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# **ECONOMIC IMPACTS OF THE KODIAK LAUNCH COMPLEX**

**PREPARED FOR**

Alaska Aerospace Development Corporation

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**PREPARED BY**

Pershing J. Hill  
Alexandra R. Hill



**INSTITUTE OF SOCIAL AND ECONOMIC RESEARCH  
UNIVERSITY OF ALASKA ANCHORAGE  
3211 PROVIDENCE DRIVE  
ANCHORAGE, ALASKA 99508**

# EXECUTIVE SUMMARY: ECONOMIC IMPACTS OF PROPOSED KODIAK LAUNCH FACILITY

The Alaska Aerospace Development Corporation hopes to build a commercial satellite launch facility on Kodiak Island during the next several years. The facility would launch small satellites and small to medium rockets into polar, low-earth orbits. It would be one of the few commercial launch facilities in the U.S. and would compete in a rapidly-growing market.

AADC hired the Institute of Social and Economic Research (ISER) at the University of Alaska Anchorage to examine the potential economic impacts of such a facility.

The economy of the Kodiak Island Borough depends heavily on the commercial fishing industry (including both seafood harvesting and processing) and on government (particularly the U.S. Coast Guard station at Kodiak). The proposed facility, to be known as the Kodiak Launch Complex, would not change the basic picture of the Kodiak economy.

- The launch facility would add a new dimension to the economy—one that would not be affected by the fluctuations in resource prices and the restructuring taking place in the federal government.

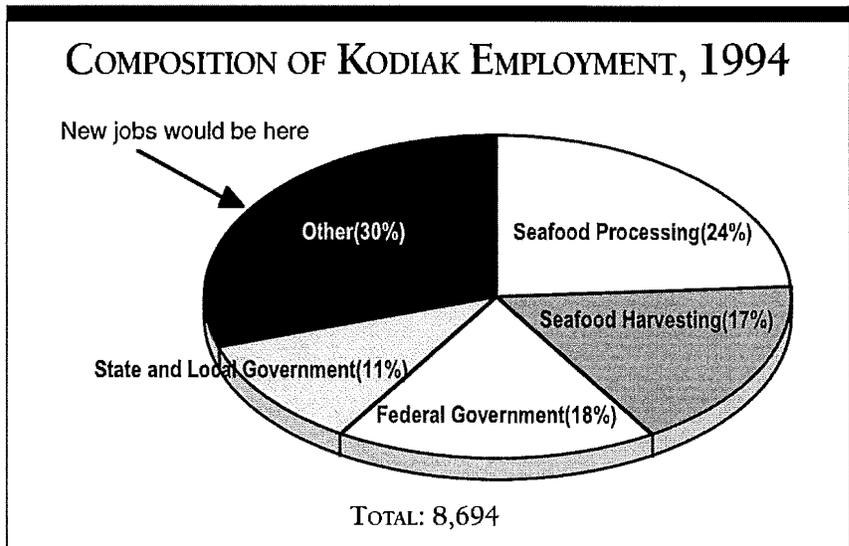
- Building the facility would temporarily increase Kodiak's construction employment by more than 50 percent. Construction expenditures would add \$4.5 million to income of Kodiak residents and another \$4.7 million to income of other Alaska residents.

- Depending on the number of launches per year, launch facility operations would generate

50 to 140 jobs, mostly in aerospace, retail trade, food, and lodging.

- These jobs would increase local employment by 0.5 to 1.5 percent—which would represent the equivalent of adding a major employer (although the jobs would be scattered among many employers).

- It would also add \$1.5 to \$4.2 million per year in Kodiak payroll. That would be an increase of .5 to 1.5 percent in Kodiak personal income.



ESTIMATED ECONOMIC IMPACTS OF KODIAK LAUNCH COMPLEX			
	KODIAK	OTHER ALASKA	TOTAL
<b>CONSTRUCTION</b>			
Payroll	\$4.6 million	\$4.7 million	\$9.3 million
Employment	134	137	271
<b>OPERATION*</b>			
Payroll	\$1.4-\$4.2 million	\$0.3-\$1.3 million	\$1.7-\$5.5 million
Employment	52-139	11-47	63-186
<i>*Estimated range of effects, at anywhere from 3 to 9 launches per year</i>			

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# ECONOMIC IMPACTS OF THE KODIAK LAUNCH COMPLEX

## Introduction and Description of Project

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This report examines the potential economic impacts of a satellite launch complex that the Alaska Aerospace Development Corporation (AADC) proposes to build on Kodiak Island. AADC hired the Institute of Social and Economic Research at University of Alaska Anchorage to examine those potential impacts. We first briefly describe the proposed complex and discuss the Kodiak economy. Then we describe how we plan to measure economic impacts of the launch complex and outline our analytical assumptions. After that we present our findings and discuss non-quantifiable impacts.

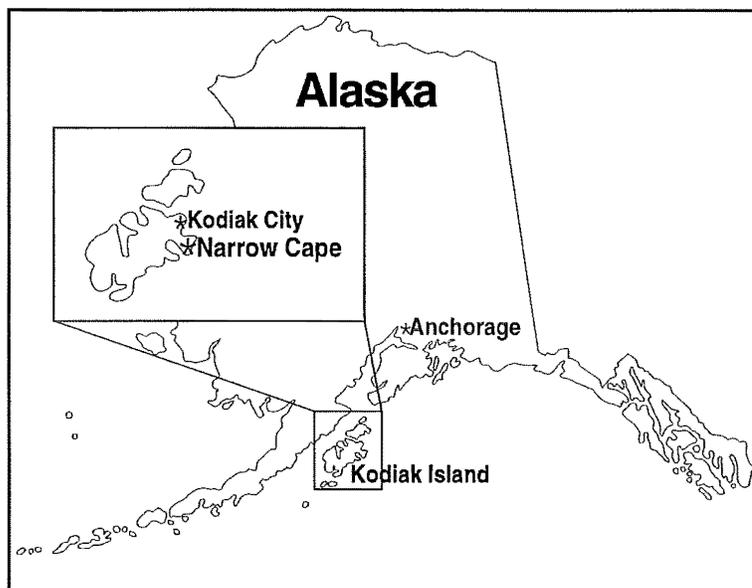
AADC hopes to build one of the nation's first commercial satellite launch facilities on Kodiak Island starting in late 1996. To be known as the Kodiak Launch Complex, the facility would be built on Narrow Cape, a peninsula 40 road miles from Kodiak City. It would use small to medium rockets to launch payloads under 8,000 pounds into polar, high inclination, low earth orbits. It would include a large indoor facility for the assembly of satellite and rocket components.

AADC is a public corporation, created by the State of Alaska to develop economic and technical opportunities in aerospace activities. It is applying to the Alaska Industrial Development and Export Authority and the Alaska Science and Technology Foundation to finance construction of the complex.

The Kodiak Launch Complex would be the only U.S. commercial launch complex not located on a federal installation. Operations at the proposed Kodiak complex would involve fewer agencies than at launch sites on federal installations, making it attractive to commercial users.

