better situated than the University of Alaska" are without supercomputers.

But Stevens still cherishes his vision — and he won't let the scientific naysayers stand in its way.

"Scientists are like lawyers," Stevens cracks. "Most of them are mistaken at any one time."

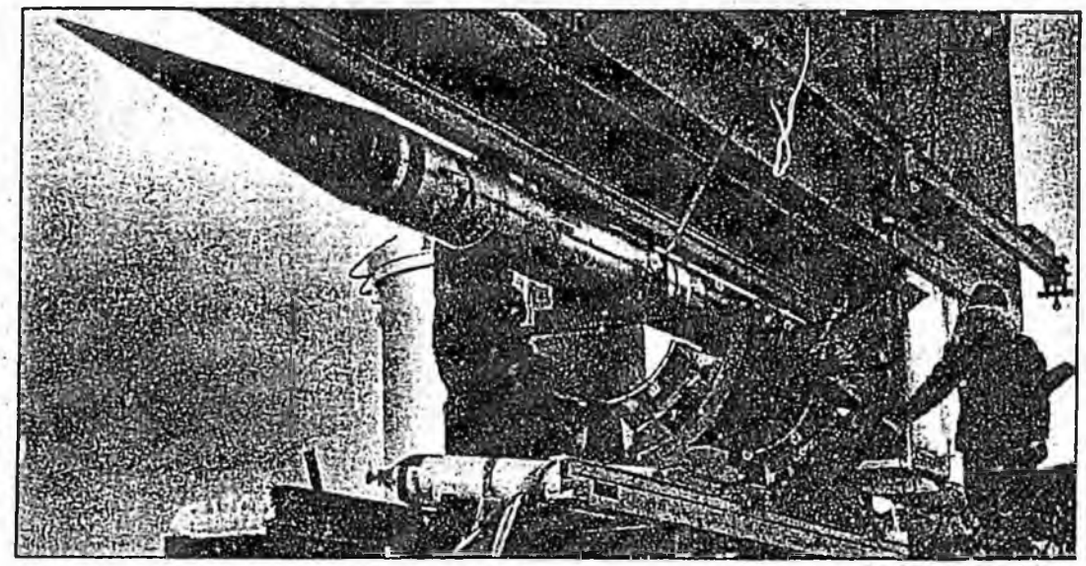

Photo courtesy University of Alaska Fairbanks

A Nike-Orion rocket with scientific payload waits on its launch pad at the Poker Flat Research Range. The state of Alaska hopes to turn Poker Flat into a commercial launching facility.

☐ Susan Cohen teaches journalism at the University of California at Berkeley. This article first appeared in the Washington Post Sunday Magazine.

Space, at warp speed

State money lights fire under rocket industry

By RALPH THOMAS
Daily News reporter

JUNEAU — Alaska may be getting into the Star Wars business and state funds are being used to design the rocket that could make it happen.

A new, Virginia-based space company in the market for military contracts is dominating Alaska's infant space industry and is likely to become the first customer of the state's hastily formed aerospace corporation

Microsat Launch Systems, which expects to fire the first commercial launch from the Poker Flat rocket range near Fairbanks within two years, has Pentagon connections and plans for capturing several Strategic Defense Initiative — Star Wars — contracts.

The company didn't tell state officials of its Star Wars plan when it applied for a state grant or when it got part of a state contract at the range near Fairbanks, but state officials didn't ask and say they don't mind that the company didn't volunteer the information.

Although Alaska's space venture is only a few months old, Microsat already is involved at almost every level.

It has a board seat on the state's Aerospace Development Corp., which will upgrade and run Poker Flat and entice companies in the fledgling small-satellite industry to use it for launches. The corporation was formed in July when Gov. Wally Hickel signed a bill that sailed through the legislature with little scrutiny and no dissenting votes. The legislature ever gave the corporation $302,500 to get started.

Microsat's seat on the state aerospace board is occupied by former astronaut Gene Cernan, who is also on Microsat's board.

Last week, Microsat got final approval

Please see Back Page, MICROSAT

THE BACK PAGE

MICROSAT: Company gets quick start at Poker Flat

Continued from Page A-1

for a $700,000 state grant, the largest ever given by the Alaska Science and Technology Foundation. Microsat will use the money to help develop the rocket it hopes to use to launch satellites, both civilian and military.

In June, a Fairbanks engineering firm affiliated with Microsat was awarded a $120,000 state contract to study the feasibility of building a new launch site at Poker Flat — one capable of sending Microsat's rockets into orbit. State officials are already discussing funding schemes for the new launch pad, estimated to cost about $3.4 million.

"Yeah, they're getting quite a deal," said Edward Ellegood, director of operations for Florida's spaceport authority. "I wish we could provide them that kind of incentive."

Microsat likes the incentives, too. Company spokesman Brad Schwartz said, "We're extremely excited about what the state has done in a short period of time."

Jamie Parsons, the company's representative in Juneau, said what Microsat finds appealing about launching from Poker Flat "is that there's no bureaucracy involved."

Commerce Commissioner Glenn Olds said he has put the aerospace corporation on a fast track, but said Microsat has not been getting any special treatment. He said it's just that Microsat got there first.

Poker Flat is a 5,200-acre rocket range about 30 miles northeast of Fairbanks off the Steese Highway. It was established in 1969 and has been used by the University of Alaska Fairbanks to launch small research rockets.

When the bill to create the aerospace corporation was racing through the legislature, supporters predicted a booming commercial space industry at Poker Flat. They talked about making Alaska the next "orbital state" and sending scores of communication, remote sensing and research satellites into space, similar to the scientific suborbital launches UAF has been doing for two decades.

There was little, if any, talk about military payloads.

But if things go according to Microsat's plans, Poker Flat could become a prime launch site for testing "Brilliant Pebbles," one of the Pentagon's most controversial defense plans. Brilliant Pebbles calls for sending up 1,000 miniature satellites to spot,

Project for the Federation of American Scientists.

Major Mike Doble, spokesman for the Pentagon's Strategic Defense Initiative Organization, said whatever funding Congress gives to Star Wars development, at least some of the launches will be with smaller rockets. Pike said Brilliant Pebbles has said.

It wouldn't have been difficult, however, for state officials to find out more about Microsat. Copies of the company's business plans are on file at the Commerce Department's securities division, where Microsat had to get permission before seeking investors in Alaska.

Microsat has tried to get the business plans out of the public file, though. In a letter sent this month to the securities division, Bruce Kraseisky, Microsat's corporate affairs vice president, said the plans are confidential and that releasing them could harm the company.

But Ed Watkins, a state securities investigator, said the plans will stay in the file. "Our general rule is that whatever we base our decisions on should be available for public review," Watkins said.

Jamie Parsons,the Microsat representative in Juneau, was formerly business development director in the Commerce Department. His job now is to help Microsat find investors in Juneau. Parsons said Microsat hopes to raise $1 million from Alaska investors.

Parsons said he hadn't been told about possible defense contracts and that they weren't mentioned in the Microsat presentations.

Olds said Microsat's specific launch plans were probably kept secret to keep information from competitors. He said it didn't concern him that future military-related launches were not discussed when the aerospace corporation was being formed.

Microsat was formed in 1988 and has since teamed with several other companies to develop and promote its new rocket, the Orbital Express. Microsat has estimated its four-stage Orbital Express will cost about $3.5 million per launch. The company's business plan says the cheapest launch any competitor can offer is $8.5 million.

When launching at Poker Flat, Microsat will have to pay a fee — averaging about $150,000 per trip — to the state aerospace corporation, Bulmer said.

According to the company's business plan, numerous firms and government agencies have inquired about Microsat's new rocket. Several firms — including Defense Systems Inc. — have already made deposits to Microsat for future launches.

The business plan also reveals several ways Microsat stands to make millions on Star Wars.

In all, Microsat lists up to $186 million in "near-term" contract opportunities. At least $127 million of that would be for military-related launches.

Microsat would conduct the launches with its Orbital Express rocket.

Microsat spokesman Schwartz wouldn't say if the company will conduct Star Wars launches from from Poker Flat, but he wouldn't rule it out. He did say 80 percent of the Orbital Express launches will be sent on polar routes, and the best place to do that will be from Alaska. It will take much less fuel to reach a polar obit from Alaska than it does from existing launch sites in the Lower 48, Schwartz said.

Schwartz would not talk about the specifics of Microsat's business plans, but said the company was gearing up for a long stay in Alaska.

Schwartz said Microsat plans to send its launch operations division, with about 30 employees, to Fairbanks. He said rocket parts and fuel would be trucked to Fairbanks, where the rockets would be assembled and prepared for launch.

It's this sort of stuff that has Bulmer and others in the Commerce Department speaking so fondly of Microsat.

"They're aggressive, high-energy young people," Bulmer said. "They're a very impressive group ... We're all going to benefit from this, there's no question."

John Sibert, director of the Alaska Science and Technology Foundation, said the foundation's board was also impressed with Microsat. Before Microsat's $700,000 grant, the largest ever given by the foundation was for $363,650.

Microsat's Schwartz said a state official — he wouldn't say who — had asked him not to discuss the grant with reporters. Sibert said that request didn't come from his office.

"Not from us," Sibert said. "We're not that paranoid yet."

Sibert said he would not be surprised if the Orbital Express were used for Star Wars-related launches, but said military launches were not part of the grant review. "If that (defense contracts) had been the whole market, we would not have funded this project," Sibert said. "Who knows what defense is going to do?"

At least five space industry experts who reviewed Microsat's plans felt the Orbital Express and its market would fly, Sibert said. But he wouldn't release the names of

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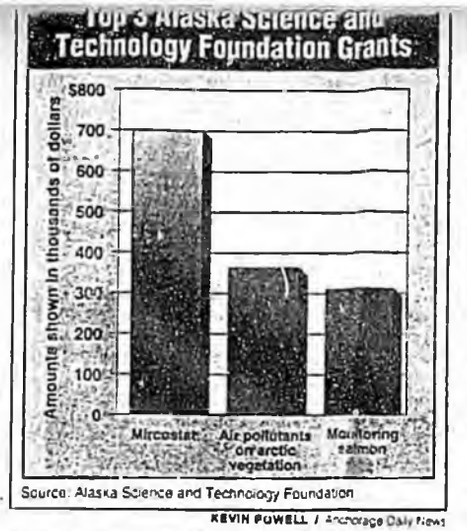
Microsat is developing a new rocket the company says will halve the cost of "microsatellite" launches, those involving payloads of less than 300 pounds.

Though Congress still has not decided how much to give the Pentagon for developing Brilliant Pebbles and other Star Wars weapons, Microsat officials figure their new rocket will get some of the action.

According to Microsat's business plans, the company has a chance at more than 40 Star Wars-related launch contracts worth more than $100 million.

Some of the satellites for Microsat's rockets would be made by a company called Defense Systems Inc., which Microsat describes as a "strategic partner."

Defense Systems Inc., also based in Virginia, has been the leading manufacturer of military-related small satellites, according to John Pike, director of the Space Policy Project for the Federation of American Scientists.



Source: Alaska Science and Technology Foundation

KEVIN POWELL / Anchorage Daily News

Major Mike Doble, spokesman for the Pentagon's Strategic Defense Initiative Organization, said whatever funding Congress gives to Star Wars development, at least some of the launches will be with smaller rockets. Pike said Brilliant Pebbles has "legitimized" the small-satellite industry.

State officials said last week they had not heard about Microsat's defense contract plans.

Even Rep. Tom Moyer, D-Fairbanks, who sponsored the spaceport bill, said he hadn't heard about any Star Wars launches. He said communication and research satellites will be the primary payloads at Poker Flat.

Bob Bulmer, who works in the Department of Commerce and is the Hickel administration's point person on spaceport issues, agreed:

"I personally have not heard anything about military or defense ... I don't know who's trying to point in that direction."

Moyer said he doesn't remember anything about military launches coming up during any of the legislative hearings on his House Bill 46. "But basically, we weren't digging too deep into who their clients might be," he hopes to raise $1 million from Alaska investors.

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The business plan also reveals several ways Microsat stands to make millions on Star Wars.

In a section called "near-term opportunities," the plan says Microsat is preparing a six-launch proposal to the Pentagon for testing Brilliant Pebbles.

According to Microsat, each "pebble" will weigh less than 150 pounds, an ideal payload for the Orbital Express.

Such a contract would be worth up to $25 million, the plan says.

Conatec, a division of Microsat, is a front-runner for a $10.5 million contract to do seven suborbital launches for the Strategic Defense Initiative Organization, according to Microsat's plans.

The business plan also says the Pentagon's Star Wars office this fall will be requesting proposals for up to 30 more suborbital launches worth up to $80 million. The plan also mentions a possible $12 million contract to do three launches for the U.S. Naval Research Laboratory.

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At least five space industry experts who reviewed Microsat's plans felt the Orbital Express and its market would fly, Sibert said. But he wouldn't release the names of those experts.

Sibert said one thing the Microsat grant is banking on is a new launch facility at Poker Flat. State officials say the facility could be built by selling revenue bonds, either through the new aerospace corporation or the Alaska Industrial Development and Export Authority.

The aerospace corporation would pay off the bonds with money from launch fees.

In June, AIDEA awarded a $120,000 contract to a Fairbanks engineering firm, Design Alaska, to do a preliminary study on a new launch pad. A supplement to Microsat's business plan says the company is a "member" of Design Alaska's "team."

Design Alaska spokesman Bill Gryder said Microsat will be a consultant to his firm, but said, "They don't have the major role of putting the feasibility study together."

AUG 2 0 1991

GEOPHYSICAL INSTITUTE

==University of Alaska Fairbanks==

August 5, 1991

The Geophysical Institute (GI) strongly supports the commercial use of the Poker Flat Research Range (PFRR) and this support is based on the GI mission statement which provides that it will work toward:

"Solving applied geophysical problems and developing resource-oriented technology of importance to the state and the nation"

"Satisfying the intellectual and technological needs of fellow Alaskans through public service."

The GI believes that:

- Commercialization at PFRR may assist the state in helping provide a stable base of employment and by encouraging statewide economic development in high technology.

- It is possible, with care, to have valuable cooperative research, academic and commercial projects at PFRR. Commercialization can help support university research and education. Cooperation can lead to other public benefits.

- Exploitation of commercial launch business opportunities should primarily be the role of the Alaska Aerospace Development Corporation, but the GI will assist in the process.

- Commercialization at PFRR will lead to an improved citizen government understanding of the GI's mission and contribution to the state through our public involvement with these projects.

- GI will assist the public in understanding space related activities.

- There can be new opportunities for access to space on satellites for UA research and instruction projects. There may be benefits to UA education through Space Grant program and "piggyback" experiments.

- Commercialization at PFRR can help expand state and national support for a National Arctic Space Center where ground instruments, sounding rockets and satellites can be used for arctic research.

UAF ousts rocket-range manager

The Associated Press

FAIRBANKS — The manager of the Poker Flat rocket range has been given the axe by the University of Alaska Fairbanks, which expects to emphasize space research work over commercial projects.

Jack Dillard, hired as manager of the rocket range last year after nearly three decades in the space industry, was given notice last week and told to clean out his desk by the end of the day.

"'Dismissal' is perhaps misleading," said Merritt Helfferich, associate director of relations at UAF's Geophysical Institute. "We non-retained him, which does not reflect any disciplinary action."

In accordance with his contract, Dillard will receive an additional six months pay. As range manager, his annual salary was $70,000, according to Karen Cedzo, director of university development.

> *"It's a concern because the formation of the aerospace corporation is imminent."*
>
> -- Bill Paulick

Dillard didn't return phone calls.

In another change, Jim Strandberg was appointed Poker Flat's director of operations, a new position with a salary of $72,000.

During the last session of the legislature, Gov. Wally Hickel and Commerce Department Commissioner Glenn Olds gave high priority to a bill creating a state Aerospace Development Authority to oversee Poker Flat's commercial prospects.

The governor has signed the bill into law and is expected to announce his appointments to the new corporation's board this week, said Rep. Tom Moyer, D-Fairbanks, the bill's sponsor.

Creation of the new aerospace authority has freed the university to concentrate on research and academics at the rocket range, Helfferich said.

Dillard, whose expertise was in commercial rocketry, was terminated due to "a philosophical difference in our emphasis," said Helfferich.

"We'll mind the store here, while the aerospace corporation takes on the commercial aspects," he said. "In fact, we'll probably end up developing separate facilities."

Strandberg, a civil and mechanical engineer employed at UAF's construction department since 1990, will supervise development of new quarters and other research facilities at the rocket range, Helfferich said. The upgrade is funded by a $20 million grant from NASA.

Commerce Department officials were caught off-guard by Dillard's dismissal, said Bill Paulick, a state business development information specialist.

"We're still trying to determine exactly what happened," Paulick said. "All we've been told is basically the locks were all changed — that type of message. We called Dillard. We called the range. No one has returned our calls. It's a concern because the formation of the aerospace corporation is imminent."

Established in 1969, Poker Flat is a 1,600-acre rocket research station about 30 miles northeast of Fairbanks off the Steese Highway.

GEOPHYSICAL INSTITUTE

==University of Alaska Fairbanks==

FACSIMILE MEMORANDUM
August 6, 1991

To: Rod Mourant
Senator Drue Pearce
3111 C Street Suite 535
Anchorage, AK 99503
FAX: (907) 561-4194

From: Merritt R. Helfferich
Associate Director for Institute Relations
Geophysical Institute
Tel: (907) 474-7790
FAX: (907) 474-5567

Re: The Geophysical Institute & Poker Flat Research Range

Attached is a copy of our position statement on commercial use of Poker Flat. For your information, I testified to the U. S. House subcommittee on Science, Space and Technology on July 17, 1991 in Washington, D.C. about our view of impediments to development of the commercial use of space. A copy of that testimony is also attached.

While in Washington I met with the General Council for the International Small Satellite Organization (ISSO). ISSO is a trade group of commercial space companies and we are a member of this organization. I also met with representatives of Orbital Sciences Corporation, the firm which just successfully launched the Pegasus rocket with seven satellites on it. We discussed the advantages of PFRR and discussed the possibility of their launching a Taurus rocket system at PFRR. I also met with Peter Diamandis, David Wine, and Bruce Kraselsky of MicroSat Launch Systems, Linda Garner of Stephens, Inc. investment bankers, and Joseph Chomsky of Birch, Horten, Bitner & Cherot to discuss the ongoing development of MicroSat's plans for PFRR. The institute is actively and energetically involved in the promotion of Poker Flat for the mutual benefit of the university and the state.

We are undergoing a $30M+ modernization program for the research activities of the nation and of the University of Alaska. These Air Force and NASA contract funds are are specifically directed for research facilities and modernization of launch support facilities. They will be partially valuable for commercial use of the range, but the funds are not transferable.

Attached also is a document from Issues in Science and Technology on commercial space activity and the problems associated with DoD and NASA's long monopolization of these services. You may find it interesting.

GEOPHYSICAL INSTITUTE

==University of Alaska Fairbanks==

August 5, 1991

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Merritt R. Helfferich
Associate Director for Institute Relations
Geophysical Institute, University of Alaska Fairbanks

Testimony to House Committee on
Science, Space and Technology
July 17, 1991

I am Merritt Helfferich, Associate Director of the Geophysical Institute. The Geophysical Institute was established at Fairbanks, Alaska by an act of Congress in 1946 and was dedicated to geophysical research concerning the Arctic regions. We are especially noted for our research into our natural mandate: the upper atmosphere and ionosphere, the earth's magnetic environment, arctic communications and the Aurora Borealis. The Institute became a research unit of the University of Alaska in the late 1950's and provided the staff to produce this northern institution's first doctoral graduate.

My testimony to the House Committee on Science, Space and Technology is based on my 25 year employment with the institute and university, and specifically, my experience with the Poker Flat Research Range. I served as the range's assistant supervisor, its flight safety officer and in several other positions as well.

The Geophysical Institute built the Poker Flat Research Range (PFRR) near Fairbanks, Alaska while carrying out the work of a succession of DoD contracts starting in 1968. The Institute also contributed many State of Alaska resources to the building of the range. That work created a near-space sounding rocket launch facility which is unique in America.

The launch site, unlike other U.S. ranges, is not owned by the federal government. The land, some of the facilities, and many of the required permits, including the essential Federal Aviation Administration waivers for rocket flights, are held by the university. The university also owns or secures control over some 24 million acres or more of launch vehicle overflight and impact land (about the size of the sum of Connecticut, Rhode Island, Massachusetts, Vermont and New Hampshire) through agreements with private, state and federal landholders. The University shares some of the legal risks of range operations. The Institute conducts the range ground and flight safety oversight in cooperation with NASA and our Range Director makes the final launch decision. The annual contract funding for range operations of about $1,500,000 is now negotiated and administered by NASA-Wallops Flight Facility.

Poker Flat's situation with respect to the government and two decades of successful operation make it a possible laboratory for innovative and productive experiments in government-industry-university interactions for the commercial use of space. Poker Flat is eminently, however, a natural laboratory for scientific research and academic endeavors.

Merritt R. Helfferich
Associate Director for Institute Relations
Geophysical Institute, University of Alaska Fairbanks

The range was established to provide a research facility to probe the arctic ionosphere and understand its nature for both military and academic scientific projects. In the years since its establishment, Poker Flat has launched more than 230 large suborbital research sounding rockets, similar to those launched at White Sands Missile Range (WSMR) and Wallops Flight Facility, and, in a cooperative program with WSMR, over 1500 small meteorological rockets. Numerous basic research projects have been conducted by military and university researchers and many graduate students have benefited from the government-university cooperative programs which result from the institute's operation of the range.

The Geophysical Institute holds the view that Poker Flat Research Range has been successful precisely because of its location and strong emphasis on research in phenomena of the arctic upper atmosphere which could not be studied at lower latitudes. We have been directly funded for launch operations and research work by the National Science Foundation, NASA, and by several DoD agencies. Had other motives driven its use, Poker Flat might have died years ago because there were alternative ranges available outside the United States. A major value of PFRR to experimenters and one which has argued for its continued support has been the Geophysical Institute's research skills and our notable experience in ground based observations which are essential to understand the data gathered in many rocket-borne experiments.

