



Economic Impact of NASA in Florida

FY 2008



Kennedy Space Center

Atlantis on Pad 39A

Endeavour on Pad 39B

Preface

The National Aeronautics and Space Administration (NASA) has a number of centers that help the Agency pursue its space exploration and discovery goals. The Kennedy Space Center (KSC) in Florida is one of those centers, and as such plays an important role in helping NASA achieve those goals.

As good stewards of the responsibilities and resources the nation entrusts to the Agency and its centers, NASA strives to maximize the benefits produced by activities it conducts at its centers, including KSC, while minimizing costs. In addition to the technical and social benefits derived from these activities, the total benefit of business NASA conducts also includes significant economic benefits in the locations it operates across the country, including Florida. To help quantify, understand, and communicate this benefit, the Chief Financial Officer (CFO) at KSC annually produces an economic impact assessment of NASA spending in Florida covering three concentric economic areas: local (Brevard county), regional (central Florida counties) and state. The CFO typically enlists the help of one or more outside economic experts in developing these assessments. This year's assessment uses the results of a study conducted by the Transportation Economics Research Institute, a Mt. Dora, FL based private organization under the direction of Dr. Warren McHone, who is also a Professor of Economics at the University of Central Florida. The study was based on data supplied by KSC and its affiliates. This report of this year's economic impact assessment has been collaboratively produced by Dr. McHone and KSC CFO personnel.

The Office of the CFO is pleased to submit the results of the Fiscal Year 2008 assessment, covering the period from October 1, 2007 through September 30, 2008. The study and methodology used has been reviewed and we concur with the findings contained in this report.

Additional copies of the report are available through the Office of the NASA KSC CFO, (321) 867-3726.

National Aeronautics and Space Administration
Economic Impact of NASA In Florida FY 2008

Economic Impact of NASA in Florida Fiscal Year 2008

Produced by the NASA Office of the CFO at
Kennedy Space Center, Florida

with the support of W. Warren McHone, PhD
Transportation Economics Research Institute (TERI)

National Aeronautics and Space Administration
Economic Impact of NASA In Florida FY 2008

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1. Study Highlights

The following is a summary list of highlights from this study.

- *KSC and other NASA Centers' expenditures in support of space program activities in the State of Florida were \$1.93 billion in FY 2008. Measured in constant dollar terms this was a 6% increase over the FY 2007 level.*
- *KSC and other NASA Centers managed 1,417 active contracts in Florida in FY 2008. 92% of KSC/NASA spending (including civil service wages) was concentrated on-site at KSC.*
- *Total KSC/NASA direct spending was \$1.82 billion in Brevard County, \$83 million in other Central Florida counties and \$45 million in other Florida counties.*
- *Commodity purchases by KSC and other NASA Centers in Florida totaled \$1.641 billion in FY 2008. Over 77% of these purchases were concentrated in four commodity categories. The top commodity category was the \$659 million for Scientific Research & Development Services.*
- *The total worker population on/near-site KSC in FY 2008 was 14,865. Of this total, 306 workers were excluded from this study as they were deemed to represent a transfer of economic activity vs. outside injection. Most (77%) of the study's 14,559 space related workers were employed by prime contractors, 16% were KSC/NASA federal civil service workers and the remainder were KSC Visitors Center and other space-related tenants.*
- *Total gross earnings of all NASA/KSC space-related workers in Florida were \$1.124 billion in FY 2008.*
- *The average annual salary for KSC on-site workers was \$77,235 in FY 2008, which was almost twice the wage level of the average Brevard County worker.*

- *1.6 million out-of-state tourists visited the KSC Visitor Center (KSCVC) in FY 2008 generating \$39 million in wages and non-labor purchases in the state by KSCVC. In addition, out-of-state business visitors to KSC spent \$5.8 million in total local travel and lodging expenditures in FY 2008.*
- *The total monetary injection of outside money into Florida's economy by all KSC-based activities was \$1.96 billion in FY 2008. This total consisted of \$1.1 billion in wage payments to households, \$815 million in non-labor purchases from contractors and \$18 million in KSC Visitor Center and business visitor local spending. 93% of the total injection went to Brevard County businesses and households and another 5% went to business and households in other nearby Central Florida counties.*
- *The injection of outside money into the state and local economies plus the subsequent indirect transactions that were generated by this spending resulted in a FY 2008 total economic impact of NASA in Florida of \$4.1 billion in output, \$2.1 billion in household income and 40,802 jobs. The injections also generated \$246 million of federal taxes and \$103 million of state and local taxes.*
- *At the state level each direct job at KSC was multiplied into 2.82 total jobs, each dollar of earnings was multiplied into \$1.87 in total income and each dollar of total direct spending for commodity purchases and wage payments was multiplied into \$2.12 of output production.*
- *98% of the output impact, 99% of the income impact and 99% of the jobs impact occurred in the seven county Central Florida Region.*

2. KSC Celebrates NASA's 50 Years in 2008

While employees at Kennedy Space Center celebrated the first 50 years of NASA in 2008, they also were working on missions and projects that will carry the space agency into the next five decades and beyond.

2.1. Space Shuttle Program (SSP) Completing International Space Station (ISS)

Kennedy teams were involved in launching seven different missions into space in 2008, four on space shuttles and three on expendable launch vehicles. Atlantis' STS-122 mission started the year's shuttle flights with a February trip to the International Space Station. Atlantis' seven astronauts attached the European Space Agency's *Columbus* science lab. The following month, Endeavour's STS-123 mission brought to the space station the first section of the Japan Aerospace Exploration Agency's *Kibo* laboratory and the Canadian Space Agency's two-armed robotic system, known as *Dextre*. In May, Discovery's STS-124 mission delivered and installed JAXA's *Kibo* pressurized module and the Japanese Remote Manipulator System to the station. Finally in November, shuttle Endeavour's STS-126 missions brought up supplies and equipment that will allow the space station to expand from its current three-person crew to a six-person crew in May 2009.