Kodiak Island has two geographic advantages for launching satellites into polar orbits. First, satellites could be launched over thousands of miles of open ocean to the south, southeast, and southwest of Narrow Cape; a launch failure would pose little danger to people or property. Second, launches into low polar orbits are more efficient at high latitudes. Polar rather than equatorial orbits are preferred for many types of satellites, including remote sensing and communications satellites, because polar orbits offer coverage of all parts of the globe several times a day.

The market for small-payload launches consists of communication systems, remote sensing satellites, and government, scientific, and microgravity payloads. Advances in communications technology have already brought and will continue to bring widespread changes to this market; the industry is expected to grow at exponential rates over the next few decades. Whereas the worldwide revenue for this market was in the \$500 billion range in 1995, it is expected to grow to \$3 trillion in the next decade. This market will include cellular communications systems and the much publicized information superhighway, with all its attendant changes.



## **The Kodiak Economy Today**

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Kodiak Island Borough has a population of about 15,400, almost all on Kodiak Island (Table 1). A description of the Kodiak economy, like a physical description of the place, yields a picture of an economy that is oriented around the sea. Commercial fishing (including not only harvesting but also seafood processing) provides the basis of economic activity—as indicated by Table 2, which shows that 8 of the top 15 employers in Kodiak are seafood processors. But there are other activities related to Kodiak's unique location and resources. Logging, tourism, and U. S. Coast Guard activities also provide a basis for Kodiak's endogenous industries—including retail trade, construction, transportation, finance, and service industries.

### **Commercial Fishing**

Fishing has dominated the economy of Kodiak since the U.S. purchased Alaska from Russia in the 1860s. By the late 1800s Kodiak had become the commercial seafood production center of Alaska—and it continues in that position today. In most years, Kodiak is the largest seafood port in the United States, exceeding all other seafood ports in ex-vessel value of landed catch. Occasionally it is displaced by Dutch Harbor in the Aleutian Islands or by an eastern U.S. seaport.

In 1994 Kodiak's commercial fishermen delivered over 300 million pounds of seafood valued at \$107 million. This catch ranked Kodiak as the third most important seafood port in the United States that year. Of the total ex-vessel value, salmon contributed 41.6 percent; groundfish (pollock and cod) 41.5 percent; halibut 6.5 percent; herring 8.5 percent; and crab and shellfish 1.9 percent. Salmon remains the number one fishery, but groundfish is a very close second.

Kodiak is also the home of the Fisheries Industrial Technology Center, where research is being conducted into developing new fishery products and markets. The world market for salmon is saturated in the 1990s, and anything that expands salmon markets or diversifies products would be significant.

Kodiak has an impressive infrastructure to support the fishing industry. The major port, smaller boat harbors, a large airport, a seaplane base, and an extensive seafood processing center all provide jobs and income that permeate the economy.

## **Seafood Processing**

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The fishing industry dominates Kodiak's employment, with seafood processing being the largest sector. Table 3 shows employment by industry on Kodiak Island in 1994. (These are the authors' estimates, based on information from the Standard Industrial Code, the Alaska Department of Labor, and other sources. The SIC figures alone do not include two of the most important sources of jobs on Kodiak—fish harvesting and the U.S. Coast Guard.)

Total Kodiak employment in 1994 was about 8,700. Of that total, food and kindred products employment (reflecting seafood processing) was 2,100, or 24 percent. During the height of the summer fishing season, employment in food and kindred products can account for more than 40 percent of total employment in Kodiak (Table 4 and Figure 1). Kodiak's total insured payroll in 1994 was \$148.9 million; \$40.7 million (27 percent) was in food and kindred products.

One drawback of using this data to indicate the importance of seafood processing to the Kodiak economy is that fish processing companies have traditionally relied on a transient work force, especially in the summer. In 1993 it was estimated that almost 50 percent of Kodiak's salary and wage earners were non-residents. However, even if we take that large proportion of non-resident workers into account, the seafood processing industry is still the dominant source of employment in the Kodiak economy.

## **Seafood Harvesting**

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Fish harvesting is of course also a big part of employment in commercial fishing. Unfortunately, the principal sources of employment and payroll data are quarterly reports of employers subject to state unemployment insurance law and quarterly reports of federal agencies made in connection with state administered programs for unemployed federal workers. These sources exclude self-employed persons, unpaid family help, domestic employees, most persons engaged in agriculture, and—in Alaska—most people employed in small commercial fishing operations. Information on employment in fish harvesting has to be garnered from other sources.

Such sources might be commercial fishing licenses sold or domestically held limited entry permits, with estimates of the crew associated with each permit. Estimating employment for harvesters is difficult because of fluctuating crew sizes, multiple fisheries, and varying seasons.

Further compounding the issue is the 1995 fisheries management strategy instituted in the halibut fishery. Under the new plan, fishermen who qualified were issued Individual Fishing Quotas (IFQs), allowing them to take a specific share of the annual halibut quota during a season that covers much of the year. Previously, the halibut quota was taken during a few short openings. No data are available yet on the impact of IFQs on seafood harvesting and processing employment. However, anecdotal evidence indicates that the relationship between vessel skippers and crew may be shifting. With the extra time now allowed for fishing, quota shareholders can pool their efforts and assist each other. Additional (transient, non-resident) crew may not be needed.

A 1990 study by Impact Assessment, a national consulting firm experienced in fisheries research, calculated that Kodiak's fish harvesting employment averaged about 1,460 jobs annually. Because

this 1990 estimate is the best figure available, we use that in Table 3. Those fishing jobs made up an estimated 17 percent of jobs in Kodiak in the early 1990s.

Another measure of fishing jobs is the number of limited entry permit holders fishing for salmon off Kodiak. Almost 500 salmon permit holders participated in the 1995 salmon season. Nearly 75 percent of those were Alaskan residents and just over 50 percent were Kodiak residents.

A further indication of the importance of fishing to the Kodiak economy is personal income by industrial source. The Bureau of Economic Analysis (BEA) of the U. S. Department of Commerce publishes data on personal income, classified by residence and sorted by geographic area. These figures are based on a variety of sources, including individual income tax data, business tax returns, and governmental expenditure data. This is the best available data that describes where people living in a given geographical area derive their income.

Unfortunately, the most recent data available are for the period 1984-1989 (Table 5). There are no published data for the 1990s, when we have seen major changes in worldwide salmon markets and big changes in prices paid Alaska fishermen. Still, this information is useful for indicating the importance of the commercial fishing industry.

Income from fishing over this period contributed 19 percent of total income in Kodiak. Income from manufacturing, which in Kodiak is primarily seafood processing, contributed 13 percent of total income. Income from transportation—a large part of which results from fishing—accounted for 9 percent. Thus, 41 percent of total Kodiak personal income during the late 1980s came from harvesting, processing, or transporting—sources directly related to the commercial fishing industry.

The primary limitation of these figures is that they represent fishing income by place of residence. Some share of the fishing income attributed to Kodiak is from other places (like Bristol Bay) where fishermen living in Kodiak might fish. However, because Kodiak residents own such a large share of Kodiak salmon permits, we believe that any income earned in other regions but attributed to Kodiak is relatively slight.