There is currently a $33,000,000 Department of Defense funded upgrade of the range in process. This upgrade has as its central goal the improvement of the range as a research center. More than 75% of the funding will be expended for new research instrumentation and facilities. The remainder of the funding will permit the range to serve the requirements of planned Air Force launch missions and will bring the range into congruence with applicable building, health and safety codes. This upgrade will give the range much greater capacity to perform as an arctic research facility for basic and applied environmental research.

As a Land-Grant/Sea Grant university, we perform scientific research, instruction and public service. The Geophysical Institute is interested in combining all three types of work in our operations at the Poker Flat Research Range despite our emphasis on basic research. We believe that Poker Flat can be a launch site for several uses of space. The advent of commercial interest in low earth orbit satellites for remote sensing, communications, low gravity experiments, etc. emphasize the advantages of Poker Flat:

- It is on United States territory.
- It has 23 years of experience in interactions with the U.S. government.

Merritt R. Helfferich
Associate Director for Institute Relations
Geophysical Institute, University of Alaska Fairbanks

- It is, in part, owned by a state entity rather than by the U.S. government.
- It is operated and associated with a university and thus there is the strong possibility for valuable industry-university interactions.
- It is at high geographic latitude making it possible to launch a polar orbiting payload on a somewhat smaller launch vehicle.
- It has launch zones to the north which permit polar orbiting satellites.
- It is within a state which is vitally interested in broadening its base of industry and prepared to contribute toward that development.
- It has very little bureaucracy and few launches per year permitting responsive scheduling.
- It is at a northern transportation hub and accessible by road, rail and air.
- It offers land recovery services for sounding rocket payloads and launch vehicles.

The University of Alaska sees that benefits can accrue to the university from the advantages of Poker Flat. These include (1) growth in a new internationally competitive industry for Alaska which will help provide the community with a stable economic environment, (2) opportunities for low cost, short lead-time space research, and (3) impressive educational opportunities gained from blending commercial activities with the new Space Grant College Consortium program the university recently was awarded. These benefits can accrue only if the interactions between the university, the state, the space industry and the federal government are crafted thoughtfully and carefully. We are now working on defining those relationships.

The state government, and at least one enterprising commercial space services firm, are intensely interested in the possibilities of using Poker Flat for commercial launch of private and government satellites and from the economic development which may accompany the commercial space launch activity. Alaska has already taken the first steps to enhance the Poker Flat capability to accommodate commercial activity. It recently passed into law a bill (attached) which creates the Alaska Aerospace Development Corporation. The corporation is administratively part of the State Department of Commerce and Economic Development and it is affiliated with the University of Alaska. This corporation has the responsibility to nurture commercial development, to provide facilities and economic support for commercial space launch activities, and also to provide support to the research and education mission of the university as it relates to space. The corporation has bonding authority.

The Alaska Industrial Development and Export Authority has just funded an assessment of the existing Poker Flat Research Range. It will examine the capitol expenditures required, evaluate the launch markets, and create a business plan to determine the feasibility of the commercial launch of low altitude polar orbiting satellites. When it is completed in December, the

Merritt R. Helfferich
Associate Director for Institute Relations
Geophysical Institute, University of Alaska Fairbanks

results of this study will be used to determine the extent to which the state will support the commercial space industry in Alaska through use of its bonding authority for capital expenditures. A major investment in facilities and staff will probably be required to bring this research sounding rocket launch facility to the capacity to launch satellites.

If one looks at DoD and NASA's history at Poker Flat they have, in fact, already been procuring from us some of the space transportation services as defined in the Commercial Space Launch Act. We provide operation and maintenance of facilities, store and move rocket vehicles, load rockets on launchers, calculate launch parameters, conduct the countdown, fire the rockets, ensure flight and ground safety, provide logistics, construct facilities, engage in public relations, perform educational activities, conduct payload and vehicle recovery, maintain physical security, and provide other services including the several mentioned earlier.

For two decades Poker Flat has demonstrated itself to be a "demonstration project" for cooperative interaction between the university and federal government. While our history reveals occasional difficulties between PFRR, DoD and NASA, the overall relationship has been excellent and the products mutually beneficial for the users and operators. I believe there is at PFRR the basis for a cooperative experiment which could be the model for future commercial experiences with NASA and DoD at other ranges.

So the stage is set for great things. Yet in spite of what is described above there are still serious questions about the relationship between the government and potential space services providers. There is some concern that the government is reluctant to assist in attaining these ambitious private and public sector goals. We know there is some progress, however. The formation of the National Space Council is notable. The initiation of methods to assist the development of commercial launch activities by the NASA Office of Commercial Programs is valuable. The creation of procedures by the NASA Office of Permits for Memoranda of Understanding and Agreement providing for the use or rental of government facilities is a helpful start.

Our sense at PFRR, so far, is that NASA is cautiously supportive of these efforts at commercialization, but why might there be some reluctance? To speculate, it is likely that NASA is concerned that its long-term operations and careful planning for research support would be damaged by demands for assistance for commercial activity for which they are not yet funded or equipped to support. They also have many years of experience in launch operations and perhaps are concerned that industry does not consider the complexities or the safety considerations of the process realistically. The transition from a research sounding rocket program to orbital launch capacity is a giant step in commitment. The sounding rocket program at

Merritt R. Helfferich
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NASA seems to have been partly sacrificed over the years to support large and visible programs such as the space station and the shuttle so commercialization may seem another serious drain on their resources.

NASA and DoD also have built-in problems which limit their responsiveness. They, as public entities, are held to a higher standard of accountability and reportage than is the private sector and they are required to advance all sorts of public, social and economic goals through their activities. These requirements make any change in their direction ponderous. They also ensure that NASA and DoD must accumulate massive amounts of written records for future inspection and inquisition to which private industry is not as accustomed. NASA and DoD may, in fact, be somewhat limited in the ability to calculate the incremental costs of launch and space operations so as to charge appropriate and fair prices. Further, determining priorities of use for fiscal resources, services and facilities can be a complicated policy issue. NASA is not now funded adequately to do these beneficial operations and it is not required by the Commercial Space Launch Act to subsidize commercial development. Their staffing levels and equipment are based on their commitment to their existing activities. If they are to provide additional support of commercial activities they must find the budget to provide that support.

To launch commercial payloads at Poker Flat we will have to get permission to use or rent NASA controlled facilities such as the vehicle and meteorological balloon tracking radars, the area surveillance radar, the vehicle command-destruct equipment and perhaps, depending on the payload, the telemetry receiving equipment. These are very expensive pieces of equipment which are used in the on-going NASA research programs and they must remain in good operating condition for those launches. Poker Flat does not have a full time NASA crew for this equipment so there are potential scheduling conflicts. Creating additional support facilities and funding adequate operations staff within NASA might help. Also if NASA had the support so that it could affirmatively assist us in formulating plans for commercialization we would be farther along the road.

An issue addressed by this committee is the method by which the nation can provide improvements to launch sites, including the several state initiatives in this area. The proposed amendment to the NASA authorization bill for a grant program permitting state agencies to participate in developing appropriate space launch technology, infrastructure and operational capabilities would help given that such a program were not funded at the expense of the already reduced science budgets within NASA. Funding for commercial development must also come from the private sector and so a public-private matching program would not be inappropriate. The proposed addition of $20,000,000 to the NASA budget for this purpose is useful and welcome but the infrastructure needs at Poker Flat alone would consume a large portion of these funds.

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In reviewing the Walker bill under discussion by the committee it appears that elements of the bill are intended to assist in the development of the commercial space enterprise and I generally support it. I draw to your attention, however, to something that, if I understand it correctly, seems at cross purposes with the intent. Section 101, calls for an inventory of facilities "...owned by the US Government and identify such facilities that are surplus to public and national security needs" Then, later, the bill states that, "...all facilities identified under this section as surplus shall be referred to GSA for disposition." Just what excess or surplus to NASA and DoD needs actually means is uncertain. Also a start-up commercial provider of launch services will be unable to afford the cost of buying all the facilities required for launch even if they are government surplus. They just need the use of the facilities for a short time.

But, in Section 103, Rental of Space Launch and Launch Support Facilities, the bill requires that the "...United States shall make available to commercial providers on a fair rental basis, based on the cost to the United States, such space launch and launch support facilities as are surplus or excess to, or are otherwise not in use for, the public and national security needs of the United States." The basis for determining fair rental basis of equipment, which is not now available or traded on the market, should be defined. This section seems to me to be contradictory to Section 101 since if the surplus assets are sold as directed in Sec 101 it will be more difficult for DoD and NASA to make such assets available to commercial providers than it is at present.

In Section 202 the bill requires the Federal Government to purchase space transportation services from commercial providers whenever such services are required in the course of its activities. As I stated, Poker Flat has been providing "...the preparation of a space transportation vehicle and its payloads for transportation to, from, or within outer space, or in suborbital trajectory, and the conduct of transporting a payload to, from, or within outer space, or in suborbital trajectory." to NASA and DoD for years. Such support can be done under the present law but there are surely serious problems specific to clashes of purpose, goals, policy and funding in encouraging such commercial activities on government launch ranges.

The exceptions to this policy permitted NASA and DoD are appropriate because they cover problems that a research organization understands clearly. Natural phenomena do not carefully schedule themselves to accommodate human activities. NASA must be prepared to respond rapidly to new requirements which means that they must have equipment, facilities and trained staff ready to support activities for which there is a public purpose and hence no commercial value and for which little specific advanced planning is possible. On the other hand, some support to commercial firms must be required.

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I think there will have to be a transition period for NASA and DoD to accommodate the changes required for the growth of a commercial space industry. Incremental funds will have to be provided and the several parties will have to negotiate a clear plan which specifies the milestones by which we evaluate change. The past decades of NASA and DoD development prepared them for a different role in the society than that which they now confront. The changes occurring now within these agencies may be creating major pressures and strains on the organizations. The provision of services by NASA and DoD to the private sector represents another major change in philosophy and operating assumptions. It is no wonder that the change has been slower than many would demand and I don't see any positive incentive given to these agencies to encourage them to participate in the solution of the problem.

BRUCE D. BERKOWITZ

Energizing the Space Launch Industry

U.S. companies can beat the foreign competition, provided Washington undoes the ties that bind them.

When discussion turns to U.S. space policy, most people think of either the National Aeronautics and Space Administration (NASA) or of U.S. military and intelligence programs high in the sky. Debate often ensues about whether NASA has lost its vitality or whether the Department of Defense consumes too much of the U.S. space dollar.

Yet there is a third topic—the U.S. commercial space industry—which has received much less attention up to now, even though it may ultimately be the most important of all. Not only will commercial space be a significant high-technology industry in the years ahead, but the ability to achieve U.S. scientific and military objectives in space will likely depend on it. The commercial launch industry in particular is of significant national interest, and for several reasons:

Revenues and foreign trade. Space launch is a big-money industry. For example, the first commercial orbital launch was carried out last August, when McDonnell Douglas lofted a British BSB-R1 communications satellite from Cape Canaveral. This launch probably cost about $40 million to 50 million (companies guard their exact costs and prices for competitive reasons), a substantial amount of foreign exchange. In addition, Florida officials estimate that it brought about $13 million in revenues into the state economy.

Opportunities to reduce costs. Because launches carried out on a commercial basis can be as much as 30 percent cheaper than those carried out by the government, transferring as much activity as possible to commercial launch services presents opportunities for significant savings.

Opportunities for space science. Cheaper transportation to space would also make it possible to carry out more scientific missions. And an economical space launch system will be essential to the construction and operation of the Space Station Freedom.

Technological innovation. Some of the most important technological progress in space launch systems is being carried out by the commercial sector. Examples include the recent comprehensive modifications General Dynamics made in its Atlas vehicle to reduce operating costs, and the monolithic composite wing developed by Orbital Sciences Corpora-

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tion for its Pegasus launch vehicle. Both innovations were funded privately, without government support, even though the government was able to take advantage of this work when it purchased launch services from the companies involved.

Impact on other industries. The loss of a strong commercial launch industry could cause strong ripples. One group certain to be affected would be the U.S. satellite companies, who currently lead the world in satellite sales mainly because of technical quality and value for the dollar. If, however, the French, the Soviets, or the Japanese came to dominate the space launch market, they could use a low-cost ride into space as part of their pitch to sell their own satellites, and U.S. satellite companies might not be able to match the package deal.

Trouble signs

Despite its great importance, several signs suggest that the U.S. commercial space industry is not well. For one thing, it is losing market share. Even though the United States was the first country to launch commercial satellites, it lost more than half of the international commercial space launch market during the mid-1980s, when NASA was promoting flights on the space shuttle and the U.S. commercial launch industry was allowed to languish. Because satellite owners were skeptical that they would be able to launch on schedule using the shuttle, many turned to non-U.S. launch services (mainly Arianespace, the European consortium managed by the French space agency, Centre National d'Etudes Spatiales). It has proven difficult to bring many of these former customers back to the United States. In fact, most industry experts estimate that at least 50 percent of the West's commercial satellites will be launched on Ariane boosters in the next five years.

Besides Arianespace, there are several other competitors waiting in the wings who will put additional pressure on U.S. companies. Prominent among them is the Soviet Union, which has offered launch services since 1980 and has already launched two commercial satellites for India on its Proton vehicle. The Soviets are also proposing to use SS-20 missiles deactivated under the provisions of the INF accords as a light, quick-response launch vehicle. A state-owned company, Gloskosmos, has been formed to market Soviet launch services internationally, and it is demonstrating good market sense: For instance, Gloskosmos has started to sell advertising space on the sides of its Proton boosters, in the flamboyant style of U.S. racing cars.

China, whose Great Wall Company has offered launch services since 1985, has signed a contract to launch two satellites for Australia on its Long March vehicle. The Chinese are also negotiating with Brazil to sell it the launch vehicles to be operated from Brazil's Alcantara Space Base.

And of course there is Japan, which presently launches its own satellites on the H-1 that was derived from the McDonnell Douglas Delta in the 1970s. The Japanese are developing an even larger booster, the H-2, which will be able to launch any commercial satellite.

One threat that these competitors present to the U.S. space launch industry is price. Arianespace has offered launch services at prices that U.S. companies are hard pressed to match, and the Soviets and Chinese already offer launch services and launch vehicles at prices considerably below those of U.S. companies. Another threat is that these foreign competitors are more "user friendly"; in trying to evolve from their underdog status, they are simply doing a better job of meeting the needs of commercial satellite owners.

Meanwhile, U.S. companies are experiencing some casualties. One major launch company—Martin Marietta—has already effectively withdrawn from the commercial market. Many industry experts questioned the ability of Martin Marietta to compete because of the high costs of its Titan booster, and some have asserted that as of last summer the company decided to stop seeking nongovernment customers. The company has denied these reports but recently announced a new set of conditions for sales to commercial customers, which are so onerous that even if the company has not formally bowed out of the commercial market, it has nevertheless achieved the same result.

For example, Martin Marietta will no longer accept "half payloads" for its Titan launch vehicle, which is designed to carry two average-sized commercial satellites. Thus, the company used to book one satellite from one company, a second satellite from another company, and then scheduled the launch. Now Martin Marietta is requiring each satellite owner to buy all the space on a Titan, even though few of them, if any,

need to launch two payloads at the same time.

Industry analysts anticipated Martin Marietta's problems because the Titan is so expensive, but McDonnell Douglas, currently the U.S. company with the most commercial launches scheduled, also faces difficulties ahead. When the government canceled most commercial satellite launches on the space shuttle, McDonnell Douglas found itself well-positioned; its launch vehicle, the Delta, happened to be the optimal size for most current commercial satellites. Unfortunately, the next generation of communications satellites will be too large for the Delta.

All government payloads should be launched by commercial services unless there is a valid reason for using government operators.

Foreign competitors, such as Arianespace, are developing new vehicles for launching these satellites, but McDonnell Douglas has so far not announced plans for a larger booster. Thus, even though it is the U.S. market leader at this time, the company's prospects do not look bright for the mid-1990s. Already, satellite owners are beginning to assume that it will be unable to meet many of their needs in the future.

Overspecification

Despite the troubling signs, many industry leaders believe that they can match or beat the foreign competition, if only government policies did not place them at a disadvantage. The irony is that even though the U.S. government's official position—as expressed in the National Space Policy, the Commercial Space Launch Act, and several Executive Orders—is to promote the space launch industry, its effective policy is handicapping the industry. Two problems are especially significant: how the government itself buys launch services, and how the government fails to provide a commercially reasonable environment at national launch ranges.

The U.S. government is the single largest buyer of launch services in the West, and it is likely to remain so for some time to come. The government requires launch services for military, intelligence, and scientific missions, and will carry out these missions in any event; the question is how it will use its considerable share of the market demand. Basically, the government can either procure a vehicle and launch it using government personnel, or it can purchase the services on a commercial basis, as nongovernment buyers do. The main difference—the degree of federal involvement in the launch operation—is the single most important influence the government has over the U.S. space launch industry.

Traditionally the government has bought launch vehicles through the Air Force or through NASA, just as it does any other weapon system or piece of equipment. But although this approach has generally achieved good results, it is highly inefficient. Consider, for instance, the problem of documentation. Both agencies have an extensive system that defines dimensions, tolerances, and construction processes for equipment they buy from contractors. In the Air Force, the relevant system is the Department of Defense's MILSPEC; NASA uses its own NSPEC system. These specification systems apply to tanks, guns, uniforms, rocket propellants, chocolate chip cookies—and launch vehicles.

Although MILSPEC and NSPEC are intended to ensure quality and performance, the rigid procedures they require are very expensive. For example, an electronic component built according to military specifications for space systems typically costs 25 percent more than a similar component built for a commercial space system.

Another cost of these specification systems lies in personnel. Each item purchased under MILSPEC or NSPEC must be monitored by an Air Force or a NASA official; the queries of these officials must in turn be answered by an official from the launch vehicle manufacturer. The result is a massive inflation of the personnel required to build and operate a launch vehicle. Indeed, it is common for up to half of the cost of a typical launch to be devoted to "nontouch" labor—personnel who do not design, build, or operate the launch vehicle, but who simply review compliance with specifications and other government requirements, or who prepare the documentation needed to prove compliance.

Such government procedures also stifle innovation. To introduce an improvement or modification to an existing system, one must first change the relevant specifications, a procedure that typically requires from 12 to 24 months.

It would be bad enough if only launch vehicles for government missions were bought this way. Unfortunately, the effects spill over into a launch company's commercial operations as well. Because it is extremely uneconomical for a company to operate two separate production lines, U.S. launch companies in effect must build all of their vehicles to comply with government specifications. As a result, they are constrained from adopting changes that would reduce costs and make them more competitive with foreign services.

Birth of an Industry

The Reagan administration issued statements as early as May 1983 that a commercial space launch industry was in the U.S. national interest; although the United States had decided to launch all government satellites on NASA's space shuttle, many officials thought that expendable launch vehicles would provide useful backup if they were kept in operation by the private sector.

Accordingly, in October 1984 the president signed the Commercial Space Launch Act, which created the apparatus for licensing commercial launch companies. Unfortunately at the time, NASA priced launches on the space shuttle considerably below cost, so it was impossible for commercial companies to compete.

The situation changed following the loss of the Challenger in February 1986. The president issued a new National Space Policy that removed virtually all commercial satellites from the shuttle's manifest; government officials realized it was unreasonable to risk the lives of astronauts—and the shuttle itself—simply to launch a commercial communications satellite. This policy effectively required all nongovernmental users of space to rely on commercial launch companies, and it also stipulated that government agencies were to use commercial launch services wherever possible.

Three of the established manufacturers of launch vehicles—General

Fear of flying commercial

These problems would be solved if the government bought most of its launches on a commercial basis. Under a commercial contract, the launch company simply agrees to put a satellite into a given orbit at a given time and at a given price; how the company achieves that result is its own concern. The company is free to modify its launch vehicle and operations as it believes most efficient. Of course, the company also assumes the risk if the launch fails.

The National Space Policy actually instructs federal agencies to use commercial launch services whenever possible. The problem, however, has been in implementation by the two agencies—the Air Force and NASA—that operate most of the government's satellites.

The Air Force has often spurned "flying commercial" by insisting that most of its satellites are critical to national security and therefore cannot be turned over to a commercial launch company. This argument, however, overlooks several points.

Most Air Force satellites are not unique and expensive intelligence systems. Rather, they are routine communications, weather, and navigation satellites, not significantly different from satellites operated by the civilian sector for similar functions. In most cases, the procedures for placing such government satellites into orbit are identical to those for their civilian counterparts.

The Air Force argument also ignores the fact that the U.S. Navy now launches virtually all of its satellites using commercial launchers. In the case of a communications satellite, for example, the Navy contracts with a company such as Hughes Aerospace to build it, and then allows Hughes to subcontract for the launch services. Similarly, the French launch all of their military and intelligence satellites on a commercial basis using Arianespace. The lesson: Real men do not need MILSPEC.

NASA takes a different approach to circumventing the policy that directs it to use commercial launch companies. NASA claims that the contracts it issues for launching its own and other government satellites

Dynamics (Atlas), Martin Marietta (Titan), and McDonnell Douglas(Delta)—began actively competing for launch contracts. They were joined by a number of smaller new firms, which planned either to build new launch vehicles (as in the case of American Rocket Company and Orbital Sciences) or adapt existing hardware to commercial operations (as with Space Sciences and Conatec).

Throughout 1987 and 1988, the government and the launch industry worked out many of the details necessary for full-scale commercial operations. One problem was the arrangements under which industry would be allowed to share government launch ranges and other facilities with the Air Force and NASA. Another was insurance; the government had been requiring launch companies to purchase the maximum amount of insurance available, or $500 million, whichever was less. These issues were resolved by the Commercial Space Launch Act Amendments of 1988, which allowed private companies to use government facilities (though subsidization was expressly prohibited). The Act also limited the insurance burden, requiring companies to purchase only enough insurance to cover the "maximum probable loss" that might be caused by a launch accident.