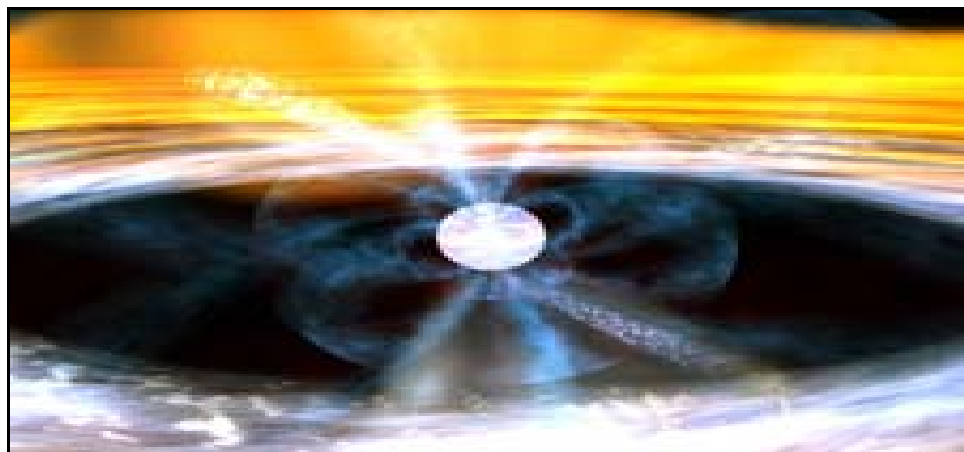
After more than four decades of use, Kennedy's Launch Pad 39A sustained significant damage during the launch of space shuttle Discovery on May 31. It occurred to an area of the pad known as the flame trench. The damage was analyzed and repaired by August. The fix is expected to last through the remainder of the space shuttle program.



Many Views of Endeavor

2.2. Launch Services Program (LSP)

Two of the three NASA science missions sent into space aboard expendable launch vehicles this year took place in June. NASA's Gamma-ray Large Area Space Telescope, or GLAST, launched from Cape Canaveral Air Force Station, FL on June 11. GLAST is exploring the universe's ultimate frontier and studying gamma-ray bursts. On June 20, the Ocean Surface Topography Mission/Jason-2 launched from Vandenberg Air Force Base, CA. The satellite is on a globe-circling voyage to continue charting sea levels, a vital indicator of global climate change. Then on October 19, NASA's Interstellar Boundary Explorer mission, or IBEX, successfully launched from the Kwajalein Atoll in the Pacific Ocean. IBEX will be the first spacecraft to image and map dynamic interactions occurring in the outer solar system.



The Gamma-ray Large Area Space Telescope (GLAST) will answer questions about supermassive black hole systems, pulsars and the origins of cosmic rays

2.3. Constellation Program Growing

The first major flight hardware pieces of the Ares I-X rocket started arriving in Florida in November for the inaugural test flight of the agency's next-generation launch system. The Ares I-X upper stage simulator and the forward skirt are being prepared for the targeted July 2009 test flight. During the next few months, all of the additional hardware needed to complete the test vehicle will be delivered to Kennedy, beginning with a piece that simulates a fifth segment for the four-segment solid rocket booster and concluding with delivery of the complete motor set in January 2009.

The Ares I-X rocket is a combination of existing and simulator hardware that will resemble the Ares I crew launch vehicle in size, shape and weight. It will provide valuable data to guide the final design of the Ares I, which will launch astronauts in the Orion crew exploration vehicle. The test flight also will

bring NASA one step closer to its exploration goals of returning humans to the moon for sustained exploration of the lunar surface and missions to destinations beyond.

In May, Kennedy Space Center awarded a contract for the construction of the Ares I mobile launch platform for the Constellation Program. The new platform will be used in the assembly, testing and servicing of Ares I at existing Kennedy facilities. The space shuttle mobile launch platform that will be used for Discovery's February 2009 mission to the International Space Station will be turned over to the Constellation Program and modified for the Ares I-X test flight.



In the Vehicle Assembly Building high bay 4 at NASA's Kennedy Space Center in Florida, one of the Ares I-X upper stage simulator segments bears the decal with the logo of the Constellation Program.

2.4. KSC Partnerships

In May, NASA entered into two agreements to help the work force and regional economy with the transition from the Space Shuttle Program to the Constellation Program. Kennedy management signed a Space Act Agreement and renewed its partnership with the Economic Development Commission of Florida's Space Coast to strengthen, retain and expand Brevard County as the prime location for the aerospace industry. Then Kennedy management signed the center's first Space Act Agreement with the Brevard Workforce Development Board to help support existing and future missions at the space center.

2.5. Other NASA Funded Activities in Florida

Not all NASA activities in Florida originate from the Kennedy Space Center. Other NASA Centers funded and managed many contracts within the state (and in turn, subcontracts, vendors and suppliers) for a multitude of Florida products and services. For example, a major Florida aerospace contractor continues support for the Space Shuttle Main Engine (SSME), which is work performed under a Marshall Space Flight Center (MSFC) contract. All NASA costs are included in this study.

2.6. Sources of NASA's Economic Impact in Florida

In addition to KSC/NASA's spending on space operations and research, there are a number of other activities directly associated with KSC that add to its total economic impact. These include the local travel expenditures of out-of-state business and government personnel that travel to KSC to conduct business and the Kennedy Space Center Visitor Center's (KSCVC) sales to out-of-state visitors.

The economic impact of all of these activities is presented in this report. The analysis is conducted at three geographic levels – Brevard County, the larger Central Florida Region (includes Brevard, Flagler, Lake, Orange, Osceola, Seminole and Volusia counties) and the State as a whole.

3. NASA Space Program Spending In Florida

3.1. Recent Trends in NASA's Spending in Florida

The money that NASA spends in Florida to support its space missions and other research activities represents an enormous injection into the economies of Brevard County, the larger Central Florida region and the State of Florida. These injections come in the form of wages to local residents and the purchase of goods and services from local businesses and organizations. In FY 2008 KSC and other NASA Centers injected \$1.93 billion into the Florida economy and \$1.80 billion into the Brevard County economy to support space program launch and landing operations at KSC (see Exhibit 1). After experiencing a slight downturn in spending in FY 2007, this year's procurement and wages represented an inflation-adjusted 6% increase for the State and a 5.9% increase for the county over their FY 2007 level.