## **U. S. Coast Guard**

After commercial fishing, the U. S. Coast Guard has the second largest impact on the Kodiak economy. The Coast Guard monitors Alaska's 33,000-mile coastline and patrols the 200-mile economic exclusion zone. There are 1,028 active duty Coast Guard personnel stationed at the Kodiak Coast Guard station, with about 1,400 additional dependents. About 320 civilians and private contractors are employed because of the station. The annual military payroll is almost \$57 million, of which a significant portion remains in Kodiak, stimulating economic activity. Capital expenditures and contracted services also contribute to the local economy. In 1995, for example, the Coast Guard appropriated \$22.6 million for capital expenditures at the Kodiak station, with much of that money ending up in the local economy.

## **Timber and Lumber Industry**

Logging began in the Kodiak area when Native corporations received timber lands under terms of the 1971 Alaska Native Land Claims Settlement Act. Virtually all the logging occurs in two places—near Chiniak on Kodiak Island, and on Afognak Island, which is part of the Kodiak Island Borough but is separate from the main island. In 1994 revenues from logging sales were about \$40 million—double what they had been in 1992. Moreover, a logging operation (Ben A.

Thomas), is the tenth largest employer in the Kodiak Island Borough. Money from logging finds its way into the Kodiak economy—partly in the form of wages and partly in the transportation expenses involved with getting people to and from the logging center on Afognak Island.

## **Tourism**

The last major sector of the Kodiak economy is tourism. Tourists are beginning to discover Kodiak. Hunters and sport anglers have been visiting Kodiak for years. However, a wider variety of tourists is now discovering Kodiak—including those seeking sightseeing and wildlife viewing activities, as well as camping, hiking, and other eco-tourism recreational activities. According to the Kodiak Island Convention and Visitors Bureau, tourists spent approximately \$10.5 million dollars in 1994. Although tourism is currently small as compared with the other major sectors of the Kodiak economy, it will undoubtedly continue to grow, as more and more tour operators include Kodiak on their schedules.

## **Total Kodiak Employment**

As Table 3 makes clear, employment in the fishing and ocean-related industries makes up over 50 percent of the jobs in Kodiak. Overall, Kodiak depends heavily on its marine environment and will continue to do so—although logging and tourism have grown in recent years. This dependence on seasonal activities is reflected in the seasonal variation in Kodiak’s unemployment. Figure 1 demonstrates this by charting monthly food processing employment against the monthly unemployment rate; as one goes up, the other goes down. So although some of the wide variation in Kodiak employment is absorbed by transient workers who come and go as needed, Kodiak residents must still cope with high unemployment for parts of each year.

**Table 1. Population of Kodiak Island, 1994**

Place	Population
Akhiok (city)	80
Chiniak (cdp)	83
Karluk (cpd)	58
Kodiak City	7,620
Larsen Bay (city)	130
Old Harbor (city)	310
Ouzinkie (city)	259
Port Lions (city)	233
Woman's Bay (cpd)	749
Coast Guard Station (cpd)	2,049
Remainder of Kodiak Island	3,829
Kodiak Island Borough	15,400

Source: Alaska Department of Labor, Research and Analysis Section, 1994.

**Table 2. Kodiak's Top 15 Employers, 1994**

Rank	Firm	Industry	Avg. Annual Employment
1	Tyson Seafoods	Seafood Processing	436
2	Internat'l Seafoods	Seafood Processing	342
3	Cook Inlet Fisheries	Seafood Processing	214
4	Queen Fisheries	Seafood Processing	193
5	APS	Seafood Processing	189
6	Ocean Beauty	Seafood Processing	149
7	Safeway	Retail Grocery	137
8	AK Commercial	Retail Grocery	121
9	Western Alaska	Seafood Processing	102
10	Ben A. Thomas	Logging	80
11	Ocean Peace	Seafood Processing	71
12	AK-Mac (McDonalds)	Restaurant	62
13	Kodiak Elect. Assn.	Public Utility	61
14	Westmark Kodiak	Hotel	44
15	Brechan Enterprises	Construct Company	43
	Total Employment in top 15 employers		2,244

Source: Alaska Department of Labor, Research and Analysis Section, 1994

**Table 3. Total Kodiak Employment, 1994**

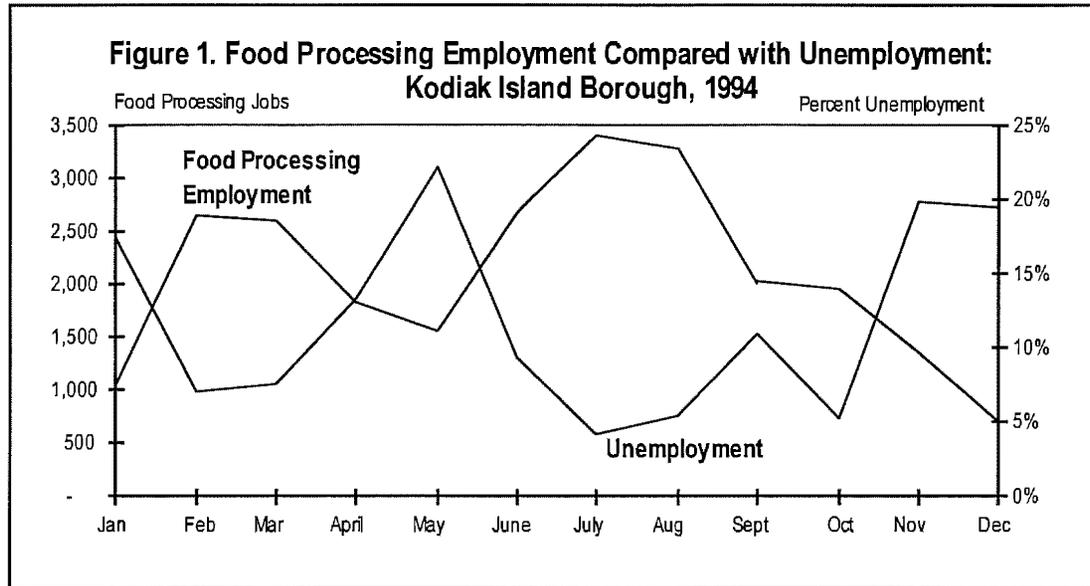
	Number	Percent
Mining	80	1%
Construction	154	2%
Misc Mfg.	168	2%
Food and Kindred Pdts	2,092	24%
Trans., Comm, Util.	301	3%
Wholesale Trade	72	1%
Retail Trade	769	9%
Finance	148	2%
Services	890	10%
Fishing	1,460	17%
Agriculture and Forestry	99	1%
Federal Government	166	2%
State Government	252	3%
Local Government	695	8%
U. S. Coast Guard	1,028	12%
Military—civilian	320	4%
Total Employment	8,694	100%

Source: Alaska Department of Labor, Research and Analysis Section, Employment and Earnings, 1994, and various other sources and estimates.

**Table 4. Employment and Earnings in Kodiak Island Borough: 1994**

Month	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Avg Monthly Emp.	Avg Annual Earnings
Total Employment	4,389	6,215	6,226	5,587	5,390	6,501	7,186	7,117	5,980	5,736	5,139	4,292	5,811	\$ 148,856,755
Food and Kindred Products	1,027	2,666	2,608	1,828	1,555	2,685	3,414	3,294	2,024	1,957	1,352	698	2,092	\$ 40,676,446
as Percent of Total	23%	43%	42%	33%	29%	41%	48%	46%	34%	34%	26%	16%	36%	27%
Percent Unemployment	18%	7%	8%	13%	22%	9%	4%	6%	11%	5%	20%	19%		

Source: Employment and Earnings 1992, Alaska Department of Labor, Research and Analysis, Juneau, Alaska, 1993.