As of late 1989, the Department of Transportation listed more than 30 commercial launches scheduled for the next three years. The customers include private firms, such as the owners of communications satellites; government agencies, such as the military services; and foreign governments and organizations.

are bona fide commercial contracts. Yet they usually contain clauses that effectively give the government the same right to inspection and documentation as it would have if it had bought and operated the launch vehicle itself.

In both cases the real issue is turf. In the past, the Air Force and NASA were the government agencies responsible for launching satellites. The Navy does not care if it must use commercial launchers because it is not in the business of launching satellites. A requirement for Air Force and NASA payloads to "fly commercial," on the other hand, would reduce or eliminate a major function for both agencies.

No home on the range

The second way in which government handicaps the U.S. launch industry is in its biased management of national launch ranges. Although launch companies must use government facilities, they remain second-class citizens there. The least important government-operated launch has a higher priority than the most important commercial launch.

Of course, one can make a case that the needs of U.S. national security deserve top priority. Yet not all government missions must be launched on a rigid schedule, and frequently there is flexibility in the government's requirements. Nevertheless, commercial missions are squeezed into the launch schedule on a strictly "space available" basis. For example, Cape Canaveral has two launch pads for Delta vehicles, each capable of supporting up to six launches a year. If the government has scheduled nine Delta launches at the Cape, then McDonnell Douglas can sell no more than three commercial launches, even if it has more customers waiting. Moreover, if a government mission is delayed by weather or a system glitch, and must remain on the pad longer than expected, then the commercial launch date will inevitably be slipped. And commercial launches have last call on support equipment.

For a commercial satellite operator choosing a launch service, the most important factor is reliability—in obtaining a launch date when its satellite is ready, and then launching on schedule. Here the lowly status of U.S. companies at national ranges puts them at a decided disadvantage to the foreign competition. The French, the Soviets, and the Chinese put greater emphasis on ensuring that commercial users have access to launch facilities, even though, like the United States, these countries operate military satellites from the same launch complexes as commercial satellites. Commercial satellites enjoy the same priority as military satellites in the assignment of launch slots and the use of support equipment.

Indeed, on at least one occasion the Soviets went the extra mile for a commercial client; when a booster intended to orbit an Indian satellite encountered technical problems during checkout prior to a launch, authorities removed a Soviet payload from a similar

launch vehicle and replaced it with the Indian satellite so that it could be launched on schedule. And although the entire launch schedule slips when an Ariane mission is delayed, as is the case with U.S. launch facilities, Ariane does not give government payloads a higher priority in assigning launch slots or in the use of equipment.

Moving in the right direction

In the past, the U.S. government played a leadership role in the early phases of such industries as aviation and computing. But as the industries matured, continued advances depended greatly on the private sector. Eventually, U.S. strength in these fields derived from the combined efforts of the government and industry; the government usually sponsored basic research and specialized applications, and the private sector provided capital, applied research, and market savvy.

The same progression should now apply to space launch systems. It was only natural that the government would take the leading role in the early development of launch vehicles (especially since they were adapted at first from weapons systems), but now that space launch technology has matured, continued progress will require the support of a strong industry. Otherwise, space launch technology will likely become stultified by the rigidity of government bureaucracy, and remain unnecessarily costly, cumbersome, and noncompetitive.

What follows are some measures that the U.S. government can take to help move the country's space launch industry in the right direction:

Require all government payloads to use commercial launch services unless there is a valid reason for using government operators. This is essentially a matter of preventing the military services from using "national security" to circumvent the National Space Policy; only truly sensitive missions should be launched by government operators. The government will also have to ensure that requirements for documentation and inspection are limited in the commercial contracts that agencies issue to launch companies.

One way to make some early progress would be for the President to issue an Executive Order requiring all unclassified payloads costing less than a certain amount of money (say, $200 million) to fly commercial. If the executive branch fails to enforce its own Space Policy, however, the Congress could impose the same kinds of requirements through statute; Representative Ron Packard (R-Calif.) submitted a bill that last summer that would do this.

Improve access to national ranges. The Air Force and NASA could each modify procedures at their ranges that currently relegate commercial missions to the absolutely lowest priority. For example, if a delay in a government mission being prepared for launch leads to a delay in a commercial mission, and that commercial mission could be launched on time by being moved ahead of nonessential government missions, then range officials should be flexible. There is considerable room to accommodate commercial missions without affecting national security or the country's space science program.

Facilitate the development of commercial space launch facilities. One reason why the Air Force is so protective of its use of government launch ranges is that U.S. range capacity is limited; there is a need for more. The ultimate solution to conflicting priorities at ranges is to provide commercial launch companies with their own facilities. States such as Hawaii and Florida have already made plans to build commercial space launch facilities, and these efforts should be encouraged.

If government payloads were required to be launched on a commercial basis, and companies could employ the launch facilities of their choice, market forces would considerably enhance the development of new launch sites.

Reexamine investments in government space launch vehicles. Consider NASA's proposed Shuttle-C (an unmanned, cargo-carrying version of the space shuttle), which Congress' Office of Technology Assessment estimates will have development costs of $1 billion and a life-cycle cost of $150 billion to $200 billion over 20 years. Imagine private industry's incentive to develop new launch systems if this kind of money were committed to purchasing commercial launch services. In theory, industry would develop a spectrum of efficient launch systems—each well-suited to its mission—and launch costs would likely decline as well. But because no one in government cur-

rently makes such comparisons, we cannot say with assurance that the country would be better off with Shuttle-C than with a robust commercial launch industry, or vice versa.

The new National Space Council, created under Executive Order 12675 (April 20, 1989) to "develop recommendations for the President on space policy" and "monitor and coordinate [its] implementation," could well carry out this kind of assessment. To do so, however, the Council will require additional resources. It will also need autonomy; currently, much of its professional staff is on loan from the Air Force, NASA, and other agencies with vested interests.

Fully integrate commercial space in the National Space Strategy. Executive Order 12675 also instructed the National Space Council to prepare a National Space Strategy that will guide U.S. policies. That strategy should not limit itself to identifying commercial opportunities for the use of space. Rather, it should enumerate opportunities for collaboration between the commercial and government sectors and define the areas in which the promotion of commercial industry would better serve national objectives than would straight-out government programs.

It has become a truism that the United States, having squandered its early lead in exploring space, has a problem. Government action may be part of the solution, but it is ironic that the country most noted for extolling the benefits of the free market has deemed centralized, government-controlled measures to be most of the solution. Unless we adopt policies that unleash the potential of the private sector, we are using only one leg to catch up in the race.

Recommended reading

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GEOPHYSICAL INSTITUTE

==University of Alaska Fairbanks==

FACSIMILE MEMORANDUM
August 8, 1991

To: Rod Mourant
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26 pages

From: Merritt R. Helfferich
Associate Director for Institute Relations
Geophysical Institute
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Re: The Geophysical Institute & Poker Flat Research Range

I hope the information I sent to you was useful. Here is another document outlining a view, and a not very complementary one, of NASA's monopoly on launch services. I also include a copy of the 1984 Commercial Launch Act. *

At the July 17th Science, Space and Technology subcommittee hearing the committee pressed NASA to deal constructively with the issue of commercial launch companies providing sounding rockets to NASA for research purposes. NASA offered to send out a RFI, request for information, to find out if U.S. firms would be prepared and interested in providing rockets for these purposes. There are not presently a bunch of small rocket manufacturers in the U.S. In fact, MicroSat, who has expressed strong interest in use of PFRR,proposes to use a combination of Canadian and U.S. rocket motors with Swedish attitude and flight control equipment.

Please let me know if there is anything more I can provide to you.

* and 1988 Amendments

THE CASE AGAINST NASA

By Gregg Easterbrook

Conventional wisdom holds that in the days of the moon race, the space program was exorbitantly expensive. Actually, measured by achievement, it was cheap. For the inflation-adjusted price of the forty space shuttle flights so far, the National Aeronautics and Space Administration could have launched 150 Apollo missions to the Moon. Can't believe that space used to cost less? Test-fire this statistic: during the Moon race, NASA's fanciest rocket put payload in orbit at about $1,700 per pound in current dollars. Today the comparable figure for the space shuttle is about $11,600 a pound.

Recent U.S. space history contains one lapse after another: Challenger, *the Hubble telescope, the antenna failure that imperils the Galileo probe bound for Jupiter. Next winter* NASA *will reach a new low when it launches the costly* GOES-NEXT *weather satellite, which the agency* already knows *to be defective. But the most fundamental* NASA *problem is that every year the United States spends more to accomplish less in space.*

This situation can be changed. There are many affordable, beneficial, and important things that can be done in space if only NASA truly were reformed. Here's a guide to how:

BOOSTERS The single greatest handicap of the space program is NASA's insistence on doing nearly everything via the space shuttle—a flying machine that is technologically impressive, visually enthralling, and fiscally nonsensical. Reusable spaceships sound cheap in theory, and someday they may be in fact. For the moment they are more expensive than the old throwaway boosters. The Saturn V, which powered *Apollo* to the Moon, cost $415 million per launch (all money figures in this article have been converted to current dollars) and put 250,000 pounds of payload in space. The shuttle now costs at least $515 million per launch and carries 48,000 pounds of cargo to space. The shuttle program was originally justified as one that would cut the cost of access to space to $400 per pound, meaning that on the key item for an efficient space program—boost cost to orbit—the shuttle is twenty-seven times more expensive than NASA predicted. The Soviet Union, with less than half the economic output of the United States, conducts on average seven times as many annual space launches mainly by using "big, dumb boosters," not max-tech hardware. The USSR's primary manned booster, the SL4, costs about $900 per pound of payload.

NASA resists ideas for new rockets because if any cheap booster were built, the shuttle's funding would be threatened. That would mean not only astronauts out of work, but also fewer jobs in the agency's manned flight centers, where there are several hundred support employees for each skywalker.

The U.S. space inventory contains some unmanned boosters that are less expensive than the shuttle, but nowhere near as cheap as they might be. All were conceived in the 1950s as military ICBMS: their designs embody assumptions from what is now space engineering's Stone Age. A combination of "dumb" design (using the least cost, not the highest-tech solution to any problem) and engineering breakthroughs has made throwaway rockets steadily cheaper since the 1950s: the powerful MX costs *less* than the old Atlas ICBM. But the civilian space program has not benefited from such advances. The United States has designed just one rocket specifically as a space booster, the Saturn. Saturns were advanced in some aspects, dumb in others: the first stage fuel was kerosene. Saturn is the only rocket built by any country to have achieved a flawless operating record. Yet NASA couldn't wait to get it out of production in the 1970s, because its continued existence would have embarrassed the shuttle.

BRITISH ADMIRALTY, NASA AS In 1964 NASA had 1,477 employees per space mission launched. By 1974 the figure had risen to 1,625. In 1984 there were 1,823. Last year there were 2,953 employees per launch. This bloat has occurred during a period when computers have revolutionized the efficiency of technical operations and knowledge of space flight has increased. Today it ought to be elementary to launch missions with fewer people, not more. Imagine any private company trying to compete with twice as many workers per product as in 1964.

CHALLENGER: THE SEQUEL The 1990 Augustine Commission called a second shuttle tragedy "likely" unless most

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flights are replaced with throwaway boosters. There may be some causes in space worth dying for. Can releasing a data relay satellite (*Challenger*'s mission) really be one of them?

When a space shuttle fails on a mere satellite launch, not only are precious human lives lost, but billions in hardware and one-quarter of the nation's space fleet vanish too, and the entire space program goes into suspension. These things do not happen when a throwaway rocket, never expected back in the first place, malfunctions.

NASA continues to repeat the mistakes that led to the *Challenger* disaster. Despite the shuttle's vaunted new "escape mechanism," there is still no possibility astronauts could survive a repeat of the failure in the solid-rocket motor that destroyed *Challenger*, or of an uncontrolled emergency in the main engines, which have nearly miscarried on several ascents. The escape mechanism can be used only after all five motors have been safely shut off; and after the shuttle, otherwise undamaged, has been steered back to low altitude and slowed down. This covers only a small percentage of shuttle calamity scenarios.

NASA's current administrator, Richard Truly, is an ex-shuttle pilot. Unlike some past administrators, he is an able and dedicated leader. "But Truly sees his task as to protect the astronaut's franchise and increase shuttle funding on his watch," said a member of a recent space commission. "He can't talk about anything but shuttle, shuttle, shuttle." The shuttle hard core constantly declares itself the last line of defense between the final frontier and the end of the manned space program. The truth is that the shuttle, soaking up all funds that might go to improved new launchers, is the greatest threat to manned space exploration. If another shuttle goes down in flames, Congress may cancel future operations, leaving the United States with no space transportation whatsoever.

ENVIRONMENTAL 'CRASH PROGRAM' NASA has a great-sounding $30 billion "crash program" to conduct environmental research, perhaps returning tangible benefit to taxpayers by answering charged political questions like whether global warming is real. Yet the first component of this effort, an Earth Observing System (EOS) satellite, is not scheduled for launch till 1998; and as more science funds are switched to space station subsidies, even that target date may slip. In NASA argot, EOS may take ten years from concept to "crash" launch—longer than the entire original Apollo program, from John Kennedy's challenge to Neil Armstrong's footprint.

Even for $30 billion, there are major omissions in the crash program. Variations in solar luminosity are a probable culprit in global temperature trends, but so far NASA is building no permanent spacecraft to collect badly needed data in this area. A solar-variability instrument will go up next year on a space shuttle, then come right back down. The device has been designed not as a permanent satellite but as a shuttle-bay fixture to be toted up every once in a blue moon, thus helping justify the shuttle but guaranteeing no data base broad enough to determine much of anything about solar luminosity trends.

And did you know that the most Earth-like planet in our solar system, Venus, has a carbon dioxide atmosphere with a runaway greenhouse effect? NASA seems not to. Though many public dollars are being spent on Magellan, the spacecraft that is radar-mapping Venus's surface—a project of intense interest to geology graduate students and meaningless to the person in the street—NASA has no plans to fire probes into the Venusian atmosphere, to determine if what went wrong there has any application to the earthly greenhouse debate.

FLETCHER, JAMES The NASA Rasputin. Fletcher was the agency's administrator during the Nixon administration, when the original disastrous shuttle decisions were made. One was the claim that shuttles would be cheaper than throwaway rockets, widely known to be a fiction within NASA at the time. The other disastrous Fletcher decision was to steer a contract to Morton Thiokol for the solid rockets that failed on *Challenger*—though Thiokol was the only bidder that proposed an engine with no safety system.

After *Challenger* exploded, Ronald Reagan called Fletcher back to be NASA boss again. Fletcher took on as his next cause space station Freedom and is now the godfather of NASA's second deeply misguided program. By first kidding themselves and the public about space shuttle costs, then kidding themselves again about the practicality of the space station, NASA managers began to transform the nature of the agency. NASA made mistakes during the 1960s, but generally its operations were characterized by honesty and openness. The reward was glory. Since Fletcher taught the agency institutional self-deception, failures and derision have been its companions.

In the aftermath of *Challenger*—when NASA as an institution was stunned and briefly open to change—Reagan sent the worst possible message first by bringing back a crony in Fletcher, then by raising NASA's budget, signaling the agency that it would be rewarded rather than punished for failure. The budget has continued to increase as operations decline: NASA had the federal government's fastest-growing appropriation in the first Bush budgets, though under Bush it has not managed even to match its depressed pre-*Challenger* launch rate.

FREEDOM: WHAT'S IT FOR? As announced by Reagan in 1984, Freedom was to be equipped for satellite repair, assembly and fueling of outbound spacecraft, astronomy, environmental studies, microgravity manufacturing, and research into the human body's response to space. As of 1991 all missions except the final two have been eliminated, and the second-to-last is on the verge of elimination. (See MANUFACTURING IN SPACE.)

Satellite repair is out because it's rarely practical, and it's usually cheaper to launch a new satellite than to repair an existing model. Astronomy and environmental studies have been eliminated to cut costs. As-

sembly and fueling of spacecraft have been cut for technical reasons. Meanwhile, in order for the space station to be shuttle-built and shuttle-serviced—NASA's budget is constructed so that the station and the shuttle justify each other—Freedom will have to float in a low orbit, because the shuttle has an unusually low altitude limit. The station will revolve just slightly below the altitude at which drag from the boundary of the atmosphere stops, meaning its orbit will degrade and the whole facility will require periodic reboosting. Of course, that gives the shuttle something to do.

Also deleted from the original plan was a "closed" life-support system in which oxygen, water, and nitrogen would be reused. As closed life-support is a requirement for Mars travel, and no such system has ever been built, this was to be the station's primary new technological achievement. Now the life-cycle will be "open," meaning essentials will be hauled up from Earth, increasing costs while decreasing knowledge gained. Further dropped was the idea of equipping Freedom with solar-dynamic mirrors, which promise an improvement over conventional photo-cell power panels. A solar-dynamic power system might have provided clues about whether energy collected in space will ever be useful on the ground.

Freedom's remaining purpose, research on human response to space, is a valid objective. Nearly all of this, however, could just as well be done on shuttles, in the life-sciences module called Spacelab that just went to orbit in Columbia's payload bay. The existence of Spacelab has been a budgetary complication to NASA: the agency is accordingly erasing many planned Spacelab flights from the shuttle manifest.

Some life-science experiments require extended stays in space, and the shuttle has a limit of about ten days. But this problem could be overcome far more cheaply with technical upgrades for the shuttle than by building a space station. Such upgrades could allow shuttles bearing the life-science lab to remain spaceborn for about a month. This "long-duration orbiter" proposal has been fought with fury by NASA for a decade, since it defoliates the sole remaining space station argument. There is now a sort-of LDO plan on NASA's chart, but one with calculated limitations to prevent direct competition with Freedom.

Finally, there are extended-stay life-science experiments, which could not be conducted even on a long-duration orbiter. The trouble is, extended life-science experiments have been the focus of the existing Soviet Mir space station program. Soviet officials have released considerable data from their findings, and have indicated they might share more. Freedom would largely duplicate tests already conducted. Though spending much less than the United States, the USSR has had a space station in operation since 1984—which suggests the kinds of things a space program can accomplish without busting the national budget, if its cost structure is in touch with reality.

FREEDOM: WHAT'S THE PRICE? When NASA proposed the space station in 1984, the basic construction price was put at $11 billion. Today, with the station shrunk to half its former size and nearly all features deleted, NASA admits the price is $30 billion. The GAO says $40 billion. Once the overruns set in, what will the real number be? Since agency managers clearly lied about the 1984 figures—three times the cost for half the size is not an honest mistake—Congress should assume that NASA continues to lie even about the recent inflated estimates. The more significant figure is $118 billion, the GAO estimate of what Freedom will cost once operating expenses are included. That number represents sixty years of funding for the National Science Foundation.

FREEDOM: WILL IT WORK? The station is already on its fifth design overhaul. "This is the most screwed-up project I've ever been associated with" is the line heard from every NASA and contractor station official who talks off the record. Technical worries about Freedom turn on its launch packaging and maintenance. The first U.S. space station, Skylab, went up in 1973 as a single unit, no assembly required. So that component can be launched aboard the shuttle, Freedom is being designed in small units that will require twenty-three to twenty-six shuttle flights for delivery, and in-space assembly far more complex than any ever attempted. (Saturn Vs, if they still existed, could launch Freedom in five flights.) Suppose another shuttle fails during the construction period, and launches undergo the kind of lengthy suspension that followed *Challenger*. The Freedom design can withstand one to two years of flight suspensions without falling back into the atmosphere. Downtime after *Challenger* was three years.

And because of all the component package assemblies necessary to cross-justify the shuttle, Freedom will require an unprecedented degree of maintenance. Last year NASA tried to suppress an internal report estimating Freedom may need 2,200 hours per year of spacewalk time for maintenance; later the estimate rose to 3,700 hours. So far American astronauts have accumulated about 400 total hours walking in space, and they found the experience profoundly exhausting. Under the current estimate, each member of Freedom's four-person crew would spend two hours per day spacewalking with wrench and hammer. In other words, the main purpose of being on the space station will be to maintain the space station.

GOES-NEXT Yes, NASA will deliberately launch this defective weather satellite (several of its high-tech sensors are less proficient than your dog's nose), because the existing U.S. weather satellite network is down to a single spacecraft that may fail soon, so an underachieving replacement is better than nothing.

The GOES-NEXT program is NASA decline in a nutshell. NASA began launching weather satellites in 1960; building these spacecraft well and quickly has never been a problem before. But GOES-NEXT has been under prep

ration since 1984 and still doesn't work. Its price tag has increased from $372 million to $1.2 billion. NASA apologists recently told *The New York Times* that GOES-NEXT is defective because of "penny pinching." Uh-huh. Commercial spacecraft manufacturers, subject to cost discipline, now make top-line communications satellites for about $100 million each, with two-year delivery. And they work.

HARWOOD, OLIVER Former Rockwell space station engineer cashiered in the late 1980s after he published an article in a technical journal describing how the station could be assembled more cheaply. Harwood, who supports the idea of station funding, objects to Freedom on the grounds that it is a "configured" facility composed of specially designed units that serve unique functions. This ensures high cost, as vast numbers of special parts must be fabricated. Once the configured units are locked together, it will be difficult to adapt Freedom to any new use: should someone actually dream up a valid purpose for a space station, Freedom may not be able to accommodate it.

Harwood proposed an evolutionary design in which mass-produced Tinkertoy pieces are joined as required, cutting costs while allowing Freedom to be expanded when necessary. NASA engineers raise technical objections to the concept, but at bottom the agency's complaint is that it would transfer design fiefdom authority from the headquarters types who now specify configuration packages. Contractors hate the idea because the mass-manufactured modular pieces could be competitively bid. Projects with one-of-a-kind components are ideal for pie-dividing among the usual gang of suspects, with most slices "negotiated" (effectively no-bid) because it's gratifyingly hard to figure out what special-order components should cost.

Harwood's experience suggests why, compared with today's NASA, the Department of Defense drives a hard bargain. In normal free enterprise, companies compete to cut costs and improve products: if there were a race on to build commercial space stations, firms would be flocking to the mass-manufactured concept. In government contracting the customer creates the specifications. And if the customer has specified a needlessly expensive system, why should the contractor point that out?