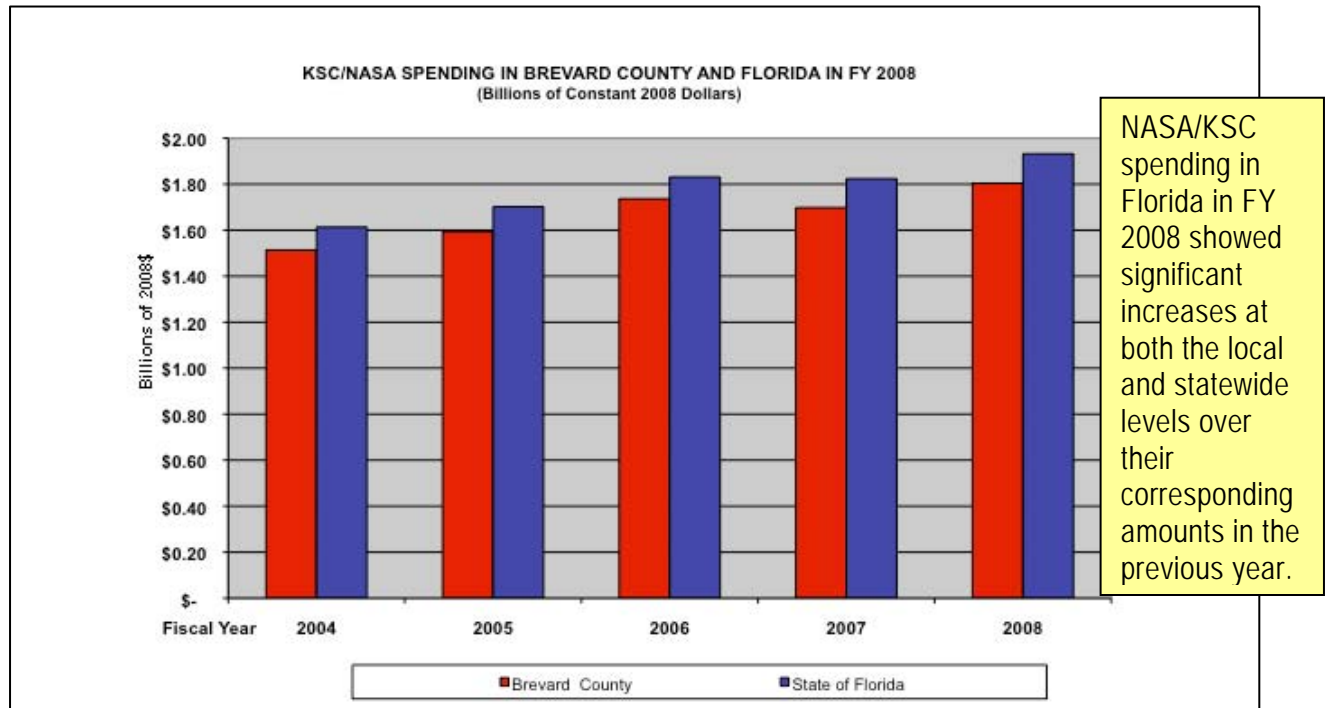


Exhibit 1

3.2. The Location of NASA Spending in Florida

Brevard County (KSC and CCAFS) is the primary launch site for most of NASA's space missions. To support the launch and other related responsibilities, KSC managed 1,038 active contracts in FY 2008 with a total value of \$1.013 billion. Eight other NASA Centers managed a total of 379 active contracts in Florida in FY 2008, by far the most significant being the Space Shuttle Program's Space Program Operations Contract (SPOC), managed by Johnson Space Center in Texas. This activity expended \$980 million through its Florida operation in FY 2008. The portion of the SPOC contract performed in Florida was \$581 million. Including this contract, other NASA Centers injected a total of \$611 million into the state in FY 2008 through contacted activities. While the majority of the KSC/NASA contract dollars was concentrated in awards to major contractors, 52% of the awards were for small contracts (\$50,000 or less).

With the inclusion of wages for on-site civil service and contractor workers, KSC and all NASA Centers spent \$1.93 billion in Florida in FY 2008. 92% percent of this spending was conducted on-site at KSC. Total direct spending in Brevard County was \$1.82 billion. Direct spending in other Central Florida counties and other counties in Florida totaled \$83 million and \$45 million, respectively. Note the totals in Exhibit 2 include spending for space operations and the KSC Visitor Center (discussed in Section 4).

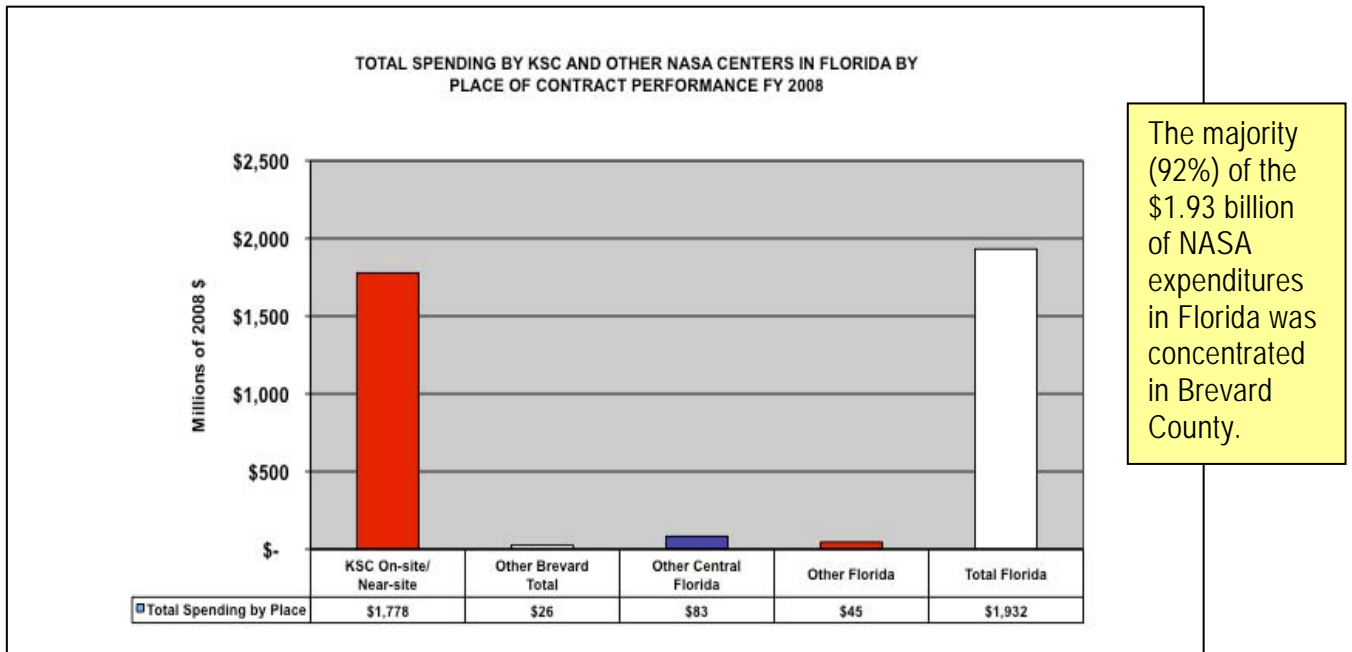


Exhibit 2

3.3. Major Commodity Purchases in Florida

As shown in Exhibit 3, KSC and other NASA Centers' commodity purchases in Florida totaled \$1.64 billion in FY 2008. For the purposes of this exhibit, the on-site labor expenditures of the NASA Space Shuttle Program's Space Flight Operations Contract (SPOC) and the Base Management Contract were allocated to relevant commodity categories, bringing the total to \$1.93 billion. NASA /KSC civil service wages and KSC Visitor Center procurements and wages are not included in these totals. The top four commodity categories constituted 77% of the total commodity purchases that were made by KSC and other NASA Centers in Florida in FY 2008. The top commodity category in FY 2008 was the \$659 million in Scientific Research and Development. A large share of the purchases in this category was spending on personnel that are employed on the Johnson Space Center's SPOC.