**Table 5. Kodiak Local Area Personal Income, 1984-89**

Year	1984	1985	1986	1987	1988	1989	1984-89						
Population	13,700	13,700	13,300	13,300	13,800	13,800							
Per capita personal income	12,432	14,352	15,994	16,524	17,643	20,537							
<b>Earnings by Industry (thousands of dollars)</b>													
Forestry, fisheries	5,738	3%	31,331	17%	40,042	20%	39,724	20%	46,990	21%	49,174	18%	19%
Mining	300	0%	717	0%	66	0%	390	0%	403	0%	479	0%	0%
Construction	25,239	15%	17,081	9%	19,800	10%	12,150	6%	11,772	5%	12,246	5%	7%
Manufacturing	22,689	14%	21,149	11%	21,827	11%	27,414	14%	32,625	15%	36,279	13%	13%
Transportation	11,864	7%	11,546	6%	13,135	7%	12,674	6%	15,906	7%	53,627	20%	9%
Wholesale Trade	1,400	1%	1,279	1%	1,332	1%	1,600	1%	1,845	1%	1,570	1%	1%
Retail	14,474	9%	15,033	8%	14,419	7%	15,364	8%	16,469	7%	17,297	6%	7%
Finance	2,669	2%	2,871	2%	3,079	2%	3,480	2%	3,289	1%	3,040	1%	1%
Services	18,631	11%	20,012	11%	22,042	11%	22,669	11%	28,130	13%	33,257	12%	12%
Federal Govt.	8,708	5%	9,131	5%	8,973	4%	8,919	4%	7,658	3%	6,024	2%	4%
Military	27,509	17%	26,694	14%	27,833	14%	29,177	15%	28,291	13%	27,832	10%	13%
State Govt.	26,192	16%	27,268	15%	27,556	14%	26,215	13%	27,883	13%	29,728	11%	13%
Total	165,413		184,112		200,104		199,776		221,261		270,553		

Source: U. S. Department of Commerce, Bureau of Economic Analysis, Local Area Personal Income, 1984-89, Volume 5, Southwest, Rocky Mountain, and Far West Regions and Alaska and Hawaii. Washington DC: U. S. Government Printing Office, July 1991.

## Methodology

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We can describe economic activity as the flow of payments among industries and consumers. We can look at this flow in Kodiak; in Alaska; or in whatever geographical area we choose. Figure 2 illustrates the flow of payments for the Kodiak economy. Basic industries (such as fishing and tourism) sell goods and services to consumers from outside Kodiak. This brings money into the Kodiak economy. Money in the Kodiak economy circulates among basic and support industries that buy locally produced goods and services; money flows between Kodiak households and Kodiak industries as industry pays wages to households for labor, and households purchase goods and services. Finally, money flows out of the Kodiak economy as both industries and households purchase goods and services produced outside Kodiak.

A new basic industry such as the launch facility would bring money into the Kodiak economy when launch providers paid to use the facility, when they paid for food and lodging for their employees visiting Kodiak, and when those visiting employees spent money on goods and services such as tours, gifts and souvenirs. Some of this money would flow directly back out of the economy—for instance when AADC used income to purchase specialized electrical components from outside Alaska. Some would circulate repeatedly through the economy—for instance, local residents working at the launch complex would spend their wages at local stores, which in turn would employ labor and make local purchases.

Economic impacts result from both the initial expenditures on goods and services and the downstream expenditures as the money circulates through the economy. Input output (IO) models attempt to measure the total effect on the economy of a change in expenditures. Once the initial expenditure was made to get the launch facility up and running, the money would circulate through the economy and create a chain reaction of additional expenditures. Input-output analysis is a method that traces the flow of spending through various sectors of the economy. It begins with an account of expenditures for final products (final demand) produced by each sector of the economy. The analysis then uses a detailed accounting of the spending by each sector of the economy in other sectors to determine how money circulates in the economy. By accounting for this circulation, the analysis provides an estimate of the full effects of spending.

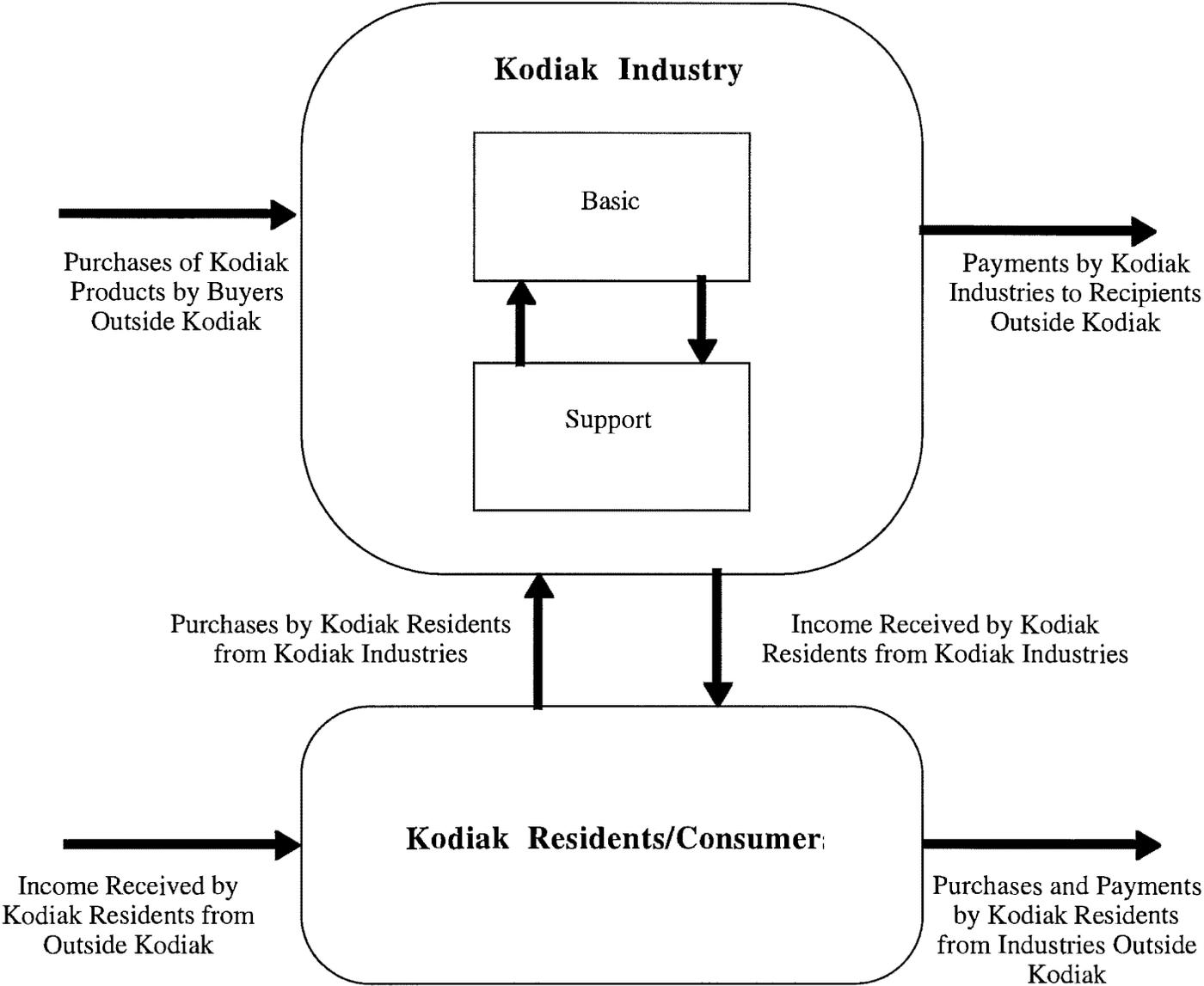
This type of analysis allows us to compare the economy in two different equilibrium states. The first is the level of output (and jobs and payroll) before new spending occurs. The second equilibrium state includes not only the effects of the initial new expenditure, but also the additional effects of that expenditure circulating through the economy.