The Pentagon sometimes works around this problem through "flyoffs"—issuing general performance criteria, then letting contractors make their own design trade-offs as they assemble competing prototypes. Reliable and cost-effective flying machines such as the F-16 and F-18 fighters have been created this way. In contrast, expensive lemons such as the B-1 bomber result when Pentagon planners "configure" a proposal, then work exclusively with one contractor on a negotiated basis.

Harwood believes that even considering the funds sunk into Freedom so far, NASA could save money by junking all existing drawings, issuing performance criteria, and letting contractors duke it out to see which can devise the cheapest new design. This would delay the station's christening—but that would be great. Another several years down the road an affordable shuttle alternative might exist (see NATIONAL LAUNCH SYSTEM), enabling the station to be launched sanely.

INDUSTRIAL SPACE FACILITY In the late Reagan administration, when space station funding seemed likely to falter, former NASA chief designer Max Faget proposed an automated space station that would be "man tended"—astronauts would visit occasionally, but not crewed. Faget said he could raise half the cost from private sources; NASA's share of the project would be $800 million.

The idea of the space station alternative costing perhaps 1 percent as much as Freedom somehow failed to engage NASA's imagination. The agency bitterly denounced the idea; James Fletcher told Congress there was no commercial market for ISF-carried experiments. Out of the other side of his mouth, Fletcher was praising the vast commercial potential of Freedom. Today the facility sits as no more than a "requested" shuttle manifest assignment for 1997, long after the big Freedom funding will be safely in the pipeline.

'MANNED' FLIGHT, GLAMOUR OF NASA managers are fond of saying that only a manned program can keep the public interested in space flight. Met anybody lately who's turned on by the glamour of deploying the SYNCOM-5 satellite, which is what *Columbia* did last year? How 'bout that stirring *Discovery* mission to release the MORELOS-A relay unit and to monitor an experiment in slipcasting? The Soviets have been putting people into space like crazy, and their program does not exactly ooze sex appeal. The argument that people make space interesting—especially the automatons NASA turns out—is a budget-justifier's fantasy. Accomplishments and knowledge are what excite the public about space. The public has good instincts for when people are doing significant or courageous things in space, when merely punching the clock. Good public instincts in this regard are one reason NASA now takes so much flak.

MANUFACTURING IN SPACE For years NASA has rhapsodized about the potential to grow industrial crystals and medicines in orbit. Complication: science has signed off this idea. The National Academy of Sciences and Bush's own science adviser, D. Allan Bromley, have said microgravity research on the station has little or no scientific justification. Donald Burnett, a professor at the California Institute of Technology, recently chaired a scientific panel whose duties included inventing microgravity experiments for the station. "We basically just couldn't come up with anything," Burnett said.

Scientists dislike the station for microgravity research because automated satellites could accomplish the same task at a fraction of the expense, freeing R&D money for more productive uses. Also, people bumping around in a space station will prevent microgravity experiments from being carried out in (relative) motionlessness.

Free enterprise has also lost interest in microgravity manufacturing, because the high cost of shuttle operations makes it economic suicide. The NASA launch cost now works out to $725 per ounce, meaning any material manufactured in space would have to sell for several times that to be profitable. Orbital alchemy, for one, would be a big loser at these prices, gold currently trading at $370 per ounce.

Some planners tried to work around shuttle costs by suggesting that discoveries could be made in space experiments; the profitable manufacturing done on the ground. One idea held that in microgravity the three-dimensional structures of important human proteins would unscrunch sufficiently that they could be patterned for analysis down below. This is, in fact, a promising field of inquiry—so promising that researchers are already close to mastering dimensional protein analysis in Earthside labs. Between the high cost and long lead times of space-based R&D, private researchers will always have powerful incentives to make NASA commercial microgravity efforts archaic before they can be launched.

MARS George Bush, Dan Quayle, Richard Darman, and many others have said they want a manned Mars expedition. For reasons having to do with the zodiac of the planets, the years 2014-22 would be ideal for Mars travel: ideal in the physical alignment, not the Nancy Reagan sense. Planning would have to start soon.

Men and women surely will journey to Mars someday. For now, anyone who advocates Mars travel is living in a dream world. NASA has put the cost of a Mars landing at $400 billion, meaning the actual figure might be twice as high. A recent NASA study estimated that an "austere" Mars mission would require 2.2 million pounds of propellant at departure from Earth orbit. At current shuttle prices, merely launching that quantity of fuel—to say nothing of financing the Mars ships—would cost $25.7 billion, almost twice NASA's annual budget. Other obstacles, though surmountable in the long run, are equally high in the short run.

Last year some researchers at the Lawrence Livermore National Laboratory put together an idea for dramatically cutting the costs of Mars exploration by using spacecraft fashioned largely from inflatable components, not metals. Senior management at NASA went wild, not only because the Livermore plan cast light on NASA's new-idea shortage but because the lab, under supervision of the Department of Energy, seemed to be engaged in a long-feared guerrilla raid against NASA's space budget monopoly. NASA rallied supporters in Congress and had Livermore reprimanded for using tax funds to research a subject where the DOE has no statutory jurisdiction. Researchers involved in the Livermore study got into deep career trouble for the sin of trying to cut space costs.

MEDIA NON-CONSPIRACY, THE "I've never seen a more compliant, unquestioning, obedient group in my life." Thus did a White House staffer describe the national press corps he observed at a recent shuttle launch. It is now widely acknowledged that a contributing factor in the *Challenger* tragedy was the boosterism of most journalists who cover the space program. In the aftermath coverage toughened briefly, but now it has mostly returned to the cozy old days. If another shuttle fails, there will be a second round of hand-wringing in which we wonder, Where were all the stories pointing out that the "escape mechanism" has almost no utility? Or the stories disclosing that after the *Challenger*, and against the advice of its own safety panels, NASA (under Fletcher, natch) committed itself to $2 billion for a new factory to build a new generation of "advanced" solid rockets that have the same fatal flaw as the Thiokol models—they cannot be shut off if something goes wrong.

Journalists traditionally have been press agents for space partly because of the dazzle factor—most have little idea what's going on other than that big light rise in sky—and partly because space is one area where people with conventional liberal credentials can show excitement over technology and the products of big corporate organizations without seeming like Tom Clancys.

NATIONAL LAUNCH SYSTEM Under pressure from Dan Quayle's Space Council, NASA announced it would build a new family of throwaway rockets to be called the National Launch System.

On paper the NLS sounds great—a big, dumb booster derived from existing components or new hardware that avoids complexity. For example, the NLS would have liquid-hydrogen engines only slightly less powerful than the shuttle main engines, but with a simplified internal structure involving hundreds fewer moving parts. Here's the problem: NASA says the NLS will take ten years and $12 billion to develop. In the early 1960s, when there were no CAD/CAM computers, the Saturn IB, similar in features and performance to the NLS, took four years and $4.2 billion to develop. NASA appears to be employing the reverse of the old low-ball gambit, overpricing the NLS so that the agency can claim it tried to construct a relatively cheap alternative to the shuttle but could not win backing from Congress.

PLAYERS Space common sense took a step backward when William Proxmire retired from the Senate in 1988. It's no coincidence that station Freedom funding prospects began to recover the following year. Though Proxmire's pronouncements sometimes had a "get a horse" quality, he provided a reality-check on spending requests. His chairmanship of the NASA appropriations subcommittee has passed to Barbara Mikulski, who has quickly shown herself a NASA mouthpiece, owing to her home state Maryland's status as fifth-ranking space spending beneficiary. The other key senator is Albert Gore Jr., who chairs the NASA authorizing subcommittee. Gore has shown interest in space process issues—was the Hubble mirror contract awarded properly?—but not in challenging NASA's status quo.

NASA's trump card in the House is Appropriations

Committee chairman Jamie Whitten—the new shuttle solid-rocket motor factory is being built in Yellow Creek, Mississippi, Whitten's district. But perhaps the most distinctive House voice on space issues belongs to Robert Walker of Pennsylvania, a Newt Gingrich accomplice who simultaneously jeers at deficit spending and is a space station zealot. Walker is the one Tip O'Neill once exposed as gesturing madly to an empty House chamber during a cable TV performance. Walker joins Gus Savage of Illinois as the members of Congress most likely to be in direct communication with alien star cruisers.

In Bush circles, Craig Fuller is a major space buff, as is Darman, who has with Gingrichian sagacity argued that somebody else ought to crack down on federal spending, yet unlimited billions for Mars travel is justified because the voyages would be "romantic."

QUAYLE Early in his tenure running space policy, Quayle indicated that he might show himself capable of creative leadership in this area. At this point, though, NASA is leading him around on a leash. Asked to cite any case in which Quayle has opposed an item from the NASA wish list, a White House staffer noted that the veep opposes Administrator Truly's request that shuttles six and seven be constructed. Not exactly political fearlessness. There is no chance that Congress, which just paid $2.5 billion for the fifth shuttle, *Endeavour*, will underwrite more of the same.

Quayle's space operative, National Space Council director Mark Albrecht, is full of ideas and enthusiasm but has little power because in every clash with NASA his boss has backed down. The Space Council itself is a weird operation. Staffers are known to call up journalists working on space stories and beg them Moonie-style not to criticize Quayle.

The major aerospace firms have made it known to Quayle that a test of his suitability for support in any future presidential run is whether he can deliver the mail in the two current areas where aerospace funding might increase—station Freedom and the National Aerospace Plane. (See SPACEPLANES, BIG.) A counter-influence has been retired General Daniel Graham and others associated with SDI advocacy. There's a contingent of the right that hates NASA because space screwups cast doubt on orbital shields: If we can't build weather satellites, who could trust Brilliant Pebbles? Graham has met with Quayle and urged him at least to stay out of the way of some anti-NASA ideas. (See STRATEGIC DEFENSE FACTOR.)

R&D ILLUSION, THE Space is widely assumed to be a "technology-driven" pursuit; Quayle has cited technocompetitiveness as a reason to build Freedom. In fact, since the shuttle designs were completed in the late 1970s, NASA has contributed little to technology. "You can debate the purpose of Star Wars, but nobody doubts that the SDI Organization, with one-third the budget of NASA, is producing more interesting new technology," said Bruce Murray, a former director of NASA's Jet Propulsion Laboratory.

Wander through mission control in Houston and you behold banks of flight controllers staring at screens. What do they see? Column after column of marching numbers being spat out by antiquated 1970s-style central processors. Watching for an important number is "like scanning the telephone book trying to spot a typo," says a NASA consultant familiar with the system. Modern computers could highlight any information needing attention, dropping insignificant data to the background. NASA has resisted this idea, partly because it would reduce the need for controllers.

Space R&D has declined because the bulk of NASA's appropriations now goes to shuttle subsidies. "During the old days NASA was good at doing new things, driven by technology," Murray says. "Now NASA mainly does shuttle operations, the kind of activity better left to private enterprise, while the flair for the new has been lost. And the big proposal is to bog NASA down in operations even further, by creating space station ops."

RUSSIANS The current station Freedom plan calls for cooperation with the NATO allies and the Japanese, but the nation we should really be coordinating space efforts with is the Soviet Union—which has something to offer. For example, if new life-science experiments are devised, they could be conducted jointly, at far lower cost, by "long-duration" U.S. shuttles flying formation with the Soviet station Mir.

SPACEPLANES, BIG In this category resides the National Aerospace Plane, NASP, intended to be a large spacefaring machine that would rise from a runway like an airplane rather than blast off vertically.

In principle, the joint NASA-Air Force NASP is intriguing; someday something like it is bound to take flight. For today, NASP planning is shuttle redux—focused on a few huge machines that would carry both cargo and crew, engaging extreme cost and risk to human life for the dinkiest satellite launch or spy photo run. Essentially, the goal of the NASP project is to make a new space shuttle that's even more expensive and complicated than the existing one. Everything NASP is expected to do could be accomplished much more cheaply by dumb boosters or cheap "lightsat" reconnaissance satellites proposed by the Pentagon's DARPA R&D division. A NASP would probably require such items as a hypothetical motor called a "scramjet." No practical scramjet has ever been static-tested, much less flown.

When Richard Cheney took over as secretary of defense, one of his first moves was to cancel NASP; Quayle interceded to keep it alive. NASP proponents use a nostalgic space-race argument, saying that Britain and Germany will develop aerospace vehicles if we do not. They don't add that the British research effort involves an automated, unmanned craft; that Germany's project is now all but officially kaput.

SPACEPLANES, SMALL Not to be confused with NASP, a small spaceplane would be powered by conventional rocket

engines and probably air-launched from a carrier aircraft such as a 747. The United States had such a spaceplane more than three decades ago, the X-15. This winged vehicle, dropped from a B-52, flew to the bottom of the thermosphere (though not into orbit) years before Yuri Gagarin became the first official man in space. Given that the successful X-15 was built before pocket calculators were invented, it should be no problem today to construct a larger model, perhaps able to carry a crew of six to eight.

Unlike the NASP, small spaceplanes are not plagued by expensive technological unknowns. The chief advantage is that the cheap, pedestrian jet engines of the carrier aircraft do most of the work of overcoming the vehicle's rest mass and moving it the first few miles skyward. The space-bound part of the system comes to life only at 30,000 feet. For technical reasons, rocket motors are less efficient than jet engines at cutting through dense low-altitude air but become extremely proficient in the upper atmosphere and in space. Thus an air-launched spaceplane would need only a fraction of the fuel and tankage required of the gargantuan shuttle, making the vehicle smaller and cheaper.

The problem from NASA's corporate perspective is that spaceplanes cannot be made large enough to carry both crew and heavy cargo. The most basic way to rationalize the U.S. space program would be to have new, dumb boosters for launching bulk; new, small spaceplanes for people only, on those missions where people truly are required. Such an arrangement would make access to space far more practical, but would eliminate the current assumption that a flying dreadnought and numerous astronauts must go along on even the most routine satellite launch. Thus, NASA opposition.

STRATEGIC DEFENSE FACTOR No space-based defenses will ever be practical unless the price of access to orbit is cut dramatically. Therefore the Strategic Defense Initiative Organization is at present doing more research into launcher innovations than NASA. Unlike NASA, Star Wars is under cost discipline. One SDI idea is a "single stage to orbit" vehicle (SSTO). Since the early 1970s a California engineer named Gary Hudson has carried on a lonely crusade for an SSTO, which the aerospace establishment considered an impossibility. A few years ago Max Hunter, a mad-genius type who designed the Thor ICBM and several NASA projects and then became active in the High Frontier SDI group, seized on SSTO as an answer to the steep cost of space. Hunter gave the idea instant credibility. Unfortunately, Hudson also believes the SSTO should be built by private enterprise without government support—a deeply subversive idea to the aerospace community—so he continues to be an outsider.

The SSTO would be a Buck Rogers rocket: blasting off for space as a single unit with no stages dropping away, then returning to land vertically with motors firing in reverse. The benefits would be simplicity, no reassembly after use, and nothing wasted. The idea has the same drawback as the small spaceplane—there's no practical way to make an SSTO that would carry both crew and heavy cargo. So this idea too makes NASA nervous, because it's likely there will never be an SSTO as big or as expensive as the shuttle.

SKYLAB The first U.S. space station, orbited in 1973. So far $5.6 billion has been spent merely planning station Freedom. The entire cost of Skylab—construction, launch, and operation—was $7.5 billion. Skylab, proposed by an ad hoc coalition of agency mavericks and fashioned from a spare Saturn upper stage, was a triumph of the old NASA can-do spirit. By the end of the third visit, however, Skylab mission planners were already having difficulty figuring out what any subsequent crews might do. Much to NASA's institutional relief, Skylab fell back into the atmosphere in 1979. It could have been reboosted to a secure orbit, but from there would only have mocked the Freedom budget requests.

WHAT IS TO BE DONE? Unlike some public issues, space is not critical: should GOES-NEXT or Galileo fail, life will go on. But space is a symbol of government's willingness to face its own problems—if we can't fix the space program because of pork barrel and deadweight bureaucracy, how can we hope to tackle intractable problems? The U.S. space program could be cheaper, more effective, and more flexible. All that's required is someone in the White House willing to face down entrenched aerospace interest groups. Here's the plan:

Cancel station Freedom. If a true need for a space station someday develops, one can always be built later. Use half the money saved to develop new generations of dumb boosters for cargo and small spaceplanes or SSTOs for people, cutting the cost of access to orbit and rationalizing the U.S. launch program. Use the other half for cost-effective science, especially new robot probes not of the far heavens (fascinating, but irrelevant to daily life on Earth), but of Mars, Venus, and the Sun. Cut NASA overstaffing by a third, which alone will speed up initiatives like the environment "crash program."

Convert the shuttles to a fleet of long-duration orbiters that will be launched at a safe and affordable rate—two or three times per year—for life-science research and other experiments. Do those experiments jointly with the Soviet Union. Conduct research into ideas like nuclear propulsion that might make Moon bases and Mars exploration practical, but don't hold your breath till they actually happen. Break NASA's monopoly by allowing the Departments of Defense and Energy to propose civilian space missions; this would force NASA to compete for its budget share.

NASA officials are correct to say that humanity must learn to "live and work in space." But it's spaced-out logic to think we should be jumping directly to that purpose when we haven't even learned sensible ways to get into orbit. •

Public Law 98-575
98th Congress

An Act

To facilitate commercial space launches, and for other purposes.

Oct. 30, 1984
[H.R. 3942]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Commercial Space Launch Act.

SHORT TITLE

SECTION 1. This Act may be cited as the "Commercial Space Launch Act".

49 USC app. 2601 note.

FINDINGS

SEC. 2. The Congress finds and declares that—

49 USC app. 2601.

(1) the peaceful uses of outer space continue to be of great value and to offer benefits to all mankind;

(2) private applications of space technology have achieved a significant level of commercial and economic activity, and offer the potential for growth in the future, particularly in the United States;

(3) new and innovative equipment and services are being sought, created, and offered by entrepreneurs in telecommunications, information services, and remote sensing technology;

(4) the private sector in the United States has the capability of developing and providing private satellite launching and associated services that would complement the launching and associated services now available from the United States Government;

(5) the development of commercial launch vehicles and associated services would enable the United States to retain its competitive position internationally, thereby contributing to the national interest and economic well-being of the United States;

(6) provision of launch services by the private sector is consistent with the national security interests and foreign policy interests of the United States and would be facilitated by stable, minimal, and appropriate regulatory guidelines that are fairly and expeditiously applied; ~~and~~

(7) the United States should encourage private sector launches and associated services and, only to the extent necessary, regulate such launches and services in order to ensure compliance with international obligations of the United States and to protect the public health and safety, safety of property, and national security interests and foreign policy interests of the United States; ;

PURPOSES

SEC. 3. It is therefore the purpose of this Act—

49 USC 2602.

(1) to promote economic growth and entrepreneurial activity through utilization of the space environment for peaceful purposes;

(2) to encourage the United States private sector to provide launch vehicles and associated launch services by simplifying and expediting the issuance and transfer of commercial launch licenses and by facilitating and encouraging the utilization of Government-developed space technology; and

(3) to designate an executive department to oversee and coordinate the conduct of commercial launch operations, to issue and transfer commercial launch licenses authorizing such activities, and to protect the public health and safety, safety of property, and national security interests and foreign policy interests of the United States.

DEFINITIONS

49 USC app. 2603.

SEC. 4. For purposes of this Act—

(1) "agency" means an executive agency as defined by section 105 of title 5, United States Code;

(2) "launch" means to place, or attempt to place, a launch vehicle and payload, if any, in a suborbital trajectory, in Earth orbit in outer space, or otherwise in outer space;

(3) "launch property" means propellants, launch vehicles and components thereof, and other physical items constructed for or used in the launch preparation or launch of a launch vehicle;

(4) "launch services" means those activities involved in the preparation of a launch vehicle and its payload for launch and the conduct of a launch;

(5) "launch site" means the location on Earth from which a launch takes place, as defined in any license issued or transferred by the Secretary under this Act, and includes all facilities located on a launch site which are necessary to conduct a launch;

(6) "launch vehicle" means any vehicle constructed for the purpose of operating in, or placing a payload in, outer space and any suborbital rocket;

(7) "payload" means an object which a person undertakes to place in outer space by means of a launch vehicle, and includes subcomponents of the launch vehicle specifically designed or adapted for that object;

(8) "person" means any individual and any corporation, partnership, joint venture, association, or other entity organized or existing under the laws of any State or any nation;

(9) "Secretary" means the Secretary of Transportation;

(10) "State", and "United States" when used in a geographical sense, mean the several States, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, the United States Virgin Islands, Guam, and any other commonwealth, territory, or possession of the United States; and

(11) "United States citizen" means—

(A) any individual who is a citizen of the United States;

(B) any corporation, partnership, joint venture, association, or other entity organized or existing under the laws of the United States or any State; and

(C) any corporation, partnership, joint venture, association, or other entity which is organized or exists under the laws of a foreign nation, if the controlling interest (as defined by the Secretary in regulations) in such entity is

held by an individual or entity described in subparagraph (A) or (B).

GENERAL RESPONSIBILITIES OF THE SECRETARY AND OTHER AGENCIES

SEC. 5. (a) The Secretary shall be responsible for carrying out this Act, and in doing so shall— 49 USC app. 2604.

(1) encourage, facilitate, and promote commercial space launches by the private sector; and

(2) consult with other agencies to provide consistent application of licensing requirements under this Act and to ensure fair and equitable treatment for all license applicants.

(b) To the extent permitted by law, Federal agencies shall assist the Secretary, as necessary, in carrying out this Act.

REQUIREMENT OF LICENSE FOR PRIVATE SPACE LAUNCH OPERATIONS

SEC. 6. (a)(1) No person shall launch a launch vehicle or operate a launch site within the United States, unless authorized by a license issued or transferred under this Act. 49 USC app. 2605.

(2) No United States citizen described in subparagraph (A) or (B) of section 4(11) shall launch a launch vehicle or operate a launch site outside the United States, unless authorized by a license issued or transferred under this Act.

(3)(A) No United States citizen described in subparagraph (C) of section 4(11) shall launch a launch vehicle or operate a launch site at any place which is both outside the United States and outside the territory of any foreign nation, unless authorized by a license issued or transferred under this Act. The preceding sentence shall not apply with respect to a launch or operation of a launch site if there is an agreement in force between the United States and a foreign nation which provides that such foreign nation shall exercise jurisdiction over such launch or operation.