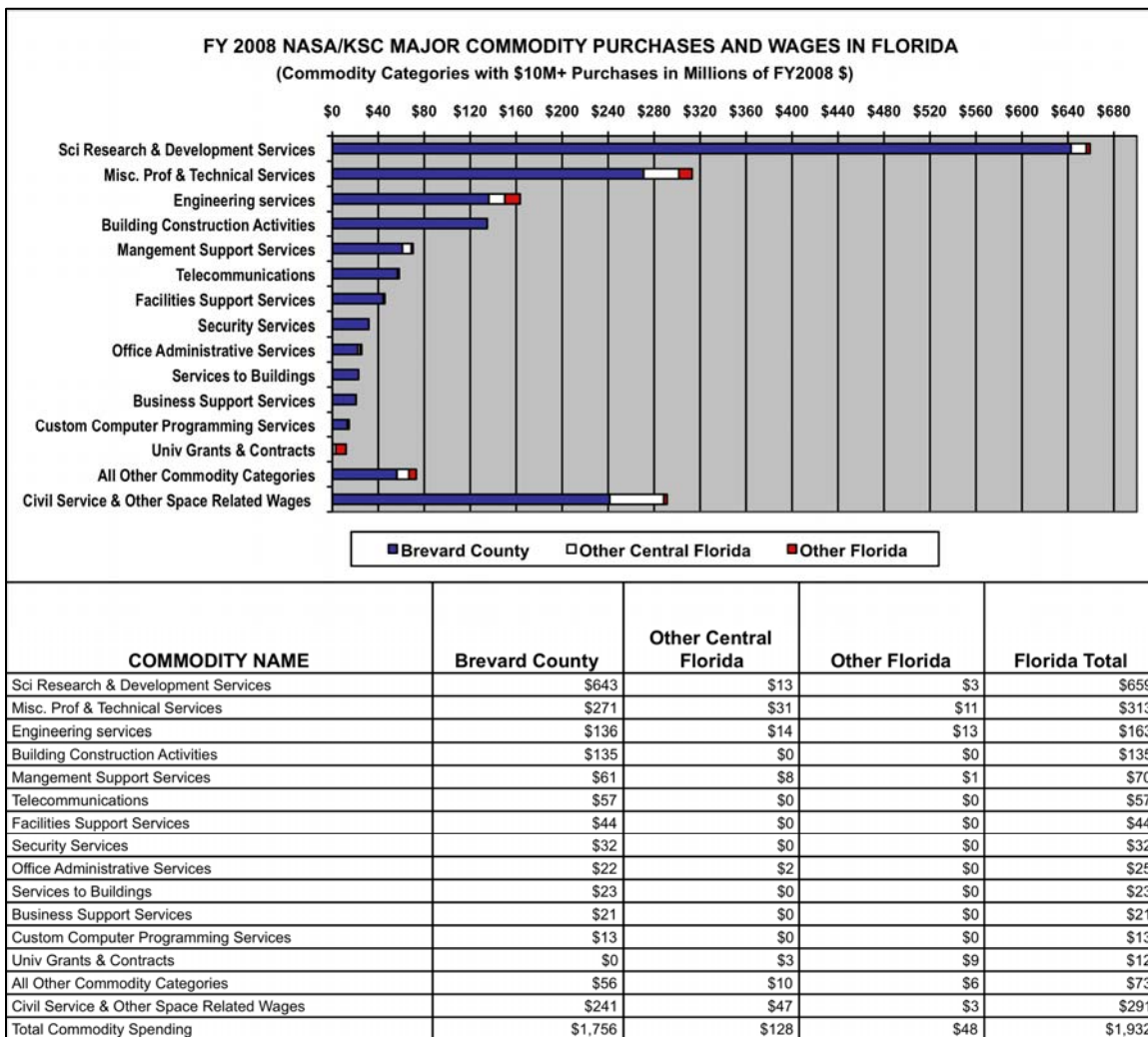
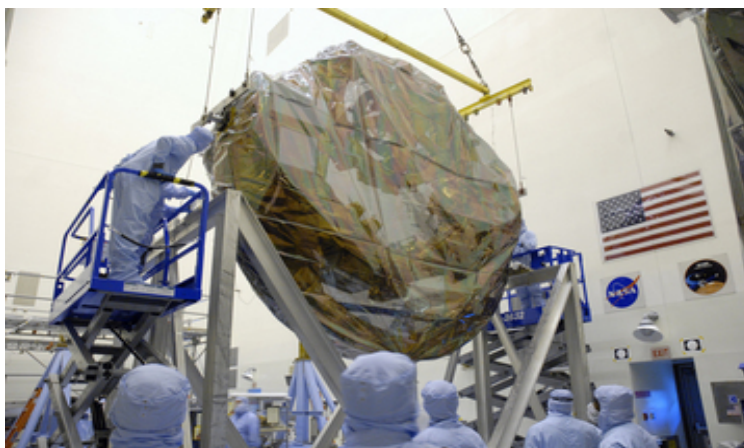


Exhibit 3

3.4. Employment at KSC

The total worker population on/near-site KSC in FY 2008 was 14,865. This includes workers involved in launch and launch control, payload processing, mission integration and technology development, as well as those workers involved in planning, maintenance, operation and management of KSC employees, infrastructure, environment and the KSC Visitors Center. It also includes 306 workers which have been excluded from the following economic analysis on the basis that their activity does not contribute new economic stimulus to the state or local economy, but merely transfers it from one segment to another. Exclusions include lease tenants and culinary staff (191), as well as 15% of the KSC Visitors Center Staff (115), which was adjusted in proportion to the number of in-state vs. out-of-state visitors (see Section 4.2. for further explanation). Thus, the total workforce upon which this study is based is 14,559.

KSC and NASA prime contractors employed the overwhelming majority (77%) of on-site workers. Federal civil service workers employed by KSC and other NASA Centers made up an additional 16% and the remainder was employed by the KSC Visitor Center and other space related tenant contractors. As might be expected, most (93%) of the employees at KSC lived in Brevard County. However, as illustrated in Exhibit 4, over 1,000 workers commuted from nearby Central Florida counties and a small number of workers lived elsewhere in the state.