The Alaska IO model was custom designed to take account of the unique characteristics of the Alaska economy. It was constructed from a national input-output model created by the U.S. Bureau of Economic Analysis and adjusted to make it conform more closely to the industrial composition of the Alaska economy.

Economists generally refer to the effects of the initial expenditure as “direct effects”, and the effects of the additional expenditures as “indirect effects.” In this study, there are also payroll and employment effects that are part of the expenditures themselves—that is, jobs at the launch facility and labor expenditures that support those jobs. So the total change in jobs, for example, is the sum of the jobs at the facility; jobs directly supported by launch facility non-labor expenditures; and jobs created when those who received launch facility expenditures spend that money on goods and services they need.

We can't accurately estimate the changes each year as the launch facility ramps up to full operation, because the changes don't have time to work through the economy. We can, however, look at how the Kodiak economy would change at different levels of launch facility operation. Here, we look at the effects of three, six, and nine launches per year. We have also looked at the overall impact of construction activity, without considering whether it lasts one year or three.

**Figure 2. Flow of Economic Activity in Kodiak**



## Expenditure Assumptions

Since economic impacts result from expenditures, our assumptions about expenditures are the starting point for our impact analysis. Our expenditure assumptions were drawn from a contractor's estimate of construction costs, AADC estimates of operations costs, and information on likely tourism expenditures derived from the Alaska Visitor Statistics Program. We estimated the "final demand" these expenditures would place on 36 Alaska industries based on national data and on estimates originally developed by ISER for earlier impact modeling. We analyzed the project's two phases—construction and operations—independently. We derived these "final demand" amounts for the three scenarios mentioned above (three, six and nine launches annually) and for total construction expenditures. The four tables of final demand became the input for the Alaska IO model.

### Construction Expenditures

In the construction phase, we used the expenditures estimated by HMS, Inc. in their Construction Cost Estimate. As Table 6 shows, this estimate breaks the \$24 million project into five categories<sup>1</sup>.

**Table 6. Construction Total**

	Materials	Labor	Profit, Bonding, Insurance	Per Diem	Airfare	Total
Overhead, Profit	196,141	646,793	2,077,464	1,104,473	111,444	4,136,315
Architectural	6,366,657	4,995,375	-	-	-	11,362,032
Mechanical	1,105,765	484,389	-	-	-	1,590,154
Electrical	1,344,753	784,067	-	-	-	2,128,820
Site work	3,072,601	1,932,389	-	-	-	5,004,990
<b>Total</b>	<b>12,085,917</b>	<b>8,843,013</b>	<b>2,077,464</b>	<b>1,104,473</b>	<b>111,444</b>	<b>\$24,222,311</b>

**Materials:** We used information on how Alaska construction non-labor expenditures are distributed across industries. Alaska manufactures few of the materials used in construction, so most of this money flows out of state.

**Labor:** Using the per diem figures provided, we estimate that 70 percent of the labor force would come from Alaska and 30 percent from outside the state<sup>2</sup>. Of the 70 percent Alaska residents, we estimate that half would be residents of Kodiak and half residents of other areas of Alaska, primarily Anchorage and the Mat-Su and Kenai boroughs.

**Profit, Bonding and Insurance:** "Bonds and Insurances" make up \$370,00 of this amount; we assumed that this money would be spent outside of Alaska. The \$1.6 million of profit would remain in Alaska, if an Alaskan contractor did the work. However, its impact on the economy is

<sup>1</sup>The grand total is the same as HMS'; all other totals look slightly higher because we allocated the \$1,128,865 of contingency budget across all other types of expenditures.

<sup>2</sup>HMS estimates \$8.4 million in labor expenditures; using the average Kodiak monthly construction wage for 1994 from the Alaska Department of Labor, this represents 2,463 person-months of labor. HMS estimates 16,200 days of per diem; or 779 person-months, which is about 70 percent of the total.

difficult to predict, in the absence of information on how and where the contractor would spend that profit.

**Per Diem:** The contractor estimate is \$65 per day. We have allocated this to \$30 per day for lodging (two persons to a room); \$30 per day for food, and \$5 per day towards a shared vehicle<sup>3</sup>. We assumed all expenditures took place in Kodiak, although vehicle expenditures might possibly be in Anchorage.

**Airfare:** We assumed this was spent out of state.

## Operations

As discussed in the methodology section, we looked at three possible levels of facility operation: three, six, and nine launches per year. We considered three general types of expenditures:

- expenditures made by AADC to operate the facility;
- expenditures made by the launch principals to conduct the launch;
- expenditures made by individuals working on Kodiak for the launch, beyond their per diem expenditures.

## AADC Expenditures

AADC expects to contract maintenance of the launch facility, and expects that the contractor will commit the equivalent of 2 to 3 full time jobs to the various duties required for security, maintenance and administration of the facility. In the absence of any launches, the labor cost for these activities would be about \$175,000. In addition, AADC also would expect to have to spend about \$195,000 for maintenance materials, utilities, and insurance (see Table 7).

**Table 7. Yearly Maintenance Costs**

	Materials	Labor	Electricity	Services	Total
Security		100,000			
Maintenance	5,000	65,000			
Insurance				70,000	
Administrative		10,000			
Utilities			120,000		
Total	\$5,000	\$175,000	\$120,000	\$70,000	\$370,000

AADC would incur additional expenses for each launch operation, but some of these expenses would be offset by reductions in some yearly maintenance costs. For instance, if AADC provides 24-hour security during a launch, they will not need to pay for the security checks which would take place in the absence of launch activity. The net additional costs per launch for operating the facility are shown in Table 8. The labor costs represent about 14 people employed for the 2 month launch operations period.

<sup>3</sup>This cost estimate does not include a construction camp; workers would have to travel from available lodging about 30 miles away, presumably using rented or leased vehicles.