(B)(i) Except as provided in clause (ii) of this subparagraph, this Act shall not apply to the launch of a launch vehicle or the operation of a launch site in the territory of a foreign nation by a United States citizen described in subparagraph (C) of section 4(11).

(ii) If there is an agreement in force between the United States and a foreign nation which provides that the United States shall exercise jurisdiction over the launch of a launch vehicle or operation of a launch site in the territory of such nation by a United States citizen described in subparagraph (C) of section 4(11), no such United States citizen shall launch a launch vehicle or operate a launch site in the territory of such nation, unless authorized by a license issued or transferred under this Act. International agreements

(b)(1) The holder of a launch license under this Act shall not launch a payload unless that payload complies with all requirements of Federal law that relate to the launch of a payload. The Secretary shall ascertain whether any license, authorization, or other permit required by Federal law for a payload which is to be launched has been obtained.

(2) If no payload license, authorization, or permit is required by any Federal law, the Secretary may take such action under this Act as the Secretary deems necessary to prevent the launch of a payload by a holder of a launch license under this Act if the Secretary determines that the launch of such payload would jeopardize the

public health and safety, safety of property, or any national security interest or foreign policy interest of the United States.

(c)(1) Except as provided in this Act, no person shall be required to obtain from any agency a license, approval, waiver, or exemption for the launch of a launch vehicle or the operation of a launch site.

(2) Nothing in this Act shall affect the authority of the Federal Communications Commission under the Communications Act of 1934 (47 U.S.C. 151 et seq.) or the authority of the Secretary of Commerce under the Land Remote-Sensing Commercialization Act of 1984 (15 U.S.C. 4201 et seq.).

AUTHORITY TO ISSUE AND TRANSFER LICENSES

49 USC app. 2606.

SEC. 7. The Secretary may, consistent with the public health and safety, safety of property, and national security interests and foreign policy interests of the United States, issue or transfer a license for launching one or more launch vehicles or for operating one or more launch sites, or both, to an applicant who meets the requirements for a license under section 8 of this Act. Any license issued or transferred under this section shall be in effect for such period of time as the Secretary may specify, in accordance with regulations issued under this Act.

LICENSING REQUIREMENTS

49 USC app. 2607.

SEC. 8. (a)(1) All requirements of Federal law which apply to the launch of a launch vehicle or the operation of a launch site shall be requirements for a license under this Act for the launch of a launch vehicle or the operation of a launch site, respectively, except to the extent provided in paragraph (2).

(2) If the Secretary determines, in consultation with appropriate agencies, that any requirement of Federal law that would otherwise apply to the launch of a launch vehicle or the operation of a launch site is not necessary to protect the public health and safety, safety of property, and national security interests and foreign policy interests of the United States, the Secretary may by regulation provide that such requirement shall not be a requirement for a license under this Act.

(b) The Secretary may, with respect to launches and the operation of launch sites, prescribe such additional requirements as are necessary to protect the public health and safety, safety of property, and national security interests and foreign policy interests of the United States.

(c) The Secretary may, in individual cases, waive the application of any requirement for a license under this section if the Secretary determines that such waiver is in the public interest and will not jeopardize the public health and safety, safety of property, or any national security interest or foreign policy interest of the United States.

LICENSE APPLICATION AND APPROVAL

49 USC app. 2608.

SEC. 9. (a) Any person may apply to the Secretary for issuance or transfer of a license under this Act, in such form and manner as the Secretary may prescribe. The Secretary shall establish procedures and timetables to expedite review of applications under this section and to reduce regulatory burdens for applicants.

(b) The Secretary shall issue or transfer a license to an applicant if the Secretary determines in writing that the applicant complies and will continue to comply with the requirements of this Act and any regulation issued under this Act. The Secretary shall include in such license such conditions as may be necessary to ensure compliance with this Act, including an effective means of on-site verification that a launch or operation of a launch site conforms to representations made in the application for a license or transfer of a license. The Secretary shall make a determination on any application not later than 180 days after receipt of such application. If the Secretary has not made a determination within 120 days after receipt of such application, the Secretary shall inform the applicant of any pending issues and of actions required to resolve such issues.

(c) The Secretary, any officer or employee of the United States, or any person with whom the Secretary has entered into a contract under section 14(b) of this Act may not disclose any data or information under this Act which qualifies for exemption under section 552(b)(4) of title 5, United States Code, or is designated as confidential by the person or agency furnishing such data or information, unless the Secretary determines that the withholding of such data or information is contrary to the public or national interest.

SUSPENSION, REVOCATION, AND MODIFICATION OF LICENSES

SEC. 10. (a) The Secretary may suspend or revoke any license issued or transferred under this Act if the Secretary finds that the licensee has substantially failed to comply with any requirement of this Act, the license, or any regulation issued under this Act, or that the suspension or revocation is necessary to protect the public health and safety, safety of property, or any national security interest or foreign policy interest of the United States. 49 USC app. 2609.

(b) Upon application by the licensee or upon the Secretary's own initiative, the Secretary may modify a license issued or transferred under this Act, if the Secretary finds that the modification will comply with the requirements of this Act.

(c) Unless otherwise specified by the Secretary, any suspension, revocation, or modification by the Secretary under this section—

(1) shall take effect immediately; and

(2) shall continue in effect during any review of such action under section 12 of this Act.

(d) Whenever the Secretary takes any action under this section, the Secretary shall notify the licensee in writing of the Secretary's finding and the action which the Secretary has taken or proposes to take regarding such finding.

EMERGENCY ORDERS

SEC. 11. (a) The Secretary may terminate, prohibit, or suspend immediately the launch of a launch vehicle or the operation of a launch site which is licensed under this Act if the Secretary determines that such launch or operation is detrimental to the public health and safety, safety of property, or any national security interest or foreign policy interest of the United States. Prohibition. 49 USC app. 2610.

(b) An order terminating, prohibiting, or suspending any launch or operation of a launch site licensed by the Secretary under this Act shall take effect immediately and shall continue in effect during any review of such order under section 12.

ADMINISTRATIVE AND JUDICIAL REVIEW

49 USC app. 2611.

SEC. 12. (a)(1) An applicant for a license and a proposed transferee of a license under this Act shall be entitled to a determination on the record after an opportunity for a hearing in accordance with section 554 of title 5, United States Code, of any decision of the Secretary under section 9(b) to issue or transfer a license with conditions or to deny the issuance or transfer of such license. An owner or operator of a payload shall be entitled to a determination on the record after an opportunity for a hearing in accordance with section 554 of title 5, United States Code, of any decision of the Secretary under section 6(b)(2) to prevent the launch of such payload.

(2) A licensee under this Act shall be entitled to a determination on the record after an opportunity for a hearing in accordance with section 554 of title 5, United States Code, of any decision of the Secretary—

(A) under section 10 to suspend, revoke, or modify a license; or

(B) under section 11 to terminate, prohibit, or suspend any launch or operation of a launch site licensed by the Secretary.

(b) Any final action of the Secretary under this Act to issue, transfer, deny the issuance or transfer of, suspend, revoke, or modify a license or to terminate, prohibit, or suspend any launch or operation of a launch site licensed by the Secretary or to prevent the launch of a payload shall be subject to judicial review as provided in chapter 7 of title 5, United States Code.

REGULATIONS

49 USC app. 2612.

SEC. 13. The Secretary may issue such regulations, after notice and comment in accordance with section 553 of title 5, United States Code, as may be necessary to carry out this Act.

MONITORING OF ACTIVITIES OF LICENSEES

49 USC app. 2613.

SEC. 14. (a) Each license issued or transferred under this Act shall require the licensee—

(1) to allow the Secretary to place Federal officers or employees or other individuals as observers at any launch site used by the licensee, at any production facility or assembly site used by a contractor of the licensee in the production or assembly of a launch vehicle, or at any site where a payload is integrated with a launch vehicle, in order to monitor the activities of the licensee or contractor at such time and to such extent as the Secretary considers reasonable and necessary to determine compliance with the license or to carry out the responsibilities of the Secretary under section 6(b) of this Act; and

(2) to cooperate with such observers in the performance of monitoring functions.

(b) The Secretary may, to the extent provided in advance by appropriation Acts, enter into a contract with any person to carry out subsection (a)(1) of this section.

USE OF GOVERNMENT PROPERTY

49 USC app. 2614.

SEC. 15. (a) The Secretary shall take such actions as may be necessary to facilitate and encourage the acquisition (by lease, sale, transaction in lieu of sale, or otherwise) by the private sector of

and state governments

launch property of the United States which is excess or is otherwise not needed for public use and of launch services, including utilities, of the United States which are otherwise not needed for public use.

(b)(1) The amount to be paid to the United States by any person who acquires launch property or launch services, including utilities, shall be established by the agency providing the property or service, in consultation with the Secretary. In the case of acquisition of launch property by sale or transaction in lieu of sale, the amount of such payment shall be the fair market value. In the case of any other type of acquisition of launch property, the amount of such payment shall be an amount equal to the direct costs (including any specific wear and tear and damage to the property) incurred by the United States as a result of the acquisition of such launch property. In the case of any acquisition of launch services, including utilities, the amount of such payment shall be an amount equal to the direct costs (including salaries of United States civilian and contractor personnel) incurred by the United States as a result of the acquisition of such launch services.

(2) The Secretary may collect any payment for launch property or launch services, with the consent of the agency establishing such payment under paragraph (1).

(3) The amount of any payment received by the United States for launch property or launch services, including utilities, under this subsection shall be deposited in the general fund of the Treasury, and the amount of a payment for launch property (other than launch property which is excess) and launch services (including utilities) shall be credited to the appropriation from which the cost of providing such property or services was paid.

(c) The Secretary may establish requirements for liability insurance, hold harmless agreements, proof of financial responsibility, and such other assurances as may be needed to protect the United States and its agencies and personnel from liability, loss, or injury as a result of a launch or operation of a launch site involving Government facilities or personnel.

LIABILITY INSURANCE

SEC. 16. Each person who launches a launch vehicle or operates a launch site under a license issued or transferred under this Act shall have in effect liability insurance at least in such amount as is considered by the Secretary to be necessary for such launch or operation, considering the international obligations of the United States. The Secretary shall prescribe such amount after consultation with the Attorney General and other appropriate agencies. 49 USC app. 2615.

ENFORCEMENT AUTHORITY

SEC. 17. (a) The Secretary shall enforce this Act. The Secretary may delegate the exercise of any enforcement authority under this Act to any officer or employee of the Department of Transportation or, with the approval of the head of another agency, any officer or employee of such agency. 49 USC app. 2616.

(b) In carrying out this section, the Secretary may—

(1) make investigations and inquiries, and administer to or take from any person an oath, affirmation, or affidavit, concerning any matter relating to enforcement of this Act; and

(2) pursuant to any lawful process—

(A) enter at any reasonable time any launch site, production facility, or assembly site of a launch vehicle, or any site where a payload is integrated with a launch vehicle, for the purpose of inspecting any object which is subject to this Act and any records or reports required by the Secretary to be made or kept under this Act; and

(B) seize any such object, record, or report where there is probable cause to believe that such object, record, or report was used, is being used, or is likely to be used in violation of this Act.

PROHIBITED ACTS

49 USC app. 2617.

SEC. 18. It is unlawful for any person to violate a requirement of this Act, a regulation issued under this Act, or any term, condition, or restriction of any license issued or transferred by the Secretary under this Act.

CIVIL PENALTIES

49 USC app. 2618.

SEC. 19. (a) Any person who is found by the Secretary, after notice and opportunity to be heard on the record in accordance with section 554 of title 5, United States Code, to have committed any act prohibited by section 18 shall be liable to the United States for a civil penalty of not more than $100,000 for each violation. Each day of a continuing violation shall constitute a separate violation. The amount of such civil penalty shall be assessed by the Secretary by written notice. The Secretary may compromise, modify, or remit, with or without conditions, any civil penalty which is subject to imposition or which has been imposed under this section.

(b) If any person fails to pay a civil penalty assessed against such person after the penalty has become final or if such person appeals an order of the Secretary and the appropriate court has entered final judgment in favor of the Secretary, the Secretary shall recover the civil penalty assessed in any appropriate district court of the United States.

(c) For purposes of conducting any hearing under this section, the Secretary may (1) issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, documents, and other records, (2) seek enforcement of such subpoenas in the appropriate district court of the United States, and (3) administer oaths and affirmations.

CONSULTATION

Defense and national security.
49 USC app. 2619.

SEC. 20. (a) The Secretary shall consult with the Secretary of Defense on all matters, including the issuance or transfer of each license, under this Act affecting national security. The Secretary of Defense shall be responsible for identifying and notifying the Secretary of those national security interests of the United States which are relevant to activities under this Act.

(b) The Secretary shall consult with the Secretary of State on all matters, including the issuance or transfer of each license, under this Act affecting foreign policy. The Secretary of State shall be responsible for identifying and notifying the Secretary of those foreign policy interests or obligations of the United States which are relevant to activities under this Act.

(c) The Secretary shall consult with other agencies, as appropriate, in order to carry out the provisions of this Act.

RELATIONSHIP TO OTHER LAWS AND INTERNATIONAL OBLIGATIONS

SEC. 21. (a) No State or political subdivision of a State may adopt or have in effect any law, rule, regulation, standard, or order which is inconsistent with the provisions of this Act. Nothing in this Act shall preclude a State or a political subdivision of a State from adopting or putting into effect any law, rule, regulation, standard, or order which is consistent with this Act and is in addition to or more stringent than any requirement of or regulation issued under this Act. The Secretary may, and is encouraged to, consult with the States to simplify and expedite the approval of space launch activities. Prohibitions. 49 USC app. 2626.

(b) A launch vehicle or payload shall not, by reason of the launching of such vehicle or payload, be considered an export for purposes of any law controlling exports.

(c) Nothing in this Act shall apply to—

(1) any—

(A) launch or operation of a launch vehicle,

(B) operation of a launch site, or

(C) other space activity,

carried out by the United States on behalf of the United States; or

(2) any planning or policies relating to any such launch, operation, or activity.

(d) The Secretary shall carry out this Act consistent with any obligation assumed by the United States in any treaty, convention, or agreement that may be in force between the United States and any foreign nation. In carrying out this Act, the Secretary shall consider applicable laws and requirements of any foreign nation.

REPORT ON LEGISLATION

SEC. 22. (a) Not later than the last day of each fiscal year ending after the date of enactment of this Act and before October 1, 1989, the Secretary shall submit to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report describing all activities undertaken under this Act, including a description of the process for the application for and approval of licenses under this Act and recommendations for legislation that may further commercial launches. Report. 49 USC app. 2621.

(b) Not later than July 1, 1985, the Secretary shall submit to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report which identifies Federal statutes, treaties, regulations, and policies which may have an adverse effect on commercial launches and include recommendations on appropriate changes thereto.

SEVERABILITY

SEC. 23. If any provision of this Act, or the application of such provision to any person or circumstance, is held invalid, the remainder of this Act and the application of such provision to any other person or circumstance shall not be affected by such invalidation. 49 USC app. 2622.

AUTHORIZED APPROPRIATIONS

49 USC app. 2623.

SEC. 24. There are authorized to be appropriated to the Secretary $4,000,000 for fiscal year 1985.

EFFECTIVE DATE

49 USC app. 2601 note.

SEC. 25. (a) Except for section 15 and the authority to issue regulations, this Act shall take effect 180 days after the date of enactment of this Act.

(b) Section 15 shall take effect on the date of enactment of this Act, except that nothing in this Act shall affect any agreement, including negotiations which are substantially completed, relating to the acquisition of launch property or launch services of the United States entered into on or before the date of enactment of this Act between the United States and any private party.

Regulations.

(c) Regulations to implement this Act shall be promulgated not later than 180 days after the date of enactment of this Act.

Approved October 30, 1984.

LEGISLATIVE HISTORY—H.R. 3942:

HOUSE REPORT No. 98-816 (Comm. on Science and Technology).
SENATE REPORT No. 98-656 (Comm. on Commerce, Science, and Transportation).
CONGRESSIONAL RECORD, Vol. 130 (1984):
June 5, considered and passed House.
Oct. 9, considered and passed Senate, amended; House concurred in Senate amendment.
WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 20, No. 44 (1984):
Oct. 30, Presidential statement.

Public Law 100-657
100th Congress

An Act

Nov. 15, 1988
[H.R. 4399]

To facilitate commercial access to space, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Commercial Space Launch Act Amendments of 1988.
49 USC app. 2601 note.

SECTION 1. SHORT TITLE.

This Act may be cited as the "Commercial Space Launch Act Amendments of 1988".

49 USC app. 2601 note.

SEC. 2. FINDINGS.

The Congress finds that—

(1) a United States commercial space launch industry is an essential component of national efforts to assure access to space for Government and commercial users;

(2) the Federal Government should encourage, facilitate, and promote the use of the United States commercial space launch industry in order to continue United States aerospace preeminence;

(3) the United States commercial space launch industry must be competitive in the international marketplace;

(4) Federal Government policies should recognize the responsibility of the United States under international treaty for activities conducted by United States citizens in space; and

(5) the United States must maintain a competitive edge in international commercial space transportation by ensuring continued research in launch vehicle component technology and development.

SEC. 3. DEFINITIONS.

Section 4 of the Commercial Space Launch Act (49 U.S.C. App. 2603) is amended—

(1) in paragraph (10) by striking "and" at the end;

(2) by redesignating paragraph (11) as paragraph (12); and

(3) by inserting immediately after paragraph (10) the following new paragraph:

"(11) 'third party' means any person or entity other than—

"(A) the United States, its agencies, or its contractors or subcontractors involved in launch services;

"(B) the licensee or transferee;

"(C) the licensee's or transferee's contractors, subcontractors, or customers involved in launch services; or

"(D) any such customer's contractors or subcontractors involved in launch services; and".

SEC. 4. PRIVATE ACQUISITION OF GOVERNMENT PROPERTY AND SERVICES.

(a) Section 15(a) of the Commercial Space Launch Act (49 U.S.C. App. 2614(a)) is amended by adding at the end the following: "In taking such actions, the Secretary shall consider the commercial

availability, on reasonable terms and conditions, of substantially equivalent launch property or launch services from a domestic source.".

(b) Section 15(b)(1) of the Commercial Space Launch Act (49 U.S.C. App. 2614(b)(1) is amended by adding at the end the following: "For purposes of this paragraph, the term 'direct costs' means the actual costs that can be unambiguously associated with a commercial launch effort, and would not be borne by the United States Government in the absence of a commercial launch effort.".

(c) Section 15 of the Commercial Space Launch Act (49 U.S.C. App. 2614) is amended by adding at the end the following new subsection:

"(d) The head of any Federal agency or department may collect payment for activities involved in the production of a launch vehicle or its payload for launch if such activities were agreed to by the owners or manufacturers of such launch vehicle or payload.".

SEC. 5. INSURANCE REQUIREMENTS OF LICENSEE.

(a) Section 16 of the Commercial Space Launch Act (49 U.S.C. App. 2615) is amended to read as follows:

"LIABILITY INSURANCE

"SEC. 16. (a)(1)(A) Each license issued or transferred under this Act shall require the licensee or transferee— Claims.

"(i) to obtain liability insurance; or

"(ii) to demonstrate financial responsibility,

in an amount sufficient to compensate the maximum probable loss (as determined by the Secretary, after consultation with the Administrator of the National Aeronautics and Space Administration, the Secretary of the Air Force, and the heads of other appropriate agencies) from claims by a third party for death, bodily injury, or loss of or damage to property resulting from activities carried out under the license in connection with any particular launch. In no event shall a licensee or transferee be required to obtain insurance or demonstrate financial responsibility under this subparagraph, with respect to the aggregate of such claims arising out of any particular launch, in an amount which exceeds (I) $500,000,000 or (II) the maximum liability insurance available on the world market at a reasonable cost, if such insurance is less than the amount in subclause (I).

"(B) Each license issued or transferred under this Act shall require the licensee or transferee—

"(i) to obtain liability insurance; or

"(ii) to demonstrate financial responsibility,

in an amount sufficient to compensate the maximum probable loss (as determined by the Secretary, after consultation with the Administrator of the National Aeronautics and Space Administration, the Secretary of the Air Force, and the heads of other appropriate agencies) from claims against any person by the United States for loss of or damage to property of the United States resulting from activities carried out under the license in connection with any particular launch. In no event shall a licensee or transferee be required to obtain insurance or demonstrate financial responsibility under this subparagraph, with respect to the aggregate of such claims arising out of any particular launch, in an amount which exceeds (I) $100,000,000 or (II) the maximum liability

insurance available on the world market at a reasonable cost, if such insurance is less than the amount in subclause (I).

"(C) Each license issued or transferred under this Act shall require the licensee or transferee to enter into reciprocal waivers of claims with its contractors, subcontractors, and customers, and the contractors and subcontractors of such customers, involved in launch services, under which each party to each such waiver agrees to be responsible for any property damage or loss it sustains or for any personal injury to, death of, or property damage or loss sustained by its own employees resulting from activities carried out under the license.

"(D) The Secretary, on behalf of the United States, its agencies involved in launch services, and contractors and subcontractors involved in launch services, shall enter into reciprocal waivers of claims with the licensee or transferee, its contractors, subcontractors, and customers, and the contractors and subcontractors of such customers, involved in launch services, under which each party to each such waiver agrees to be responsible for any property damage or loss it sustains or for any personal injury to, death of, or property damage or loss sustained by its own employees resulting from activities carried out under the license. Any such waiver shall apply only to the extent that claims exceed the amount of insurance or demonstration of financial responsibility required under subparagraph (B). After consultation with the Administrator of the National Aeronautics and Space Administration and the Secretary of the Air Force, the Secretary may also waive, on behalf of the United States and any Federal agency, the right to recover any damages for loss of or damage to property of the United States to the extent insurance is not available by reason of policy exclusions which are determined by the Secretary to be usual for the type of insurance involved.