KSC workforce prepares payloads for launch

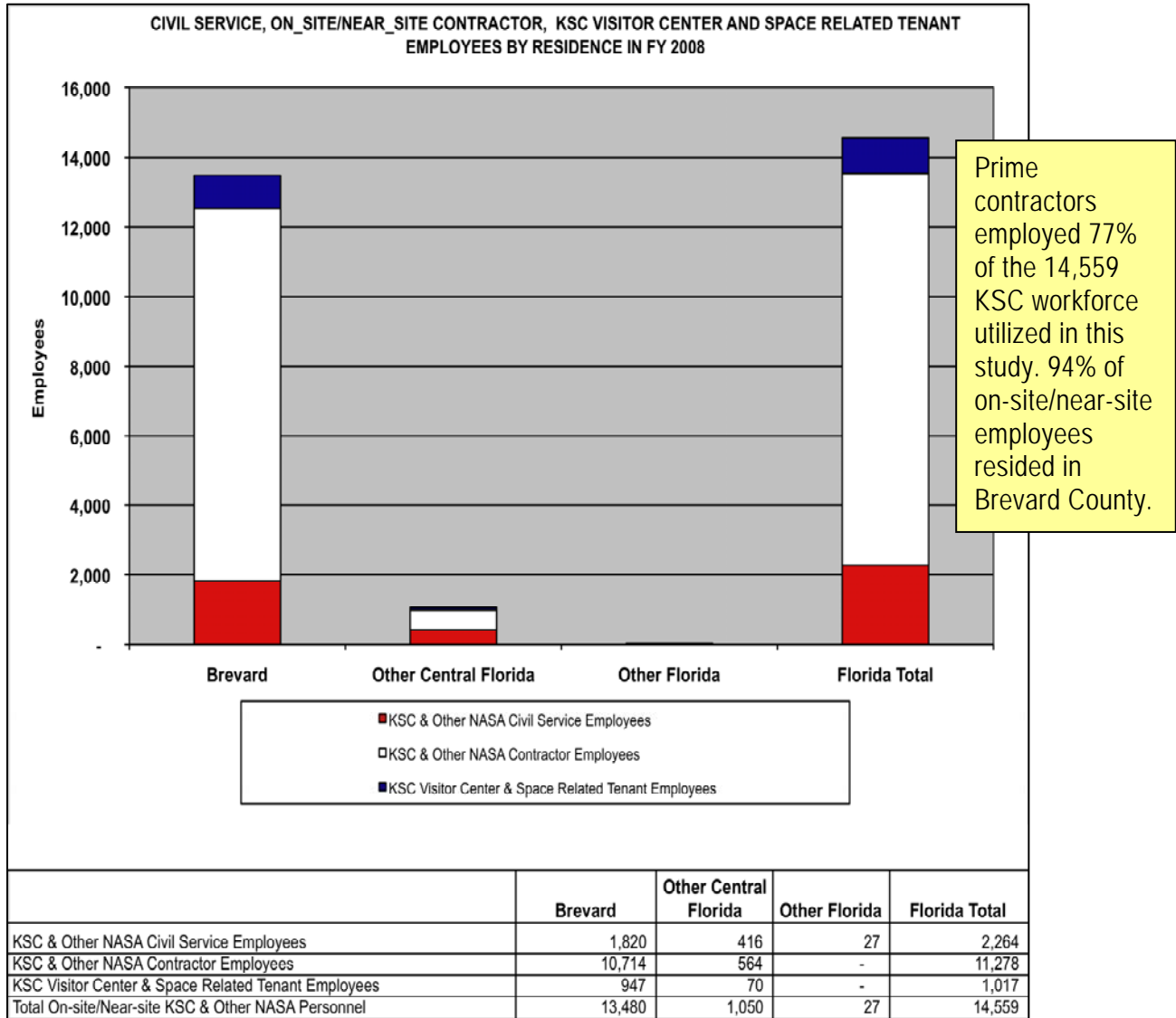


Exhibit 4

3.5. Earnings at KSC

Total earnings for contract and civil service workers at KSC were \$1,124 million dollars in FY 2008 (see Exhibit 5). Over 99% of these wages were paid to residents of Brevard and other Central Florida counties. A large majority of the workers at KSC are highly trained engineers, managers and technicians that command relatively high salaries. Accordingly the average annual salary for the workforce at KSC was \$77,235, which was almost twice the salary that was earned by the average Brevard County worker.