**Table 8. Net Additional Costs per Launch**

	Materials	Labor	Electricity	Total
Operations Planning		20,000		
Admin		38,000		
Operational Costs*		50,000		
Maintenance	786	10,214		
Utilities			5,000	
Security		(20,000)		
<b>Total</b>	<b>786</b>	<b>98,214</b>	<b>5,000</b>	<b>\$104,000</b>

\*May include security, maintenance and administrative costs

**Launch Provider Expenditures**

AADC anticipates that launch providers will bring an average of 100 people to Kodiak for the 60 day launch period. The major expenditure on Kodiak for the provider will be the per diem costs of these people, estimated at \$120 per person per day (\$75 per day single room; \$40 per day food, \$5 per day shared transportation). In addition, we anticipate the launch provider may hire local (Alaska) technicians. Low levels of launch activity (4 or fewer launches per year) would support temporary hire technicians who would be paid per diem as well as an entry level wage; five technicians would be needed for 2 months for each launch. Five or more launches per year could support more highly skilled full time technicians; although each would be paid more, fewer would be needed (six to handle 6 launches per year; eight to handle 9 launches per year). As full time employees, they would be expected to live on Kodiak and not incur per diem costs. These expenses are shown in Table 9.

**Table 9. Local Expenses by the Launch Principal**

**Launch Technicians**

	Hourly Cost	Total Cost	Lodging	Food	Vehicle
Option A- temp workers			(shared room)		(shared)
Wage for 1 PT launch technician	\$ 16.83	\$5,791 for 2 months	\$37.50	\$40	\$5
Per Diem for 1 technician			\$2,250	\$2,400	\$300
Option B - FT workers					
Wage for 1 FT launch technician	\$25.04	\$ 65,095 for full year	0	0	0
Benefits for full time technician	\$6.26				

**Visitor Per Diem Expenditures**

		Lodging	Food	Vehicle
No of People	100			
\$/day	\$120	\$75	\$40	\$5
No. of days	60	\$450,000	\$240,000	\$30,000

Table 10 shows how all these expenditures come together for three, six or nine launches per year.

**Table 10. Annual Expenditures  
3 Launches/ Year**

	Materials	Labor	Electricity	Services	Lodging	Food	Vehicle	
Security	-	40,000	-	-				
Maintenance	2,000	26,000	-	-				
Insurance	-	-	-	70,000				
Administrative	-	4,000	-	-				
Utilities	-	-	120,000	-				
Operations Planning	-	60,000	-	-				
Admin	-	120,000	-	-				
Operational Costs	-	150,000	-	-				
Maintenance	5,357	69,643	-	-				
Utilities	-	-	15,000	-				
Launch Technicians 5 part time tech/launch		\$ 86,860			\$ 33,750	\$36,000	\$4,500	
Visitor Per Diem					1,350,000	720,000	90,000	
<b>TOTAL</b>	<b>7,357</b>	<b>556,503</b>	<b>135,000</b>	<b>70,000</b>	<b>1,383,750</b>	<b>756,000</b>	<b>94,500</b>	<b>\$3,003,110</b>

**Table 10. Annual Expenditures (cont'd)**  
**6 Launches/ Year**

	Materials	Labor	Electricity	Services	Lodging	Food	Vehicle	
Security								
Maintenance								
Insurance				70,000				
Administrative								
Utilities			120,000					
Operations Planning		120,000						
Admin		240,000						
Operational Costs		300,000						
Maintenance	10,714	139,286						
Utilities	-	-	30,000					
Launch Technicians 6 full time technicians		390,572						
Visitor Per Diem					2,700,000	1,440,000	180,000	
<b>TOTAL</b>	<b>10,714</b>	<b>1,189,858</b>	<b>150,000</b>	<b>70,000</b>	<b>2,700,000</b>	<b>1,440,000</b>	<b>180,000</b>	<b>\$5,740,572</b>

**Table 10. Annual Expenditures (cont'd)**  
**9 Launches/ Year**

	Materials	Labor	Electricity	Services	Lodging	Food	Vehicle	
Security								
Maintenance								
Insurance				70,000				
Administrative								
Utilities			120,000					
Operations Planning		180,000						
Admin		360,000						
Operational Costs		450,000						
Maintenance	\$ 16,071	\$208,929						
Utilities			45,000					
Launch Technicians (opt B)		\$520,763						
8 full time technicians								
Visitor Per Diem					4,050,000	2,160,000	270,000	
<b>TOTAL</b>	<b>16,071</b>	<b>1,719,691</b>	<b>165,000</b>	<b>70,000</b>	<b>4,050,000</b>	<b>2,160,000</b>	<b>270,000</b>	<b>\$8,450,763</b>

## Tourism Expenditures by Launch Visitors

In our estimates above, launch providers bring about 100 people to Kodiak for 60 days for each launch. Some of these visitors will take advantage of the wide recreational and tourism opportunities available on Kodiak, and elsewhere in Alaska. In order to estimate how much these visitors might spend, we used data from the Alaska Visitor Statistics Program, which is conducted by the McDowell Group for the Division of Tourism, Alaska Department of Commerce and Economic Development. This study provides instate expenditure patterns by visitors to Alaska. It provides descriptions of these expenditures for different types of visitors (e.g. business, pleasure, visiting friends), different times of year, and different regions. Because there were few business visitors to southwest, expenditure patterns there were dominated by pleasure visitors. We used information on business visitors throughout Alaska.

We looked at expenditure patterns of summer<sup>4</sup> and winter visitors, and of visitors who said they were in Alaska for business only, and those who said they were in Alaska for both business and pleasure. Most visitors were here for much less than 60 days—the average was one to two weeks. For our launch visitors, food and lodging was paid as per diem by the launch provider; extra expenditures would be for tours, gifts, souvenirs, recreation, and a variety of expenditures grouped under “personal expenditures”<sup>5</sup>. Personal expenditures are probably closely related to length of trip, and we have calculated a per person, per day amount for them. Tour, gift, and souvenir expenditures are more likely to be constrained by the visitor’s disposable income, and will vary less with the length of the visit. For those expenditures we calculated a per person, per trip amount. Table 11 shows the reported expenditures for visitors to Alaska.

**Table 11. Reported Expenditures for Business and Business/Pleasure Alaska Visitors**

	Business Only		Business and Pleasure	
	Summer 1993	Fall/Winter 93/94	Summer 1993	Fall/Winter 93/94
Total Expenditures per Person	\$398	\$559	\$904	\$432
Total net of Food, Lodging	\$132	\$183	\$487	\$184
Average Nights Spent in Alaska (VES)	8.4	4.5	10.1	8.2
Per Person Per day Lodging	\$ 19.76	\$52.22	\$ 25.15	\$18.41
Per Person Per Day Food	\$11.90	\$ 31.33	\$16.14	\$11.83
Per Person Per Day Personal Expenditures	\$ 2.62	\$ 3.11	\$ 3.76	\$5.12
Per Person Per trip tours, gifts, clothing, misc	\$36.00	\$49.00	\$ 285.00	\$92.00

<sup>4</sup>Summer is defined as May through September

<sup>5</sup>Personal expenditures include telephone, laundry, sundries/drugs, reading matter and photo supplies.

We then developed low, medium and high estimates of the number and type of visitors, shown in Table 12.