"(2) Any insurance policy obtained, or demonstration of financial responsibility made, pursuant to a requirement described in paragraph (1) shall protect the United States, its agencies, personnel, contractors, and subcontractors, and all contractors, subcontractors, and customers of the licensee or transferee, and all contractors and subcontractors of such customers, involved in providing the launch services, to the extent of their potential liabilities, at no cost to the United States.

"(3) The Secretary shall determine the maximum probable loss under paragraph (1) (A) and (B) associated with activities under a license, within 90 days after a licensee or transferee has required such a determination and has submitted all information the Secretary requires to make such a determination. The Secretary shall amend such determination as warranted by new information.

Reports. Within 12 months after the date of enactment of the Commercial Space Launch Act Amendments of 1988, and within each 12-month period thereafter, the Secretary shall submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report on the current determinations with respect to all issued licenses and the reasons for those determinations.

Reports. "(4) Within 6 months after the date of enactment of the Commercial Space Launch Act Amendments of 1988, and within each 12-month period thereafter, the Secretary shall review the amounts specified in paragraph (1) (AXI) and (BXI), and shall submit a report to the Congress which, if appropriate, contains a proposed adjustment to such amounts to conform with altered liability expectations

and availability of insurance on the world market. Such proposed adjustment shall take effect 30 days after the submission of such report.

"(b)(1) To the extent provided in advance in appropriations Acts or to the extent there is enacted additional legislative authority to provide for the payment of claims as submitted in the compensation plan outlined in paragraph (4), the Secretary shall provide for the payment by the United States of successful claims (including reasonable expenses of litigation or settlement) of a third party against the licensee or transferee, or its contractors, subcontractors, or customers, or the contractors or subcontractors of such customers, resulting from activities carried out pursuant to a license issued or transferred under this Act for death, bodily injury, or loss of or damage to property resulting from activities carried out under the license, but only to the extent that the aggregate of such successful claims arising out of any particular launch—

"(A) is in excess of the amount of insurance or demonstration of financial responsibilities required under subsection (a)(1)(A); and

"(B) is not in excess of the level that is $1,500,000,000 (plus any additional sums necessary to reflect inflation occurring after January 1, 1989) above such amount.

The Secretary shall not provide for payment of any part of such claim for which the death, bodily injury, or loss of or damage to property has resulted from willful misconduct by the licensee or transferee. To the extent insurance required pursuant to subsection (a)(1)(A) is not available to cover any such successful third party liability claim by reason of insurance policy exclusions determined by the Secretary to be usual for the type of insurance involved, the Secretary may provide for the payment of such excluded claims without regard to the limitation expressed in subparagraph (A).

"(2) The payment of claims under paragraph (1) shall be subject to—

"(A) notice to the United States of any claim, or suit associated with such claim, against a party described in paragraph (1) for death, bodily injury, or loss of or damage to property;

"(B) participation or assistance in the defense by the United States, at its election, of that claim or suit; and

"(C) approval by the Secretary of that portion of any settlement which is to be paid out of appropriated funds of the United States.

"(3) The Secretary may withhold payment under paragraph (1) if the Secretary certifies that the amount is not just and reasonable, except that the amount of any claim determined by the final judgment of a court of competent jurisdiction shall be deemed by the Secretary to be just and reasonable.

"(4)(A) If as a result of activities carried out under a license issued or transferred under this Act the aggregate of the claims arising out of a particular launch are likely to exceed the amount of insurance or demonstration of financial responsibility required under the license, the Secretary shall (i) make a survey of the causes and extent of damage and (ii) expeditiously submit to the Congress a report setting forth the results of such survey. Reports.

"(B) Not later than 90 days after any determination by a court indicating that the liability for the aggregate of claims arising out of a particular launch under such a license may exceed the amount of insurance or demonstration of financial responsibility required President of U.S.

under the license, the President, on the recommendation of the Secretary, shall submit to the Congress a compensation plan or plans that (i) outlines the aggregate dollar value of such claims; (ii) recommends sources of funding to pay for these claims; and (iii) includes any legislative language required to implement the compensation plan or plans if additional legislative authority is required. No compensation plan for a single event or incident may exceed the aggregate of $,500,000,000.

"(C) Any compensation plan transmitted to the Congress pursuant to subparagraph (B) shall bear an identification number and shall be transmitted to both Houses of Congress on the same day and to each House while it is in session.

"(D)(i) The provisions of this subparagraph shall apply with respect to consideration in the Senate of any such compensation plan and to Senate action on such compensation plan.

"(ii) Any such compensation plan that requires additional appropriations or additional legislative authority must be considered by the Senate pursuant to this subparagraph within 60 calendar days of continuous session of Congress after the date on which such plan is transmitted to the Congress.

"(iii) For the purposes of this subparagraph, the term 'resolution' means only a joint resolution of Congress the matter after the resolving clause of which is as follows: 'That the approves the compensation plan numbered submitted to the Congress on , 19 .', the first blank space therein being filled with the name of the resolving House and the other blank spaces being appropriately filled; but does not include a resolution which includes more than one compensation plan.

"(iv) A resolution once introduced with respect to a compensation plan shall immediately be referred to a committee (and all resolutions with respect to the same compensation plan shall be referred to the same committee) by the President of the Senate.

"(v)(I) If the committee of the Senate to which a resolution with respect to a compensation plan has been referred has not reported it at the end of 20 calendar days after its referral, it shall be in order to move either to discharge the committee from further consideration of such resolution or to discharge the committee from further consideration with respect to such compensation plan which has been referred to the committee.

"(II) A motion to discharge may be made only by an individual favoring the resolution, shall be highly privileged (except that it may not be made after the committee has reported a resolution with respect to the same compensation plan), and debate thereon shall be limited to not more than one hour, to be divided equally between those favoring and those opposing the resolution. An amendment to the motion shall not be in order, and it shall not be in order to move to reconsider the vote by which the motion was agreed to or disagreed to.

"(III) If the motion to discharge is agreed to or disagreed to, the motion may not be renewed, nor may another motion to discharge the committee be made with respect to any other resolution with respect to the same compensation plan.

"(vi)(I) When the committee has reported, or has been discharged from further consideration of, a resolution, it shall be at any time thereafter in order (even though a previous motion to the same effect has been disagreed to) to move to proceed to the consideration of the resolution. The motion shall be highly privileged and shall not

be debatable. An amendment to the motion shall not be in order, and it shall not be in order to move to reconsider the vote by which the motion was agreed to or disagreed to.

"(II) Debate on the resolution referred to in subclause (I) of this clause shall be limited to not more than 10 hours, which shall be divided equally between those favoring and those opposing such resolution. A motion further to limit debate shall not be debatable. An amendment to, or motion to recommit, the resolution shall not be in order, and it shall not be in order to move to reconsider the vote by which such resolution was agreed to or disagreed to.

"(vii)(I) Motions to postpone, made with respect to the discharge from committee, or the consideration of a resolution or motions to proceed to the consideration of other business, shall be decided without debate.

"(II) Appeals from the decision of the Chair relating to the application of the rules of the Senate to the procedures relating to resolution shall be decided without debate.

"(5) The provisions of paragraphs (1) through (4) shall apply only to each license issued or transferred under this Act for which a complete and valid application has been received by the Secretary prior to the date that is 5 years following the date of enactment of the Commercial Space Launch Act Amendments of 1988.

"(c) The head of any Federal agency or department shall collect insurance proceeds or any other payment owed for the loss of or damage to Government property under its jurisdiction or control resulting from activities carried out under a license issued or transferred under this Act. Such proceeds or other payment shall be credited to the current applicable appropriations, funds, or accounts of that agency or department.".

(b) Section 15(c) of the Commercial Space Launch Act (49 U.S.C. App. 2614(c)) is amended to read as follows:

"(c) Consistent with the requirements of this Act, the Secretary shall establish requirements for proof of financial responsibility and such other assurances as may be necessary to protect the United States and its agencies and personnel from liability, death, bodily injury, or loss of or damage to property as a result of a launch or operation of a launch site involving Government facilities or personnel. The Secretary may not under this subsection relieve the United States of liability for death, bodily injury, or loss of or damage to property resulting from the willful misconduct of the United States or its agents.".

SEC. 6. UNITED STATES LAUNCH INCENTIVES FOR CERTAIN SATELLITES. 49 USC app. 2615 note.

(a) The requirements of subsection (a)(1)(B) of section 16 of the Commercial Space Launch Act (49 U.S.C. App. 2615), as amended by this Act, shall not apply to eligible satellites.

(b) To the extent approved in appropriations Acts, the United States shall not require payment for the provision of launch services in connection with the commercial launch of an eligible satellite.

(c) For purposes of this section, the term "eligible satellite" means a satellite that—

(1) was under construction on August 15, 1986;

(2) was the subject of a launch services agreement or contract with the National Aeronautics and Space Administration, which as of August 15, 1986, was in effect and not yet carried out; and

(3) is licensed for launch under the Commercial Space Launch Act.

SEC. 7. PREEMPTION OF SCHEDULED LAUNCHES.

Section 15(b) of the Commercial Space Launch Act (49 U.S.C. App. 2614(b)) is amended by adding at the end the following new paragraph:

"(4)(A) The Secretary, with the cooperation of the Secretary of Defense and the Administrator of the National Aeronautics and Space Administration, shall take steps to ensure that the launches of payloads with respect to which a launch date commitment from the United States has been obtained for a launch licensed under this Act are not preempted from access to United States launch sites or launch property, except in cases of imperative national need. Any determination of imperative national need shall be made by the Secretary of Defense or the Administrator of the National Aeronautics and Space Administration, in consultation with the Secretary, and shall not be delegated. A licensee or transferee preempted from access to a launch site or launch property shall not be required to pay to the United States any amount for launch services solely attributable to the scheduled launch prevented by such preemption.

Reports.

"(B) The Secretary of Defense or the Administrator of the National Aeronautics and Space Administration, in cooperation with the Secretary, as the case may be, shall report to the Congress within 7 days after any determination of imperative national need under subparagraph (A), including an explanation of the circumstances justifying such determination and a schedule for ensuring the prompt launching of a preempted payload."

SEC. 8. STUDY OF PROCESS FOR SCHEDULING LAUNCHES.

The Secretary of Transportation, in cooperation with the Secretary of Defense and the Administrator of the National Aeronautics and Space Administration, and in consultation with representatives of the space launch and satellite industry, shall study ways and means of scheduling Government and commercial payloads on commercial launch vehicles at Government launch sites in a manner which—

(1) makes the best practicable use of the launch property of the United States; and

(2) assures that the launch property of the United States that is available for commercial use will be available on a commercially reasonable basis,

consistent with the objectives of the Commercial Space Launch Act.

Reports.

The Secretary shall report the results of such study to the Congress within 90 days after the date of enactment of this Act.

SEC. 9. COMMERCIAL SPACE LAUNCH SERVICE COMPETITION.

It is the sense of the Congress that the United States should explore ways and means of developing a dialogue with appropriate foreign government representatives to seek the development of guidelines for access to launch services by satellite builders and users in a manner that assures the conduct of reasonable and fair international competition in commercial space activities.

SEC. 10. LAUNCH VEHICLE RESEARCH AND DEVELOPMENT.

The Administrator of the National Aeronautics and Space Administration shall, in consultation with representatives of the space launch and satellite industry, design a program for the support of research into launch systems component technologies, for the purpose of developing higher performance and lower cost United States launch vehicle technologies and systems available for the launch of commercial and Government spacecraft into orbit. The Administrator shall submit a report outlining such program to the Congress within 60 days after the date of enactment of this Act. Reports.

SEC. 11. APPLICABILITY TO LICENSES. 49 USC app. 2603 note.

This Act, and the amendments made by this Act, shall apply to all licenses issued under the Commercial Space Launch Act before, on, or after the date of enactment of this Act.

Approved November 15, 1988.

LEGISLATIVE HISTORY—H.R. 4399:

HOUSE REPORTS: No. 100-639 (Comm. on Science, Space, and Technology).
SENATE REPORTS: No. 100-593 (Comm. on Commerce, Science, and Transportation).
CONGRESSIONAL RECORD, Vol. 134 (1988):
May 24, considered and passed House.
Oct. 14, considered and passed Senate, amended.
Oct. 21, House concurred in Senate amendment.

SENATE COMMITTEE REPORT

DATE: 5/3/91 FURTHER: Finance

DATE TURNED INTO OFFICE: ____________

L&C Committee considered CS FOR HOUSE BILL NO. 46 (FINANCE) am

"An Act creating the Alaska Aerospace Development Corporation; providing for the lease of state land to the corporation; providing an exemption from municipal sales and use taxes for space-related activities; and providing for an effective date."

and recommended:

[✓] replace with S CS For CS HB 46 (L+C) [✓] same title
[ ] or adopt ____ CS ____ [ ] new title
[ ] technical title change (HB only)

[ ] attached amendment(s)
[✓] L + C letter of intent adopted

[ ] do pass

[ ] do not pass

[ ] no recommendation

[✓] individual recommendations

[ ] further referral to ____________

ATTACHES NEW FISCAL NOTE(S): Dept/Date:

[ ] fiscal note(s) ____________

[ ] zero fiscal note(s) ____________

[ ] appropriation-no fiscal note

APPROVES PREVIOUS: Dept/Date:

[✓] fiscal note(s) ____________

[ ] zero fiscal note(s) ____________

[ ] Governor's bill w/fiscal note

SIGNING DO PASS:

Virginia Collins
Rick Halford

OTHER RECOMMENDATIONS:

True Pearce - 10 Pass
Chair: Signature and Recommendation

HB 46 Aerospace Development Corp.
Sen. Halford Concerns

1. Board choose own chair.

   Pg 2 Ln 26 provides for UA president or designee to be chair.
   Result - No

2. Statement that corporation may not be terminated.

   Pg 1 Ln 14 does not allow termination while outstanding bonds, loans or obligations are outstanding and has provision for continued UA and Poker Flat continuation.
   Result - No

3. Appropriation process.

   There is no tie to appropriation process.
   Pg 9 Ln 13 requires legislative vote to <u>disapprove</u> any project of $1 million or more.
   *Result - change to require vote to approve.
   *Add provision that the Corp is covered by the Executive Budget Act.

4. Maximum debt - no limit
   Approval of debt - no requirement
   *Result - Add provision that provides for explicit approval by the legislature when debt service will exceed $1 million.

   Bond issuance - no restrictions
   * Add approval of bond issues in excess of $1 million other than refunding bonds

5. Land not corporate asset.

   Pg 4 Ln 15 - 17 does not exempt non-corporate land.
   *Result - Clarify

6. Exemption from Administrative Procedures Act should include requirement for parallel process adopted by corporation.

   Pg 7 Ln 24 exempts corporation from APA
   *Result - Add provision on pg 20 Sec 7 that Corp should formulate procurement policy similar to AKRR

7. Trade secrets confidentiality will be a problem with the corporate board member.
   *Result - Pg 2 Ln 12 insert: <u>two members should be experts</u> [an expert] with experience and understanding of the

AEROSPACE OR COMMERCIAL SPACE INDUSTRY [WITH] ONE OF WHICH MUST POSSESS AN EMPHASIS IN ....
*DELETE LN 16 & RENUMBER

8. SECURITY FOR BONDS (3) REVENUE OR OTHER ASSETS OF THE CORPORATION.

PG 9 LN 30 - DEFINITION OF "OTHER ASSETS"
RESULT: NO

9. CONFLICT OF INTEREST DISCLOSURE - BY BOARD & TOP EXEMPT EMPLOYEES?

SHOULD SECTION BE ADDED INCLUDING CORPORATION IN AS 39.50?
*RESULT - INSERT SPECIFIC LANGUAGE THAT EXEC DIRECTOR SHOULD BE COVERED UNDER AS 39.50.

DNR CONCERN:

*RESULT - PG 21 LN 14: DELETE [SHALL LEASE LAND] INSERT "MAY ISSUE PERMITS AT FEES SET IN REGULATION" .
*DELETE LN 16 -19 STARTING AT [THE COMMISSIONER] AND INSERT: "THE COMMISSIONER MAY IF IT IS IN THE BEST INTEREST OF THE STATE LEASE LAND TO THE ALASKA AEROSPACE DEVELOPMENT CORPORATION FOR OTHER SPACE-RELATED PURPOSES AT OR LESS THAN THE APPRAISED FAIR MARKET VALUE.

FISCAL NOTE

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. SCSCS HB 46(L & C)

Revision Date: _____ Department Affected: Commerce & Economic Dev.

Title: Establishing the Alaska Aerospace Development Corporation BRU: Alaska Aerospace Development Corporation

Component: _____

Sponsor: Rep. Moyer

Requestor: Rep. Moyer COMPONENT SERIAL NO. [ ][ ][ ][ ]

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES	126.4					
TRAVEL	37.6					
CONTRACTUAL	118.0					
SUPPLIES	1.5					
EQUIPMENT	19.0					
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	302.5	*	*	*	*	*
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND	302.5					
FEDERAL FUNDS						
OTHER						
TOTAL	302.5	*	*	*	*	*

POSITIONS:

FULL-TIME	2					
PART-TIME						
TEMPORARY						

Estimate of current year impact: _____

ANALYSIS: (Attach a separate page if necessary.) Assumes the AADC will become effective July 1, 1991. Initial year would be funded from the general fund.

*Subsequent years will be funded from corporate receipts of the AADC revolving fund. Since this is a new organization, it is not possible to predict annual costs beyond FY 92.

Prepared By: Guy Bell, Director Phone: 465-2587

Division: Administrative Services Date: _____

Approved by Commissioner: Glenn A. Olds

Agency: Department of Commerce & Economic Development Date: 5/14/91

Distribution (by preparer): Legislative Finance, Legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

ALASKA AEROSPACE DEVELOPMENT CORPORATION

Personal Services:		$126.4
Executive Director (26A)	$ 90.1	
Secretary I (10B)	$ 36.3	
Travel:		$ 37.6
Executive Director	$ 20.0	
Board (4 meetings/year)	$ 12.0	
Honorarium/Stipend	$ 5.6	
Contractual:		$118.0
Office Space (500 sq. ft. @ $2.00/ft)	$ 12.0	
Professional Services (bond counsel engineering, actuarial, etc.)	$100.0	
Utilities (phones, other)	$ 6.0	
Supplies:		$ 1.5
Office Supplies	$ 1.5	
Equipment:		$ 19.0
Telecopier	$ 3.0	
Computer/Word Processing	$ 10.0	
Furniture	$ 6.0	
FY 92 TOTAL		$302.5

9111.D

Alaska State Legislature

Senator Drue Pearce, Chair
Senator Virginia Collins, Vice Chair
Senator Dick Eliason
Senator Rick Halford
Senator Jay Kerttula

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SENATE LABOR AND COMMERCE COMMITTEE

SENATE LABOR & COMMERCE COMMITTEE

LETTER OF INTENT

SCS FOR CSHB 46(L&C)

IT IS THE INTENT OF THE LEGISLATURE THAT THE ALASKA AEROSPACE DEVELOPMENT CORPORATION FORM AN INDUSTRY ADVISORY BOARD. MEMBERSHIP OF THE BOARD SHALL BE COMPRISED OF ONE MEMBER FROM ANY INTERESTED AEROSPACE DEVELOPMENT CORPORATION. THE IAB MAY BE ASKED BY THE CORPORATION TO RESEARCH POLICY ISSUES AND MAKE RECOMMENDATIONS TO THE CORPORATION.

7-LS0236\Y.2
Luckhaupt
05/13/91

AMENDMENT

OFFERED IN THE SENATE BY SENATOR PEARCE

TO: SCS CSHB 46 (L&C)

Page 2, line 12:

Delete "experts with"

Insert "members who have"

7-LS0236\Y.1
Luckhaupt
05/13/91

AMENDMENT

OFFERED IN THE SENATE BY SENATOR PEARCE

TO: SCS CSHB 46 (L&C)

Page 2, line 19, following "(a)(1), (6),":

Insert "(7),"

Page 22, line 19, following "AS 14.40.826(a)(1), (6),":

Insert "(7),"

Page 22, line 19:

Delete "AS 39.05.055(2)"

Insert "AS 39.05.055(3)"

May 11, 1991

Drue -

RE: HB 46

DNR has a problem with Section 9, pg 21 -

LN 14 change "shall" to may

LN 17 10 % of fair market value - in other land leases, DNR usually receives a percent of profit. Would like provision that commissioner may negotiate appropriate rental in the state's best interest.

LESS THAN FAIR MARKET VALUE

Rod

PERMIT RATHER THAN LEASE

on Pg 21 LINE 14

HB 46 Aerospace Development Corp.
Sen. Halford Concerns

1. Board choose own chair.

Pg 2 Ln 26 provides for UA president or designee to be chair.

2. Statement that corporation may not be terminated.

Pg 1 Ln 14 does not allow termination while outstanding bonds, loans or obligations are outstanding and has provision for continued UA and Poker Flat continuation.

3. Appropriation process.

There is no tie to appropriation process.
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4. Maximum debt - no limit
Approval of debt - no requirement
Bond issuance - no restrictions

5. Land not corporate asset.

Pg 11 Ln 9 does not exempt land.

6. Exemption from Administrative Procedures Act should include requirement for parallel process adopted by corporation.

Pg 7 Ln 24 exempts corporation from AAP

7. Trade secrets confidentiality will be a problem with the corporate board member.

8. Security for bonds (3) revenue or other assets of the corporation.

Pg 9 Ln 30 - definition of "other assets"

9. Conflict of interest disclosure - by board & top exempt employees?

Should section be added including corporation in AS 39.50?

DNR OBJECTS TO SEC 7. LEASE NORMALLY 90 OF PROFIT

pg(2) 1. Board Choose own Chair –

pg(1) 2. Statement that Corporation May not be terminated

pg(3) 3. Appropriation Process –

pg(5) 4. Maximum Debt
Approval of Debt. – Bond Issuance

(4) pg. 4 5. Land not Corporate Assets

pg 7 6. Exemptions from A.P.Act. should include requirement for parallel process adopted by Corporation.

pg 9 7. Trade Secrets confidentiality will be a problem with the corporate board member

pg 9 8. Security for Bonds (3) revenue or other assets of the corporation.