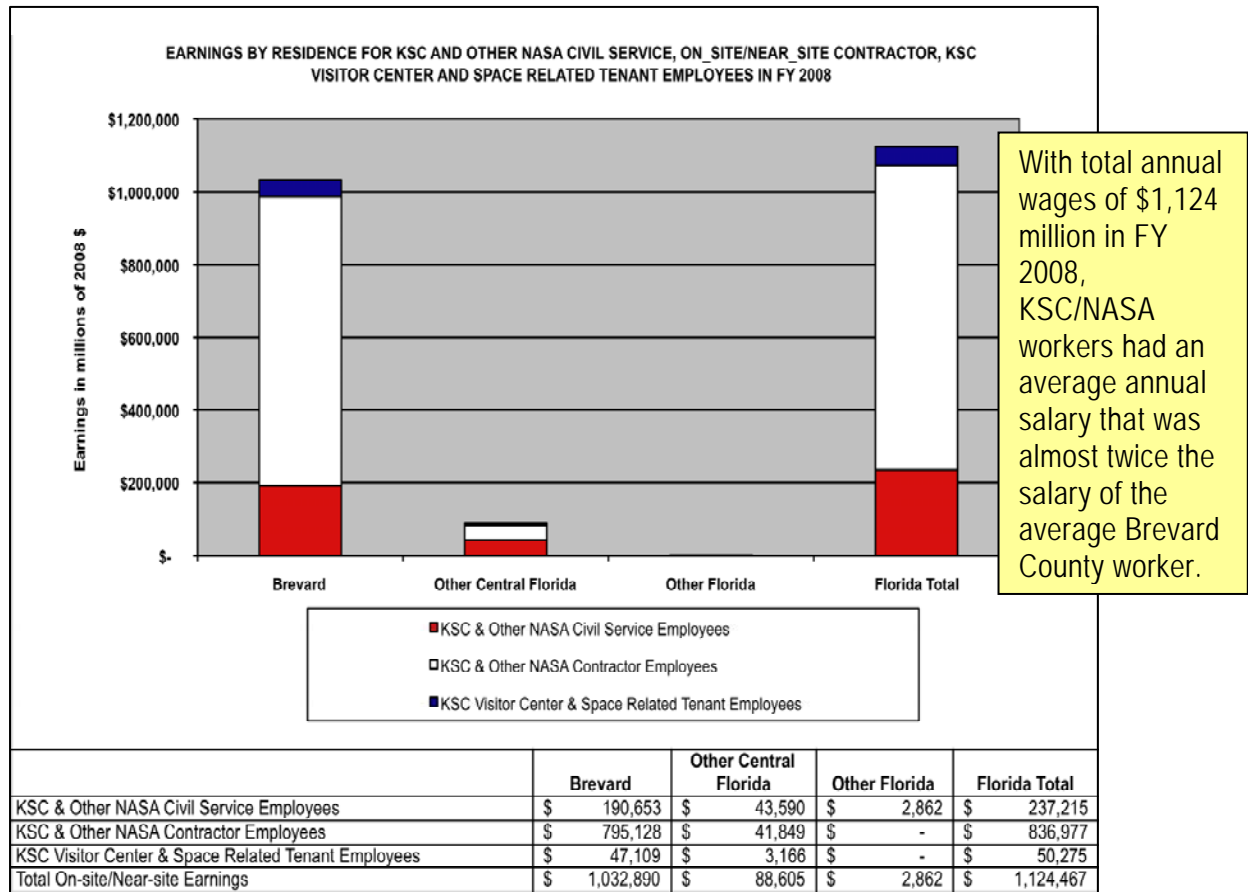


Exhibit 5

4. Spending By Tourists and Business Visitors

4.1. KSC Visitor Center Operations

KSC's economic presence in Florida is not just limited to the contracts and employees that are required to carry out NASA launch and research programs. KSC's Visitor Center welcomed approximately 1.6 million visitors in FY 2008. Out-of-state residents accounted for 85% of these visitors, spending a little over \$78 million on goods and services provided by the Visitor Center. The KSCVC had 768 employees, which it paid \$26 million in wages. All of these employees were residents of Central Florida. In addition to its payroll expenses, the Visitor Center spent \$40 million to purchase the merchandise and services that are required to operate the facility.



KSC Visitor Complex Rocket Garden

4.2. Impact Relevant Visitor Center Spending

In considering the economic impact of Visitor Center expenditures in Florida, it is necessary to focus only on the portion of the purchases and wages that went to Florida firms and residents. While all of the wages paid by the KSCVC went to Brevard and other Central Florida residents, only 49% of the procurement purchases were from Florida firms. In addition to adjusting for out-of-state purchases, it is also necessary to adjust the in-state spending to reflect the portion that is attributable to out-of-state visitors. The logic behind such an adjustment is that the expenditures by in-state visitors do not represent an injection of outside money into the state and local economies. Instead, these expenditures are only a transfer of economic activity between sectors within the state or local economy. Based on the geographic distribution of visitors, it was determined that 85% of the total activity at the Visitor Center could be attributed to out-of-state visitors. Consequently, the amounts of KSCVC spending that were relevant for the state level impact analysis were \$22 million in salaries, \$17 million in other non-labor purchases for a total injection of \$39 million.

4.3. Business Visitor Spending

One other source of NASA's economic stimulus in Florida is the local travel expenditures of out-of-state business visitors that came to KSC in FY 2008. This includes visitors that came from NASA Headquarters, other NASA Centers and out-of-state contractor personnel. The purpose of the visits included pre-launch meetings and reviews, general information exchange and a variety of other business functions. It was estimated that the total local (Brevard and other Central Florida Counties) spending for lodging, food, car rentals and other miscellaneous items by business visitors in FY 2008 was \$5.8 million.

The spending by the Visitor Center attributed to out-of-state visitors and the local travel expenditures of KSC business visitors' resulted in a total injection of \$45 million dollars into the Florida economy in FY 2008. The details of this injection are show in Exhibit 6.

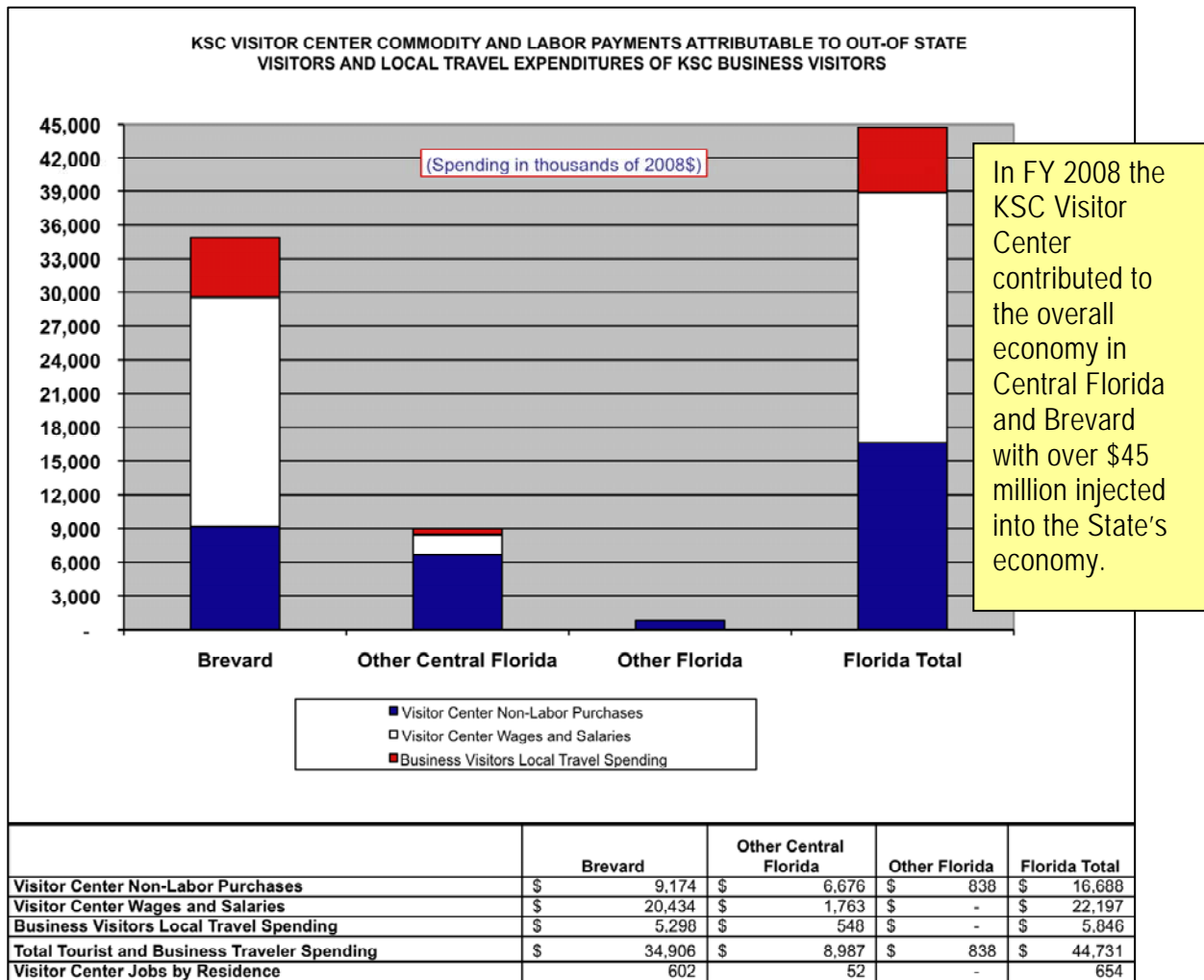


Exhibit 6

5. Monetary Injections into Florida Economies

The purchases and household income payments that are described in the preceding sections of this study are injections of outside money into the economies of Brevard County, the larger seven-county Central Florida region and the State as a whole. These injections enter the economy through direct purchases of goods and services from contractors and the direct payment of earnings to workers. For the purpose of this analysis, all on-site contractors' awards were divided into their wage and non-wage components. The wage portion of these contracts was added to the earnings of KSC and NASA Civil Service workers to arrive at the amount of direct household income received by all on-site workers at KSC. Exhibit 7 shows the total direct commodity purchases and direct household income payments resulting from spending for space program operations, KSC Visitor Center sales to out-of-state tourists and KSC business visitors' local travel spending.