**Table 12. Visitor Characteristic Assumptions**

	<b>Low</b>	<b>Medium</b>	<b>High</b>
Number of People	100	125	150
Percent Business Only	100%	75%	50%
Percent Business/Pleasure	0%	25%	50%
Percent Summer	50%	50%	50%
Number of days	60	60	60

Based on these numbers we generated low, medium, and high expenditure estimates per launch as shown in Table 13. Because the variation in expenditures was small compared to other expenditures in our analysis, we used only the medium per launch tourist spending estimate to generate annual tourism expenditures (Table 14) for three, six and nine launches per year.

**Table 13. Tourism Expenses Per Launch**

	<b>Low</b>	<b>Mid</b>	<b>High</b>
Tours/recreation	\$ 1,337	\$ 6,579	\$11,821
Gifts, Souvenirs	\$14,889	\$19,353	\$23,817
Clothing	\$ 1,978	\$ 3,845	\$5,712
<b>Total</b>	<b>\$18,204</b>	<b>\$29,777</b>	<b>\$41,350</b>

**Table 14. Annual Tourism Expense Estimates**

(using mid-level tourism expenditures)

<b>Launches/Year</b>	<b>3</b>	<b>6</b>	<b>9</b>
Tours/Recreation	\$19,737	\$39,474	\$59,211
Gifts, Souvenirs	\$58,059	\$116,118	\$174,177
Clothing	\$11,534	\$23,068	\$34,602
<b>Total</b>	<b>\$89,330</b>	<b>\$178,660</b>	<b>\$267,990</b>

## Economic Impacts

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The KLC will primarily affect the Kodiak and Alaska economy in two ways. First, during the construction phase there will be a significant increase in economic activity that will increase spending and employment in the local and state economies. Second, once construction is completed, the operation and maintenance of the facility will inject significant spending into the regional and local economies. We have assessed the impact from these areas of spending, and also of the tourism spending by visitors in Alaska working on launches.

In addition there are several sources of impact we did not quantify, which are discussed in a later section. It appears likely that the project will produce profits. The profits themselves do not change the economic impacts; however, to the extent that those profits are spent in Alaska, they will have economic impacts here. We don't know how the profits will be spent; one possible scenario is that the state government will put any profits in the general fund as part of a strategy to keep taxes down; another possibility is that AADC will reinvest the profits in other Alaska aerospace development projects. Because of this uncertainty, and because the impacts vary widely with the way money is spent, we have not quantified impacts from potential profits. The second likely area of economic impacts that we can't quantify at this time is the general increase in tourism that the launch facility might generate. More tourists might decide to come to Alaska, and some visitors might decide to stay longer, increasing tourist spending in the state.

### Construction Impact

Table 15 shows the estimated impacts of the construction phase. The construction of the KLC is expected to begin in 1996 and expected to last 18 months. The estimated cost of the project is \$24 million. Based on cost estimates and the average Kodiak construction wage, workforce during the construction will average 90 to 100 workers from Alaska, and about 25 to 35 more from out of state. It's important to remember that the construction impacts are for the entire construction phase: 140 jobs over the construction period does not mean that there will be 140 Alaska residents employed for the entire time construction is underway. Rather it means that total construction payroll is about 140 times the average annual construction wage in Alaska.

Local employment would increase during the construction period not only from construction labor at the facility, but also because material and per diem expenditures would support other jobs in Kodiak and southcentral Alaska, primarily in lodging, food, retail trade and business services. The total increase in employment is small relative to Kodiak's largest sectors—seafood harvesting and processing—but still significant. Construction employment would increase by over 50 percent during the busiest times.

Over the 18-month construction period, Kodiak payroll would increase by a total of about \$4.5 million. This represents an increase of about 1% in total Kodiak personal income<sup>6</sup> for the construction period. The remainder of Alaska would also see a similar increase; the construction phase would increase total Alaska payroll by just over \$9 million.

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<sup>6</sup>\$4.5 million over 18 months is about \$3 million per year, compared to the US BEA estimate of about \$300 million for total Kodiak personal income in 1993, the most recent year available.

**Table 15. Kodiak Launch Facility Economic Impacts:  
Construction Phase**

	State	Remainder Alaska	Kodiak
<b>Launch Facility</b>			
Payroll	\$6,190,109	\$3,095,055	\$3,095,055
Employment	140.0	70.0	70.0
<b>Direct Effect Of Expenditures</b>			
Output	\$3,543,131	\$874,436	\$2,668,695
Payroll	\$1,151,368	\$307,852	\$843,516
Employment	47.4	11.1	36.3
<b>Indirect/Induced Effect</b>			
Output	\$7,257,217	\$5,099,038	\$2,158,179
Payroll	\$1,933,576	\$1,310,824	\$622,752
Employment	83.4	56.0	27.4
<b>Total Effect</b>			
Output	\$10,800,348	\$5,973,473	\$4,826,875
Payroll	\$9,275,053	\$4,713,730	\$4,561,323
Employment	270.8	137.1	133.7

## Operation Impact

While the construction impacts are significant, they are temporary. The operation of the launch facility provides an opportunity for long-term increases. We have analyzed operations in terms of annual expenditures, and so can interpret these results as annual jobs, payroll, and employment. Jobs, however, are not full-time equivalent jobs. In some industries, such as tourism, the average worker may be employed only a few months a year, and their average annual wages represent only those few months work. In others, the average annual earnings do reflect full-time, year-round work.

The economic impact of the KLC during the launch phase of the operations will vary depending on the number of launches the facility is actually able to attract. Depending on the growth in the market for LEO launches and assumptions as to the share of the market that the KLC could capture, the number of annual launches could vary between three and twelve. In examining the economic feasibility of the launch facility, AADC assumed that the number of launches would increase from one in 1997 to three in 1998 to seven by the middle of the first decade of the next century.

We assessed the economic impact of the launch facility at three levels. Three launches per year is just below what AADC expects it would need to cover all expenses (including the AADC budget), and represents our low estimate of impacts. Six launches per year represents a thriving facility which has captured adequate market share to provide a good return on investment. Nine launches per year, the high estimate, approaches the capacity of the facility. We have discussed the facility employment and expenditures for these scenarios above; the range of economic impacts is shown in tables 16, 17, and 18.

Kodiak employment would increase by 50 to 140 workers and Alaska employment by 60 to 180. As in the construction phase, most of the jobs not at the launch facility would be in retail trade, lodging, and food establishments. Kodiak's annual payroll would increase by \$1.5 million to just over \$4 million. This would be an increase of 0.5 percent to 1.5 percent of total personal income. Output (sales) would increase by over \$3 million. Because launch facility operations are not assumed to employ a significant number of Alaskans outside of Kodiak, the effects on the remainder of the state would be smaller than during the construction phase, but would still total over \$1 million annually in sales, \$300,000 in payroll, and 11 jobs.

While these impacts are small relative to Kodiak's major industries of fishing and fish processing, they are still significant. The Kodiak Launch Complex would be a significant change in the industrial structure of the region, adding a completely different form of economic activity. It would help to diversify the local economy by providing 50 to 140 jobs, none of which would depend on fish prices or abundance. These new jobs would help even out the employment fluctuations illustrated in Figure 1. Often diversification is accomplished or attempted by running counter to the market. Alaska tried this with agriculture projects near Point MacKenzie in the Mat-Su Borough, and with the development of the Delta Barley Project. However, these projects ran counter to the way in which markets worked, and only appeared feasible as a result of massive government subsidies.