9. Conflict of Interest Disclosure – by board + top exempt employees. ?

MicroSat Launch Systems

CIT Tower, Suite 200
2214 Rock Hill Road
Herndon, VA 22070
(703) 733-2819 (voice)
(703) 733-2827 (fax)

MEMO

TO: DAVID RAMSEUR
FROM: PETER H. DIAMANDIS
RE: SPACEPORT LEGISLATION
DATE: 11 May 1991
FAX #: 907-465-2318

A) Proposed formation of an *Industry Advisory Board (IAB)* which has voting representation on the Aerospace Development Corporation Board of Directors.

(1) An IAB should be formed in concert with the formation of the Aerospace Development Corporation.

(2) Any corporation which is actively conducting activities or operations which are governed or regulated by the Aerospace Development Corporation will have one seat on the IAB.

(3) The IAB membership will elect two members to represent a balanced view of the IAB membership to the Aerospace Development Corporation. At least one of the two seats will be reserved for an Alaska-based launch company operating out of Poker Flat (if such a company exists).

(4) These two elected IAB representatives will each have voting Board seats on the Aerospace Development Corporation.

(5) At any time when industry proprietary information is being discussed by the Board, the two industry representatives may be recused to avoid a potential conflict of interest:

(6) The IAB may be asked by the Aerospace Development Corporation to research policy issues and make recommendations to the full Aerospace Development Corporation Board through its industry representatives.

B) Rationale for having an IAB with voting representation on the Aerospace Development Corporation:

(1) The major purpose for forming the Aerospace Development Corporation is to promote, facilitate and regulate commercial space activities in Alaska in general and to accommodate, coordinate, and regulate commercial use of Poker Flat in particular.

(2) Industry board members has it in their best interests to:

- Keep the Board focused on industry requirements.
- To make sure that the policies and procedures enacted by the Board are commercially reasonable.
- To make sure the unique needs of a company operating out of Poker Flat are met (as compared to other ranges).

Alaska State Legislature

Senator Drue Pearce, Chair
Senator Virginia Collins, Vice Chair
Senator Dick Eliason
Senator Rick Halford
Senator Jay Kerttula

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SENATE LABOR AND COMMERCE
COMMITTEE

SENATE LABOR & COMMERCE COMMITTEE

LETTER OF INTENT

SCS FOR CSHB 46(L&C)

IT IS THE INTENT OF THE LEGISLATURE THAT THE ALASKA AEROSPACE DEVELOPMENT CORPORATION FORM AN INDUSTRY ADVISORY BOARD. MEMBERSHIP OF THE BOARD SHALL BE COMPRISED OF ONE MEMBER FROM ANY CORPORATION WHICH ARE GOVERNED OR REGULATED BY THE ALASKA AEROSPACE DEVELOPMENT CORPORATION. THE IAB MAY BE ASKED BY THE CORPORATION TO RESEARCH POLICY ISSUES AND MAKE RECOMMENDATIONS TO THE CORPORATION.

Alaska State Legislature

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SENATE LABOR AND COMMERCE COMMITTEE

SENATE LABOR & COMMERCE COMMITTEE

LETTER OF INTENT

SCS FOR CSHB 46(L&C)

DRAFT

IT IS THE INTENT OF THE LEGISLATURE THAT THE ALASKA AEROSPACE DEVELOPMENT CORPORATION FORM AN INDUSTRY ADVISORY BOARD.

MEMBERSHIP OF THE BOARD SHALL BE COMPRISED OF ONE MEMBER FROM ANY ~~CORPORATION, WHICH ARE GOVERNED OR REGULATED BY THE ALASKA~~ INTERESTED AND SKILLED INDIVIDUALS IN AEROSPACE ACTIVITIES IN ALASKA

~~AEROSPACE DEVELOPMENT CORPORATION.~~ THE IAB MAY BE ASKED BY THE CORPORATION TO RESEARCH POLICY ISSUES AND MAKE RECOMMENDATIONS TO THE CORPORATION.

7-LS0236\Y
Luckhaupt
5/12/91

SENATE CS FOR CS FOR HOUSE BILL NO. 46 (L&C)

IN THE LEGISLATURE OF THE STATE OF ALASKA

SEVENTEENTH LEGISLATURE - FIRST SESSION

BY THE SENATE LABOR AND COMMERCE COMMITTEE

Offered:
Referred:

Sponsor(s): REPRESENTATIVES MOYER, Koponen, M.A.Miller

A BILL

FOR AN ACT ENTITLED

"An Act creating the Alaska Aerospace Development Corporation; providing for the lease of state land to the corporation; providing an exemption from municipal sales and use taxes for space-related activities; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. SHORT TITLE. This Act may be known as the Alaska Aerospace Development Corporation Act.

* Sec. 2. AS 14.40 is amended by adding new sections to read:

APTICLE 7. ALASKA AEROSPACE DEVELOPMENT CORPORATION.

Sec. 14.40.821. CREATION AND TERMINATION OF CORPORATION. (a) The Alaska Aerospace Development Corporation is created as a public corporation of the state. The corporation is a body corporate and politic located for administrative purposes within the Department of Commerce and Economic Development and affiliated with the University of Alaska but with a separate and independent legal existence.

(b) The corporation may not be terminated as long as it has bonds, notes, or other

New Text Underlined [DELETED TEXT BRACKETED]

obligations outstanding. If the corporation is terminated, it shall be terminated in a manner that permits the University of Alaska and Poker Flat Research Range to continue their research and educational missions uninterrupted.

Sec. 14.40.826. BOARD OF DIRECTORS. (a) The board of directors of the corporation consists of nine members appointed by the governor as follows:

(1) one member of the Board of Regents of the University of Alaska;

(2) the president or the designee of the president of the University of Alaska;

(3) the director of the Geophysical Institute of the University of Alaska;

(4) the executive director of the Alaska Science and Technology Foundation;

(5) the commissioner of commerce and economic development or the commissioner's designee;

(6) two experts with experience and understanding of the aerospace or commercial space industry, one of whom shall have a special emphasis in federal regulatory procedures and policy involving space;

(7) one faculty member of the University of Alaska with research interests involving rockets or satellites;

(8) a public member.

(b) The members of the board of directors of the corporation described in (a)(6) of this section may be nonresidents of the state. The term of the members described in (a)(1), (6), and (8) of this section is four years and those terms shall be staggered.

(c) Members of the board of directors of the corporation described in (a)(6) and (8) of this section receive $100 compensation for each day spent on official business of the corporation.

(d) Members of the board of directors of the corporation are entitled to per diem and travel expenses authorized under AS 39.20.180.

Sec. 14.40.831. CHAIR AND VICE-CHAIR. The president of the University of Alaska or the designee of the president shall be the chair of the board of directors of the corporation. The commissioner of commerce and economic development or the designee of the commissioner shall be vice-chair of the board of directors of the corporation. The vice-chair presides over all meetings in the absence of the chair and has other duties the board of directors of the corporation may direct.

Sec. 14.40.836. MEETINGS: STAFF. (a) A majority of the members of the corporation

constitutes a quorum for the transaction of business or the exercise of a power or function at a meeting of the corporation. The corporation shall meet at least every three months. The corporation may meet and transact business by electronic media if (1) public notice of the time and locations where the meeting will be held by electronic media has been given in the same manner as if the meeting were held in a single location; (2) participants and members of the public in attendance can hear and have the same right to participate in the meeting as if the meeting were conducted in person; and (3) copies of pertinent reference materials, statutes, regulations, and audio-visual materials are reasonably available to participants and the public. A meeting by electronic media as provided in this subsection has the same legal effect as a meeting in person.

(b) The corporation may employ persons as staff it considers advisable, including an executive director, and may employ professional advisors, technical experts, agents, and other employees it considers advisable. The executive director and employees of the corporation are in the exempt service under AS 39.25.

(c) The corporation may hire legal counsel to represent the corporation.

(d) The corporation shall keep minutes of each meeting and send a certified copy of the minutes to the governor and to the Legislative Budget and Audit Committee.

Sec. 14.40.841. ALASKA AEROSPACE DEVELOPMENT CORPORATION REVOLVING FUND. The Alaska Aerospace Development Corporation revolving fund is established in the corporation. The revolving fund consists of appropriations made to the revolving fund by the legislature, and rents, fees, or other money or assets transferred to the revolving fund by the corporation. Amounts deposited in the revolving fund may be pledged to the payment of bonds of the corporation or expended for the purposes of the corporation under this chapter.

Sec. 14.40.846. INSURANCE COVERAGE; SAFETY PROGRAM. (a) The corporation may engage actuarial experts and shall develop probability models to indicate the degree of potential harm to the public and private enterprise from the corporation's activities.

(b) The corporation shall, to the extent available and consistent with federal requirements, secure insurance coverage within reasonable limits for liability that may arise as a consequence of its activities and the activities of its officers and employees and to insure its buildings, structures, and other facilities against loss.

(c) The corporation shall establish a safety program that includes

(1) the development and implementation of a loss prevention program consisting of a comprehensive corporation wide safety program, including a statement by the board, of safety policy and responsibility and regulations implementing it;

(2) provision for regular and periodic facility and equipment inspections;

(3) investigation of job-related accidents and other accidents occurring on the premises of the corporation or within areas of its jurisdiction;

(4) the establishment of a program to promote increased safety awareness among employees, agents, and subcontractors of the corporation;

(5) the study of safety operations at other space-related facilities in the United States;

(6) all federal and state safety and emergency facility requirements for commercial space facilities.

Sec. 14.40.851. SPACE ACTIVITIES LOCATION. To the extent that the University of Alaska agrees to lease the Poker Flat Research Range to the corporation, the Poker Flat Research Range constitutes the location and launch site for the corporation. The corporation may not pledge or encumber the Poker Flat Research Range, nor is it an asset of the corporation. Other sites may be developed and utilized if determined by the board to be necessary.

Sec. 14.40.856. LICENSES AND PERMITS. The corporation shall obtain all federal and state licenses and permits necessary to fulfill the purposes, to perform the duties, and exercise the powers of the corporation.

Sec. 14.40.861. PURPOSE OF THE CORPORATION. The purpose of the corporation is to allow the state to take a lead role in the exploration and development of space, to enhance human and economic development, and to provide a unified direction

(1) for space-related economic growth thereby ensuring a stable and dynamic research and business climate by attracting space-related businesses to locate within and utilize the opportunities provided in the state;

(2) for space-related educational and research development by encouraging and assisting the University of Alaska in developing space-related programs, research, and courses of instruction and to assist the University of Alaska as a member of the Space Grant State Consortia under 42 U.S.C. 2486 (National Space Grant College and Fellowship Program);

(3) to promote the continued utilization of the Poker Flat Research Range as a launch site for launch vehicles and for scientific research both from ground based and rocket or balloon based instrumentation;

(4) to recognize the importance and benefits of and to promote and encourage the continued utilization of Poker Flat Research Range for the University of Alaska's polar research efforts;

(5) for promotion of space-related tourism activities at Poker Flat Research Range and other space-related facilities or centers that may be utilized or established by the corporation; and

(6) for development of a state strategy for and to implement the acceleration of space-related economic growth and educational and research development in the state by the use of innovative development methods designed to stimulate space-related business and educational and research development and improve the entrepreneurial atmosphere in the state.

Sec. 14.40.866. POWERS AND DUTIES OF THE CORPORATION. (a) In furtherance of its corporate purposes, in addition to its other powers the corporation may

(1) sue and be sued;

(2) adopt a seal;

(3) have perpetual succession;

(4) adopt, amend, and repeal bylaws and regulations;

(5) make and execute contracts and other instruments;

(6) in its own name acquire property, lease, rent, convey, or acquire real and personal property, except that a project site or part of a project site may not be acquired by eminent domain;

(7) issue bonds and otherwise incur indebtedness, in accordance with AS 14.40.891, in order to pay the cost of a project or projects to construct or improve launch facilities or other space and aerospace projects or in order to provide money for the corporation's purposes under this chapter; the corporation may also secure payment of the bonds or other indebtedness as provided in this chapter;

(8) accept gifts, grants, or loans from, and enter into contracts or other transactions regarding them with, a federal agency or an agency or instrumentality of the state, a municipality, private organization, or other source;

(9) enter into contracts or agreements with a federal agency, agency or instrumentality of the state, municipality, or public or private individual or entity, with respect to the exercise of its powers, and do all things necessary or convenient to carry out its corporate purposes and exercise the powers granted in this chapter;

(10) own, acquire, construct, develop, create, reconstruct, equip, operate, maintain, extend, and improve launch sites, launch pads, landing areas, ranges, payload facilities, laboratories, space business incubators, facilities for the construction of rockets and other launch vehicles, and other space facilities and space-related systems, including educational, cultural, tourism, and parking facilities, and space-related initiatives;

(11) undertake a program of advertising to the public and space-related businesses promoting the space-related projects of the corporation and space-related businesses;

(12) construct, improve, and operate by itself or in cooperation with the University of Alaska or the Department of Transportation and Public Facilities transportation facilities appropriate to meet the transportation requirements of a facility operated by the corporation;

(13) construct, improve, and operate water, sewage, and utility service to a facility operated by the corporation;

(14) construct, provide, or improve public safety facilities for a facility operated by the corporation;

(15) charge fees, rents, or other charges for the use of a facility, structure, or service developed, operated, or provided by the corporation including fees, rents, and other charges in excess of the actual operating cost of the use of the facility, structure, or service;

(16) pledge rents, fees, charges, or other revenue from the use of its services or facilities as security for bonds of the corporation;

(17) undertake to finance or develop a space-related project with any agency or authority of the state, its political subdivisions, agencies or authorities of other states, the federal government, foreign governments, or private entities;

(18) apply to the federal government for a grant allowing the designation of corporation territory as a foreign trade zone under AS 45.77.010;

(19) negotiate agreements for the overflight or recovery of a space vehicle, rocket, missile, payload, booster, scientific experiments or other space-related material, debris, or parts

with any person or entity, including but not limited to adjacent landowners;

(20) lease the Poker Flat Research Range or portions of it from the University of Alaska and to lease to the University space-related facilities that the corporation may construct or acquire;

(21) apply for and hold in the name of the corporation patents, copyrights, and other intellectual property.

(b) The corporation shall

(1) prepare an annual report of its operations to include a balance sheet, an income statement, a statement of changes in financial position, a reconciliation of changes in equity accounts, a summary of significant accounting principles, an auditor's report, comments regarding the year's business, and prospects from the next year; the report shall be provided by the third day of each regular session of the legislature to the governor, the presiding officers of each house of the legislature, the University of Alaska, and the Legislative Budget and Audit Committee;

(2) submit its annual budget to the legislature through the governor as provided for state agencies by AS 37.07;

(3) establish a personnel management system for hiring employees and setting employee-benefit packages;

(4) establish procedures, rules, and rates governing per diem and travel expenses of the employees of the corporation in substantial conformity to statutes, procedures, rules, and rates governing state employees;

(5) fulfill its purposes, perform its duties, and exercise its power in a manner that does not interfere or restrict the educational and research functions of Poker Flat Research Range and the University of Alaska.

Sec. 14.40.871. REGULATIONS. (a) The corporation shall adopt regulations to carry out the purposes of this chapter.

(b) Except for AS 44.62.310 and 44.62.312 regarding public meetings, the provisions of AS 44.62 (Administrative Procedure Act) regarding the adoption of regulations do not apply to the corporation. The corporation shall make available to members of the public copies of the regulations adopted under this section. Within 45 days after adoption of a regulation under this section, the chair of the corporation shall submit the regulation adopted to the chair of the

Administrative Regulation Review Committee under AS 24.20.400 - 24.20.460.

(c) The corporation may adopt regulations by motion or by resolution or in another manner permitted by its bylaws.

(d) Except as provided in (e) of this section, at least 15 days before the adoption of a regulation, the corporation shall give public notice of the proposed action by publishing the notice in at least three newspapers of general circulation in the state and by mailing a copy of the notice to every person who has filed a request for notice of proposed regulations with the corporation. The public notice must include a statement of the time, place, and nature of the proceedings for the adoption of the regulation and must include an informative summary of the subject of the proposed action. On the date and at the time and place designated in the notice, the corporation shall give each interested person or an authorized representative of the person, or both, the opportunity to present statements, arguments, or contentions orally or in writing and shall give members of the public an opportunity to present oral statements, arguments, or contentions for a total period of at least one hour. The corporation shall consider all relevant matter presented to it before taking the proposed action on the regulation. At a hearing under this subsection, the corporation may continue or postpone the hearing to a time and place determined by the corporation and announced at the hearing before taking the action to continue or postpone the hearing. A regulation adopted by the corporation may vary from the informative summary specified in this subsection if the subject matter of the action taken on the regulation remains the same and if the original notice of the proposed action was written so as to assure that members of the public are reasonably notified of the subject matter of the proposed action in order for them to determine whether their interests could be affected by the corporation's proposed action on that subject.

(e) The adoption of a regulation may be made as an emergency regulation if, in the order of adoption, the corporation states the facts constituting the emergency and makes a finding that the adoption of the regulation is necessary for the immediate preservation of the orderly operation of the corporation's programs. The requirements of (d) of this section do not apply to the initial adoption of an emergency regulation; however, upon adoption of an emergency regulation under this subsection, the corporation shall, within 10 days after that adoption, publish notice of the adoption in accordance with the notice procedures specified in (d) of this section. An emergency regulation adopted under this subsection may not remain in effect for more than 120 days unless,

before the expiration of that period, the corporation adopts that regulation as a permanent regulation in accordance with the procedures specified in (d) of this section.

(f) A regulation adopted under this section takes effect immediately upon its adoption by the corporation or at another time specified by the corporation in its order of adoption.

Sec. 14.40.876. EXERCISE BY CORPORATION OF POWERS WITHIN MUNICIPALITIES. The corporation may exercise any of its powers in all portions of a space-related facility or territory lying within the boundaries of a municipality to the same extent and in the same manner as in areas of the space-related facility or territory not within the boundaries of a municipality.

Sec. 14.40.881. TRADE SECRETS CONFIDENTIAL. The corporation shall maintain the confidentiality of a trade secret, or other proprietary technical information, supplied for purposes related to this chapter unless the owner of the trade secret authorizes its release or a court orders its release. Information covered by this section is not a public record for purposes of AS 09.25.110 - 09.25.140. The corporation shall adopt regulations implementing this section.

Sec. 14.40.886. APPROVAL OF PROJECTS BY LEGISLATURE. Notwithstanding any other provision of this chapter, a proposed construction project of $1,000,000 or more shall be submitted by the corporation to the legislature for approval at a regular session of the legislature.

Sec. 14.40.891. ISSUANCE OF BONDS, NOTES, AND REFUNDING BONDS. (a) Except as provided in (b) of this section, the corporation may issue bonds in its discretion for any of its corporate purposes and may issue refunding bonds for the purpose of paying or retiring bonds previously issued by it.

(b) The corporation may not, without prior legislative approval, issue bonds, other than refunding bonds,

(1) in a total amount in excess of $1,000,000 each calendar year; or

(2) if the annual debt service on all outstanding bonds issued and proposed to be issued exceeds $1,000,000 in a fiscal year.

Sec. 14.40.896. SECURITY FOR BONDS. The corporation may issue bonds including but not limited to bonds on which the principal and interest are payable (1) exclusively from the income and revenue of the space-related project financed with the proceeds of the bonds, (2) exclusively from the income and revenue of designated space-related projects whether or not they are financed in whole or in part with the proceeds of the bonds, (3) from its revenue or other

assets generally, or (4) exclusively from rents, fees, charges, or other revenue collected or received by the corporation. Bonds may be additionally secured by a pledge of a grant or contribution from the federal government or from another source, or by a pledge of income or revenue of the corporation, or by a mortgage of a space-related project or other property of the corporation.

Sec. 14.40.899. LIMITATION OF LIABILITY ON BONDS. The members of the corporation and a person executing the bonds are not liable personally on the bonds by reason of their issuance. The bonds of the corporation are not a debt of the state or a political or municipal corporation or other subdivision of the state, including the University of Alaska, and each bond must so state on its face. Neither the state nor a political or municipal corporation or other subdivision of the state, including the University of Alaska, other than the corporation is liable on the bonds, nor are the bonds payable out of funds or properties other than those of the corporation. The corporation may not pledge the faith of the people of the state for a loan or obligation. Bonds of the corporation are not a debt, indebtedness, or the borrowing of money within the meaning of a limitation or restriction on the issuance of bonds contained in the constitution or laws of the state.

Sec. 14.40.902. ISSUANCE AND SALE OF BONDS AND NOTES. Bonds and notes of the corporation are authorized by adoption of a resolution prescribing the date of issuance and maturity, interest rate, denomination, form, conversion privilege, rank or priority, execution, terms of redemption, medium, and place of payment. Bonds and notes may be sold in the manner, on the terms, and at the price the corporation determines. Each bond and note is negotiable. The signature of a member or an officer upon a bond or note or coupon is not invalidated by that person's ceasing to hold office before the delivery of the bond or note. The recitation of a bond or note that it has been issued in the financing of a space-related project or purpose under this chapter is conclusive as to the issuance of the bond or note and the character of the project in a challenge of the validity of the bond or note or the security for it.

Sec. 14.40.906. BONDS EXEMPT FROM TAXES. Bonds and other obligations of the corporation are issued for an essential public and governmental purpose and are public instrumentalities and, together with interest on them and income from them, are exempt from taxes.

Sec. 14.40.908. INDEPENDENT FINANCIAL ADVISOR. In negotiating the private

sale of bonds or bond anticipation notes to an underwriter, the corporation shall retain a financial advisor who is independent from the underwriter. The financial advisor may not bid on the bonds or notes if offered at public sale or negotiate for their purchase if sold at private sale.