The total injection of outside money into Florida's economy by all KSC based activities was \$1.96 billion in FY 2008. (Note: this total differs from the spending totals in Exhibits 1-3 because it includes the \$5.8 million in business visitor spending.) Direct earnings payments to Florida households totaled \$1.1 billion and the total direct commodity purchases from contractors were \$833 million. 98% of the direct payments went to Central Florida businesses and households.

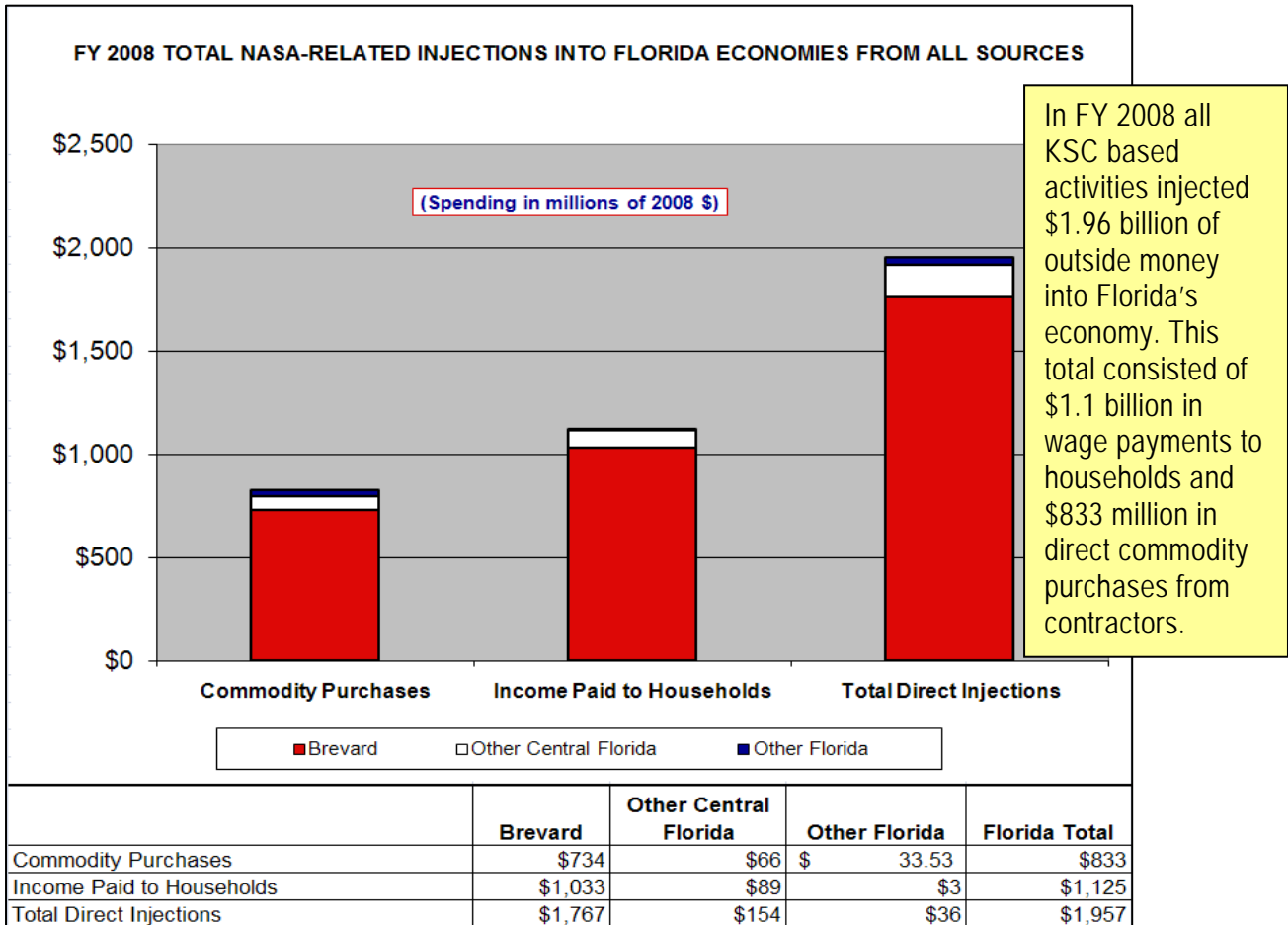


Exhibit 7

6. Total Economic Impact of NASA in Florida

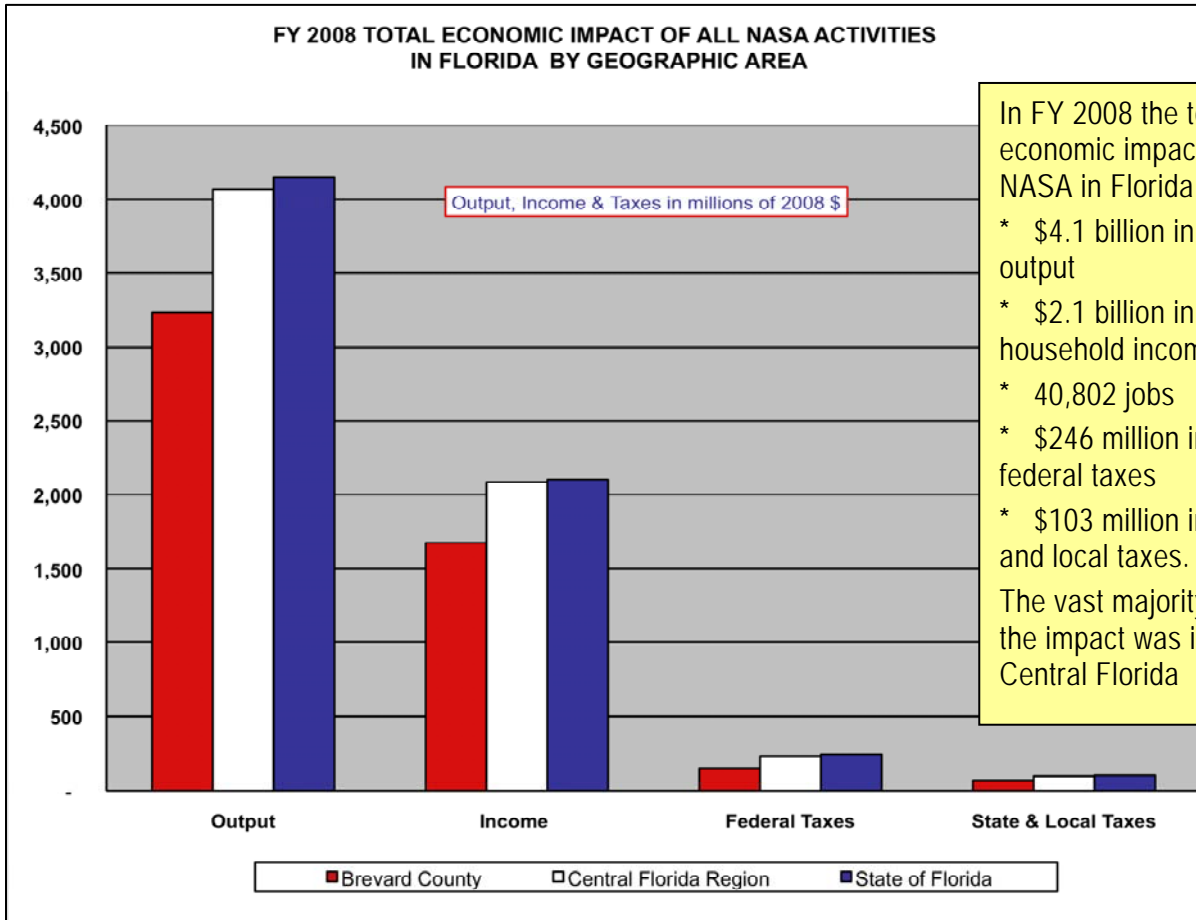
6.1. Indirect Economic Activity Generated by NASA Spending

The economic activity generated by NASA organizations in Florida begins, but does not end, with the direct purchases of these organizations and the wage payments to their workers. This first round of spending generates a secondary set of economic interactions in the local businesses that supply goods and services to NASA contractors and employees. These businesses, in turn, pay wages to their employees and buy goods and services from their own suppliers and the process continues through many subsequent rounds of purchases. All of these rounds of indirect activity are referred to as the generated impact of the initial KSC/NASA injections into the economy.

The tracing and accumulation of all of the many rounds of generated economic activity that are set in motion by NASA's initial stimulus requires a complex set of economic models that map the structure of the economy and the way in which the many sectors of the economy interact to support each other. These models are referred to as regional input-output models. The specific models used in this study utilize a highly detailed breakdown (500 plus economic sectors) of the economy to trace economic transactions. Separate models were built for Brevard County, the larger seven-county Central Florida region and the State of Florida as a whole.

6.2. Total Economic Impact

The total impact of all KSC/NASA activities in Florida (see Exhibit 8) is the sum of the initial injection of earnings and commodity purchases plus the subsequently generated impact of these injections. In FY 2008, this total impact in Florida was \$4.1 billion in output, \$2.1 billion of household income and 40,802 jobs. This activity also generated \$246 million of federal taxes and \$103 million of state and local taxes. The largest share of the impact—98% of the output impact, 99% of the income impact and 99% of the employment impact—occurred in Central Florida.