The KLC project, on the other hand, appears to have a natural comparative advantage. There is open ocean south of Kodiak, so launching rockets in that direction is relatively safe. Transportation is relatively inexpensive, when compared to the total cost of a launch, and there are other technical advantages as well. Moreover, Kodiak has a literate population and a good level of expertise in high tech fields like communications, transportation, some areas of fishing. Finally, there is a local college, where education in areas that are specific to the needs of the KLC could be facilitated.

**Table 16. Kodiak Launch Facility Economic Impacts:  
Operating At 3 Launches Per Year**

	State	Remainder Alaska	Kodiak
<b>Launch Facility</b>			
Payroll	\$556,503	\$55,650	\$500,853
Employment	7.0	0.7	6.3
<b>Direct Effect Of Expenditures</b>			
Output	\$2,315,475	\$36,858	\$2,278,617
Payroll	\$688,516	\$14,271	\$674,245
Employment	34.8	0.7	34.1
<b>Indirect/Induced Effect</b>			
Output	\$1,987,748	\$1,011,901	\$975,847
Payroll	\$522,721	\$252,316	\$270,405
Employment	21.3	10.1	11.2
<b>Total Effect</b>			
Output	\$4,303,223	\$1,048,759	\$3,254,464
Payroll	\$1,767,740	\$322,238	\$1,445,502
Employment	63.0	11.5	51.6

**Table 17. Kodiak Launch Facility Economic Impacts:  
Operating At 6 Launches Per Year**

	<b>State</b>	<b>Remainder Alaska</b>	<b>Kodiak</b>
<b>Launch Facility</b>			
Payroll	\$1,189,858	\$118,986	\$1,070,872
Employment	8.0	0.8	7.2
<b>Direct Effect Of Expenditures</b>			
Output	\$5,050,846	\$762,569	\$4,288,277
Payroll	\$1,603,139	\$310,541	\$1,292,598
Employment	78.1	12.5	65.6
<b>Indirect/Induced Effect</b>			
Output	\$4,171,206	\$2,301,286	\$1,869,919
Payroll	\$1,118,136	\$595,954	\$522,182
Employment	45.8	24.2	21.7
<b>Total Effect</b>			
Output	\$9,222,052	\$3,063,855	\$6,158,196
Payroll	\$3,911,132	\$1,025,480	\$2,885,652
Employment	131.9	37.5	94.4

**Table 18. Kodiak Launch Facility Economic Impacts:  
Operating At 9 Launches Per Year**

	State	Remainder Alaska	Kodiak
<b>Launch Facility</b>			
Payroll	\$1,719,691	\$171,969	\$1,547,722
Employment	10.0	1.0	9.0
<b>Direct Effect Of Expenditures</b>			
Output	\$7,011,749	\$645,790	\$6,365,959
Payroll	\$2,254,081	\$322,255	\$1,931,826
Employment	111.3	13.1	98.2
<b>Indirect/Induced Effect</b>			
Output	\$5,927,651	\$3,183,317	\$2,744,334
Payroll	\$1,587,283	\$819,402	\$767,881
Employment	65.0	33.2	31.8
<b>Total Effect</b>			
Output	\$12,939,400	\$3,829,107	\$9,110,293
Payroll	\$5,561,055	\$1,313,626	\$4,247,429
Employment	186.3	47.3	139.0

## **Non-Quantifiable Effects**

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There are numerous other impacts that may be difficult to quantify, but will nonetheless be present. The major portion of this analysis rests on well understood and universally appreciated economic processes. The multiplier concept, and its attendant relationships to the particular economic structure, has been studied and quantified in a variety of economic circumstances, and there is a great deal of agreement as to the size and direction of the impacts. There are other impacts that are less certain but still need to be elaborated.

### **Tourism**

In the foregoing model some of the staff and personnel of KLC customers who would travel to Kodiak to participate in launches were assumed to behave, in part, like tourists. Most business visitors to Alaska combine their visit with some amount of tourism; for some, it becomes an important component of their visit. For most launch provider personnel the satellite launching project will be their first visit to Alaska. Kodiak is a unique place, very different from the areas where the KLC customers live. It is assumed that these business visitors will behave (in terms of their spending) much like business visitors to other parts of Alaska who are combining their visit with tourism.

There would be other tourism impacts. First of all, the staffs of KLC customers will have some Alaska experience—experience that may encourage them to return in the future. They may see things during their launch visits that would interest them enough to draw them back to Kodiak or to other areas of Alaska during their vacations. To many people, Alaska seems to be a great distance from “America,” and business trips to Alaska may show them how close it really is. For all these reasons, business trips related specifically to launches may also be catalysts for further travel to Alaska.

The launch facility in and of itself may be a draw for tourism. It is a new tourist attraction. At the margin, it may be the thing that causes some people to travel to and vacation in Alaska. The Florida Division of Tourism has cited the large numbers of people who gather to watch space shuttle launches. They estimate that roughly 200,000 people watch lift-offs at Cape Canaveral from the roads and highways near the launch facility. While there is no specific research as to what the actual economic impact of shuttle launches has been, economists at the Bureau of Economic Research at the University of Florida feel that the impact would be statistically verifiable.

It is conceivable that some tour operators in Kodiak might carve out a niche for satellite launch viewing trips. Satellite and rocket launches provide an interesting contrast to the rugged natural beauty of the Kodiak Archipelago. It is entirely possible that a flotilla of boats and other tourist facilities will arise catering to people interested in viewing rocket launches from Narrow Cape.

Finally, the launch complex may draw tourists from other areas of Alaska. In the discussion above the focus is on increased spending in Alaska by non-Alaskan tourists. If the KLC stimulates intra-state tourism, Alaskans may spend more of their vacation dollars here, and fewer elsewhere, thus keeping more Alaska dollars within the state.

## Other Effects

There may be educational spin-offs with the building of the KLC. There is a branch of the University of Alaska in Kodiak, and it could eventually offer a degree program oriented toward space technology. There may also be an opportunity for cooperative research projects between the University of Alaska and the KLC. The site will certainly demonstrate high technological endeavors—and thus provide something very different from what children in Kodiak area schools can see today.

One added educational benefit is that the development of more high technology industries will provide a wider variety of jobs within Alaska. This may provide more opportunities for people who currently feel that in order to use their talents they need to work in the Lower 48. These people may be more tempted to stay here because of a wider variety of employment opportunities. The marginal moves into high technology industries may diminish the “brain drain” from Alaska.

Aside from the educational benefits, the development of the KLC would move the Kodiak economy and the Alaskan economy toward diversification. The economy in Kodiak is oriented to the bounty of the sea. It is heavily dependent on the prices for and abundance of salmon, halibut, groundfish, and crab. When these sectors are booming, the economy of Kodiak booms. When these markets are doing poorly, so is Kodiak. The KLC would be completely independent of the seafood industry. It would tend to stabilize the economy of Kodiak. It has to be understood, though, that the KLC is small relative to the whole economy in Kodiak. However, economies diversify one step at a time, and the KLC is certainly a movement in that direction.