Sec. 14.40.912. ADDITIONAL POWERS TO SECURE BONDS OR OBLIGATIONS UNDER LEASES. In connection with the issuance of bonds or the incurring of obligations under leases and in order to secure the payment of bonds or lease obligations, the corporation, in addition to its other powers, may

(1) pledge all or a part of its gross or net rents, fees, or revenues to which its right exists or may exist;

(2) mortgage or encumber all or a part of its real or personal property, owned or later acquired;

(3) covenant against pledging all or a part of its rents, fees, and revenue, or against mortgaging all or a part of its real or personal property, to which its right or title exists or may come into existence or against permitting or suffering any lien on the revenues or property;

(4) covenant with respect to limitations on its right to sell, lease, or otherwise dispose of a space-related project or a part of a space-related project;

(5) covenant as to what other, or additional debts or obligations may be incurred by it;

(6) covenant as to the bonds to be issued and as to the issuance of the bonds in escrow or otherwise, and as to the use and disposition of the proceeds of bonds;

(7) provide for the replacement of lost, destroyed, or mutilated bonds;

(8) covenant against extending the time for the payment of its bonds or interest on the bonds;

(9) redeem the bonds, and covenant for their redemption and to provide the terms and conditions of redemption;

(10) covenant as to the rents and fees to be charged in the operation of a space-related project, the amount to be raised each year or other period of time by rents, fees, and other revenue, and as to the use and disposition of this revenue;

(11) create or authorize the creation of special funds for money held for construction or operating costs, debt service, reserves, or other purposes, and covenant as to the

use and disposition of this money;

(12) prescribe the procedure by which the terms of a contract with bondholders may be amended or abrogated, the amount of bonds the holders of which must consent thereto and the manner in which the consent may be given;

(13) covenant as to the rights, liabilities, powers, and duties arising upon the breach by it of a covenant, condition, or obligation, and covenant and prescribe as to events of default and terms and conditions upon which any or all of its bonds or obligations shall become or may be declared due before maturity, and covenant as to the terms and conditions upon which this declaration and its consequences may be waived;

(14) vest in a trustee or trustees or the holders of bonds or a specified proportion of them, the right to enforce the payment of the bonds or covenants securing or relating to the bonds;

(15) vest in one or more trustees the right, in the event of a default by the corporation, to take possession of a space-related project or a part of the project, and so long as the corporation continues in default to retain possession and to use, operate, and manage the project, and to collect the rent and revenue from the project, and to dispose of the money according to the agreement between the corporation and the trustees;

(16) provide for the powers and duties of the trustees, and limit the liability of the trustees; and

(17) provide the terms and conditions upon which the trustee or trustees or the holders of bonds, or portions of bonds, may enforce a covenant or right securing or relating to the bonds.

Sec. 14.40.916. RIGHT OF OBLIGEE OF CORPORATION TO BRING INJUNCTION. An obligee of the corporation may, in addition to all other rights that may be conferred and subject only to contractual restriction binding upon the obligee, seek an injunction or an action in nature of an action for mandamus against the members, the corporation, its officers, agents, or employees.

Sec. 14.40.921. POWER OF CORPORATION TO CONFER UPON OBLIGEE RIGHT TO BRING ACTION OR PROCEEDING. The corporation may by resolution, trust indenture, mortgage, lease, or other contract confer upon an obligee holding or representing a specified amount in bonds, or holding a lease, the right upon a default as defined in the resolution or

instrument by suit, action or proceeding

(1) to have possession of a space-related project or part of one surrendered to the obligee, with possession retained by the obligee as long as the corporation continues in default;

(2) to obtain the appointment of a receiver of a space-related project or part of one and its rents and profits, who may enter, take possession, and for the duration of the default operate and maintain it, collect and receive all fees, rents, revenues, or other charges thereafter arising, and keep the money in a separate account or accounts to be applied in accordance with the obligations of the corporation as the court directs;

(3) to require the corporation and its members to account as if they were the trustees of an express trust.

Sec. 14.40.926. EXEMPTION OF REAL PROPERTY OF CORPORATION FROM EXECUTION OR OTHER PROCESS. All real property of the corporation is exempt from levy and sale by execution, and an execution or other judicial process may not issue against it. A judgment against the corporation may not be a charge or lien upon its real property. However, this section does not limit the right of an obligee to foreclose or otherwise enforce a mortgage of the corporation or to pursue any remedy for the enforcement of a pledge or lien given by the corporation on its rents, fees, or revenues.

Sec. 14.40.931. POWER OF CORPORATION TO OBTAIN FEDERAL AID AND COOPERATION. The corporation may borrow, accept contributions, grants, or other financial assistance from the federal government in aid of a space-related project and for this purpose may comply with conditions and enter into the mortgages, trust indentures, leases, or agreements that are necessary, convenient, or desirable in order to obtain financial aid or cooperation from the federal government in the undertaking, construction, maintenance, or operation of a space-related project.

Sec. 14.40.936. EXEMPTION FROM TAXES AND ASSESSMENTS. The property of the corporation is public property used for essential public and governmental purposes and this property and the corporation are exempt from all taxes and special assessments of a municipality, the state, or a political subdivision of the state. However, instead of taxes, the corporation may make payments to the municipality or political subdivision for improvements, services, and facilities furnished by it for the benefit of a space-related project.

Sec. 14.40.941. DISPOSAL OF SURPLUS PROPERTY. (a) The corporation may

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convey real or personal property that it determines is in excess of its needs. Except as provided in (b) of this section, the sale shall be by public auction or by sealed bids. Public notice shall be given by publishing notice of the sale at least once a week for two consecutive weeks in a newspaper of general circulation within the area in which the property to be sold is located and by posting notice of sale in at least two public places in the area. In no event may the auction be held less than 30 days after the last day of publication. If an acceptable bid is not received, the corporation may sell the property at negotiated sale within six months after the date of the auction. A negotiated sale may not be made on an appraisal made more than nine months before the date of sale. The price at a negotiated sale may not be less than the appraised value.

(b) Real or personal property of the corporation may be conveyed to a state or federal agency or political subdivision or the University of Alaska for less than the appraised value without competitive bidding, upon a determination by the board that the terms are fair and proper and in the best interests of the state. The board shall consider both the nature of the agency's or political subdivision's public services or functions and the terms under which the property was acquired by the corporation.

Sec. 14.40.946. PUBLIC LOANS OR DONATIONS TO OR COOPERATION WITH CORPORATION. (a) A public body or agency of the state may

(1) lend or donate money or property to the corporation;

(2) cooperate with it in the planning, construction, or operation of a project;

(3) transfer to it an interest in property, grant an easement, undertake otherwise authorized construction of facilities adjacent to a project;

(4) furnish or improve otherwise authorized roads, streets, alleys, and sidewalks;

(5) purchase bonds of the corporation;

(6) incur the entire expense of improvements made under this chapter;

(7) agree with the corporation that a certain sum or that no sum shall be paid by the corporation to it instead of taxes;

(8) enter into agreements respecting exercise of the powers granted in this chapter that shall be approved and executed by the public body or municipality in or adjacent to the project before the project may be constructed; and

(9) in general do all things necessary or convenient to cooperate in the planning, construction, or operation of a project.

(b) Except as required under AS 44.62.310 and 44.62.312, a sale, conveyance, lease, or agreement under this section may be made without appraisal, public notice or advertisement, or bidding. A public body may exercise the powers granted in this section by resolution or ordinance by a majority of the members of the governing body present at the meeting at which it is introduced, and the resolution or ordinance takes effect immediately without publishing or posting.

Sec. 14.40.951. RESERVE FUND. (a) The corporation shall establish and maintain a special fund called the Alaska Aerospace Development Corporation reserve fund in which there shall be deposited or transferred

(1) all money appropriated by the legislature for the purpose of the fund in accordance with the provisions of (g) of this section;

(2) all proceeds of bonds required to be deposited in the fund by terms of a contract between the corporation and its bondholders or a resolution of the corporation with respect to the proceeds of bonds;

(3) all other money appropriated by the legislature to the reserve fund; and

(4) any other money or funds of the corporation that it decides to deposit in the fund.

(b) Subject to the provisions of (h) of this section, money in the reserve fund shall be held and applied solely to the payment of the interest on and principal of bonds of the corporation as the interest and principal become due and payable and for the retirement of bonds; and the money may not be withdrawn if a withdrawal would reduce the amount in the reserve fund to an amount less than the required debt service reserve except for payment of interest then due and payable on bonds and the principal of bonds then maturing and payable and for the retirement of bonds in accordance with the terms of a contract between the corporation and its bondholders and for which payments of other money of the corporation is not then available. In this subsection, "required debt service reserve" means, as of the date of computation, the amount required to be on deposit in the reserve fund as provided by resolution of the corporation.

(c) Money in the reserve fund in excess of the required debt service reserve as defined in (b) of this section, whether by reason of investment or otherwise, may be withdrawn at any time by the corporation and transferred to another fund or account of the corporation subject to the provision of (h) of this section.

(d) Money in the reserve fund may be invested in the same manner and on the same conditions as permitted for investment of funds belonging to the state or held in the treasury under AS 37.10.070; however, the corporation may agree with the bondholders to further limit these investments.

(e) For purposes of valuation, investments in the reserve fund shall be valued at par or if purchased at less than par, at cost unless otherwise provided by resolution of the corporation. Valuation on a particular date shall include the amount of interest then earned or accrued to that date on the money or investments in the reserve fund.

(f) Notwithstanding any other provision of this chapter, bonds may not be issued by the corporation unless there is in the reserve fund the required debt service reserve for all bonds then issued and outstanding and for the bonds to be issued; however, the corporation may satisfy this requirement by depositing as much of the proceeds of the bonds to be issued, upon their issuance, as is needed to meet the required debt service reserve. The corporation may at any time issue its bonds or notes for the purpose of increasing the amount in the reserve fund to the required debt service reserve, or to meet whatever higher or additional reserve that may be fixed by the corporation with respect to the fund.

(g) In order to assure the maintenance of the required debt service reserve in the reserve fund, the legislature may appropriate annually to the corporation for deposit in the fund the sum, certified by the chair of the corporation to the governor and to the legislature, that is necessary to restore the fund to an amount equal to the required debt service reserve. The chair annually, before January 30, shall make and deliver to the governor and to the legislature a certificate stating the sum required to restore the fund to that amount, and the certified sum may be appropriated and paid to the corporation during the then current state fiscal year. Nothing in this subsection creates a debt or liability of the state.

(h) All amounts received on account of money appropriated to the reserve fund referred to in (a)(3) of this section shall be held and applied in accordance with (b) of this section; however, at the end of each fiscal year, if the amount in the reserve fund is in excess of the required debt service reserve, any amount representing earnings or income received on account of money appropriated to the reserve fund that exceeds the operating expenses of the corporation for that fiscal year shall be transferred to the general fund of the state.

(i) All references to the reserve fund in this section include special accounts within the

reserve fund that may be created by the corporation to secure the payment of particular bonds. The commissioner of revenue may lend surplus money in the general fund to the corporation for deposit to any account in the reserve fund in an amount equal to the required debt service reserve. The loans shall be made on the terms and conditions that may be agreed upon by the commissioner of revenue and the corporation, including, without limitation, terms and conditions providing that the loans need not be repaid until the obligations of the corporation secured and to be secured by the account in the reserve fund are no longer outstanding.

Sec. 14.40.956. COOPERATION WITH OTHER AUTHORITIES. In issuing a bond, the corporation may request the assistance of and work with the Alaska Industrial Development and Export Authority and the Alaska Municipal Bond Bank Authority. The Alaska Industrial Development and Export Authority may invest in and issue bonds for space-related projects of the Alaska Aerospace Development Corporation. The Alaska Industrial Development and Export Authority and the Alaska Municipal Bond Bank Authority may purchase and market bonds of the Alaska Aerospace Development Corporation.

Sec. 14.40.961. INVESTMENT OF REVENUE. The revenue and receipts of the corporation, to the extent they are not needed to pay bonds or other obligations of the corporation shall be invested by the commissioner of revenue in cooperation with the corporation.

Sec. 14.40.966. LEGALITY OF CORPORATION BONDS AS INVESTMENTS. Bonds of the corporation are legal and proper investments and security for public and private banking, insurance, and trust funds.

Sec. 14.40.990. DEFINITIONS. In AS 14.40.821 - 14.40.990,

(1) "board" means the board of directors of the Alaska Aerospace Development Corporation;

(2) "corporation" means the Alaska Aerospace Development Corporation;

(3) "landing site" means a site or facility designed, intended, or used for the landing or recovery of space vehicles, aircraft, or balloons;

(4) "launch site" means a site or facility designed, intended, or used for the launching of space vehicles, sounding rockets, aircraft, or balloons;

(5) "payload" means property or cargo, including people or animals, to be transported aboard a vehicle launched by the corporation;

(6) "recovery" means the retrieval and recovery of space vehicles, payloads, and

parts that have been launched from the corporation's facilities;

(7) "space vehicle" means a rocket, missile, booster, or other vehicle designed, intended, or used to reach high altitude.

* **Sec. 3.** AS 24.20.201(a) is amended to read:

(a) The Legislative Budget and Audit Committee has the power to:

(1) organize, adopt rules for the conduct of its business, and prescribe procedures for the comprehensive fiscal analysis, budget review, and post-audit functions;

(2) hold public hearings, administer oaths, issue subpoenas, compel the attendance of witnesses and production of papers, books, accounts, documents, and testimony, and have the deposition of witnesses taken in a manner prescribed by court rule or law for taking depositions in civil actions;

(3) require all state officials and agencies of state government to give full cooperation to the committee or its staff in assembling and furnishing requested information;

(4) review revenue projections, state agency appropriation requests, the expenditure of state funds, including the relationship between state agency program accomplishments and legislative intent, and the fiscal policies and procedures of state government;

(5) review and approve proposed changes to agency authorized budgets as provided in the Executive Budget Act (AS 37.07);

(6) make recommendations concerning appropriations, their expenditure and the fiscal policies and procedures of state government to the governor when appropriate, and to the legislature;

(7) prepare and distribute reports, memoranda, or other necessary materials;

(8) sue in the name of the legislature during the interim between sessions if authorized by majority vote of the full membership of the committee;

(9) hold public hearings on the confirmation of the members of the Board of Trustees of the Alaska Permanent Fund Corporation;

(10) make recommendations to the legislature and to agencies of the state <u>that</u> [WHICH] perform lending or investment functions concerning the structure and operating practices of the agencies;

(11) enter into and enforce all contracts necessary or desirable for the functions

of the committee;

(12) provide for annual post audits of the Alaska Housing Finance Corporation, the Alaska Aerospace Development Corporation, and the Alaska Industrial Development and Export Authority.

* **Sec. 4.** AS 29.45.650(a) is amended to read:

(a) Except as provided in AS 04.21.010(c) and in (f) and (h) of this section, a borough may levy and collect a sales tax on sales, rents, and on services provided in the borough. The sales tax may apply to any or all of these sources. Exemptions may be granted by ordinance.

* **Sec. 5.** AS 29.45.650 is amended by adding a new subsection to read:

(h) A borough may not levy or collect a sales tax on sales, rents, and services, or a use tax on the storage, use, or consumption of personal property on the following activities:

(1) the sale, lease, rental, storage, consumption, or distribution in this state of or the provision of services relating to an orbital space facility, space propulsion system, or space vehicle, satellite, or station of any kind possessing space flight capacity, including the components of them;

(2) the sale, lease, rental, storage, consumption, or use of tangible personal property placed on or used aboard an orbital space facility, space propulsion system, or space vehicle, satellite, or station of any kind, regardless of whether the tangible personal property is returned to this state for subsequent use, storage, or consumption; an exemption under this paragraph is not affected by the failure of a launch to occur, or the destruction of a launch vehicle or a component of a launch vehicle.

* **Sec. 6.** AS 36.30.015(e) is amended to read:

(e) The board of directors of the Alaska Railroad Corporation and the board of directors of the Alaska Aerospace Development Corporation shall adopt procedures to govern the procurement of supplies, services, professional services, and construction. The procedures must be substantially equivalent to the procedures prescribed in this chapter and in regulations adopted under this chapter.

* **Sec. 7.** AS 36.30.990(1) is amended to read:

(1) "agency"

(A) means a department, institution, board, commission, division, authority, public corporation, the Alaska Pioneers' Home, or other administrative unit of the

executive branch of state government;

(B) does not include

(i) the University of Alaska;

(ii) the Alaska State Housing Authority;

(iii) the Alaska Railroad Corporation;

(iv) the Alaska Housing Finance Corporation;

(v) a regional Native housing authority created under AS 18.55.996, or a regional electrical authority created under AS 18.57.020;

(vi) the Alaska Aerospace Development Corporation;

* Sec. 8. AS 37.05.146 is amended to read:

Sec. 37.05.146. DEFINITION OF PROGRAM RECEIPTS. In AS 37.05.142 - 37.05.146 and AS 37.07.080 "program receipts" means fees, charges, income earned on assets, and other state money received by a state agency in connection with the performance of its functions; all program receipts except the following are general fund program receipts:

(1) federal receipts;

(2) University of Alaska receipts (AS 14.40.491);

(3) individual, foundation, or corporation gifts, grants, or bequests that by their terms are restricted to a specific purpose;

(4) receipts of the following funds:

(A) highway working capital fund (AS 44.68.210);

(B) correctional industries fund (AS 33.32.020);

(C) loan funds;

(D) international airport revenue fund (AS 37.15.430);

(E) funds managed by the Alaska State Housing Authority (AS 18.55.020), the Alaska Housing Finance Corporation (AS 18.56.020), the Medical Indemnity Corporation of Alaska (AS 21.88.020), the Alaska Railroad Corporation (AS 42.40.010), the Municipal Bond Bank Authority (AS 44.85.020), the Alaska Aerospace Development Corporation (AS 14.40.821), or the Alaska Industrial Development and Export Authority (AS 44.88.020);

(F) fish and game fund (AS 16.05.100);

(G) school fund (AS 43.50.140);

(H) training and building fund (AS 23.20.130);

(I) retirement funds (AS 14.25, AS 22.25, AS 26.05.222, AS 39.35, and former AS 39.37);

(J) permanent fund (art. IX, sec. 15, Alaska Constitution);

(K) public school fund (AS 37.14.110);

(L) second injury fund (AS 23.30.040);

(M) fishermen's fund (AS 23.35.060);

(N) FICA administration fund (AS 39.30.050).

*** Sec. 9.** AS 38.05.810 is amended by adding a new subsection to read:

(h) The commissioner may issue permits to the Alaska Aerospace Development Corporation for purposes of down range space vehicle or payload overflight, booster retrieval, and recovery. The commissioner may, if it is in the best interests of the state, lease land to the Alaska Aerospace Development Corporation for other space-related purposes for, or at less than the appraised market value.

*** Sec. 10.** AS 39.25.110(11) is amended to read:

(11) the officers and employees of the following boards, commissions, and authorities:

(A) Alaska Gas Pipeline Financing Authority;

(B) Alaska Permanent Fund Corporation;

(C) [REPEALED,

(D)] Alaska Industrial Development and Export Authority;

(D) [(E)] Alaska Commercial Fisheries Entry Commission;

(E) [(F)] Alaska Commission on Postsecondary Education;

(F) Alaska Aerospace Development Corporation;

*** Sec. 11.** AS 39.50.200(b) is amended by adding a new paragraph to read:

(52) the board of directors and the executive director of the Alaska Aerospace Development Corporation (AS 14.40.821).

*** Sec. 12.** AS 44.99.200(b) is amended to read:

(b) The determination under (a) of this section shall be made by the

(1) commissioner of administration for a state agency in the executive branch, except as provided in (4) - (6) of this subsection;

(2) administrative director of the judicial branch for an agency in the judicial branch;

(3) Alaska Legislative Council for an agency in the legislative branch;

(4) Board of Regents or president of the University of Alaska for the university;

(5) board of directors of the Alaska State Housing Authority for the authority; [AND]

(6) board of directors of the Alaska Railroad Corporation for the corporation; and

(7) board of directors of the Alaska Aerospace Development Corporation for the corporation.

* **Sec. 13.** AS 44.99.400 is amended to read:

Sec. 44.99.400. COPYRIGHTS. A state agency may hold the copyright for software created by the agency or developed by a private contractor for an agency, and may enforce its rights to protect the copyright. In this section, "state agency" means a department, institution, board, commission, division, authority, public corporation, committee, or other administrative unit of the executive, judicial, or legislative branch of state government, including the University of Alaska, the Alaska State Housing Authority, the Alaska Aerospace Development Corporation, and the Alaska Railroad Corporation.

* **Sec. 14.** INITIAL APPOINTMENTS. The initial appointments of the members of the board under AS 14.40.826(a)(1), (6), and (8) shall be staggered under AS 39.05.055(2).

* **Sec. 15.** This Act takes effect July 1, 1991.

REPRESENTATIVE TOM MOYER

DISTRICT 19 • 119 N. CUSHMAN ST., SUITE 203 • FAIRBANKS, AK 99701 • (907) 456-8161

International Trade & Tourism, Chair • State Affairs, Vice Chair • Resources, Member

MEMORANDUM

To: Senator Drue Pearce — April 30, 1991
Chair, Senate Labor and Commerce Committee

From: Representative Tom Moyer TM

Re: HB46, Creating the Alaska Aerospace Development Corp.

5/1/91 unanimous!

I anticipate the full House will approve HB46 within the next few days and would expect that it next would be referred to your committee. Due to the short time left in the session this year, could you please schedule the bill for a hearing as soon as possible?

The bill would create an Alaska Aerospace Development Corporation whose purpose is to attract commercial space companies to Alaska. This is a budding new industry which has produced thousands of jobs and millions of dollars in revenue in those states which have active commercial launch operations.

Under the legislation, the corporation would be affiliated with the University of Alaska which manages the Poker Flat research rocket range north of Fairbanks. The bill would preserve the educational and research functions of the Poker Flat range while taking advantage of Poker Flat's unique qualities for commercial operations. Those qualities include geography, lack of a burdensome bureaucracy and a relatively undeveloped facility.

This legislation also has the strong support of the Hickel administration. Several private companies already have approached state officials about launching from Poker Flat.

I am happy to supply additional information as is necessary and will make myself and others available to testify at your convenience.

I'll send you another memo for the committee files. I'm asking Dick to send it only 2 referrals: L&C and FIN. Thanks.

IT
L&C
FIN

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WRD 6/8 Worried you Consider waiving 5 day notice?