In FY 2008 the total economic impact of NASA in Florida was:

- * \$4.1 billion in output
- * \$2.1 billion in household income
- * 40,802 jobs
- * \$246 million in federal taxes
- * \$103 million in state and local taxes.

The vast majority of the impact was in Central Florida

Area of Economic Impact	(Millions of 2008\$)			
	Output	Income	Federal Taxes	State & Local Taxes
Brevard County	3,238	1,676	153	71
Central Florida Region	4,069	2,085	234	98
State of Florida	4,150	2,104	246	103

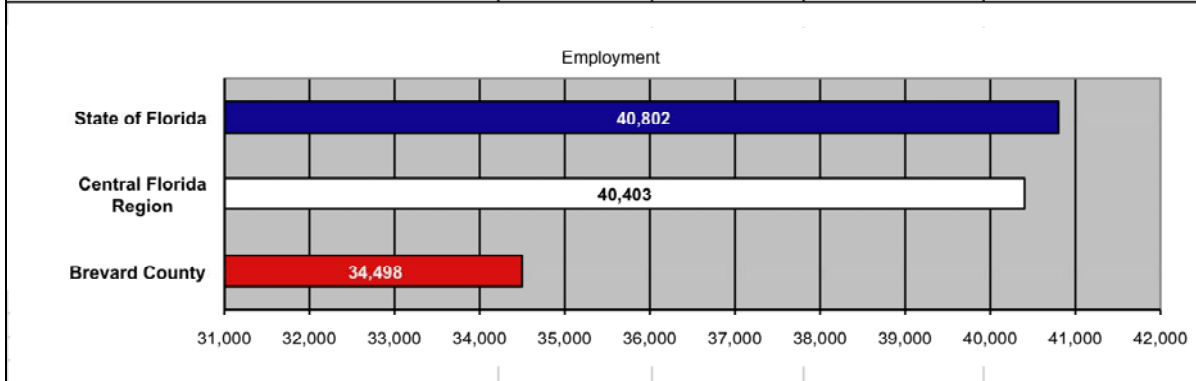


Exhibit 8

6.3. Impact Multipliers

Impact multipliers provide a summary measure of the economic potency of a particular economic activity. Multipliers were calculated in this study for Output, Income and Employment. The Output Multiplier is the total output impact as shown in Exhibit 8 divided by the total direct spending for commodity purchases and wage payments to workers. The Income Multiplier is the total income impact shown in Exhibit 8 divided by the wage payments to all KSC based employees. Finally, the employment multiplier is the total employment impact shown in Exhibit 8 divided by the number of on-site employees at KSC.

The multipliers that were calculated for each of the geographic study areas in this analysis are shown in Exhibit 9. The jobs multiplier for the State as a whole indicates that each direct on-site job (i.e. civil service and contractor employees) at KSC was multiplied into 2.82 total jobs throughout the Florida economy. It should be noted that this represents the direct job itself plus 1.82 jobs that were generated through the indirect economic process. The Florida income multiplier indicates that each dollar of direct wages that was paid at the KSC complex resulted in \$1.87 of total income in the State. The output multiplier shows that each dollar of direct total spending for commodity purchases and wage payments resulted in \$2.12 in total statewide output. Similar interpretations apply to the Central Florida and Brevard County multipliers.

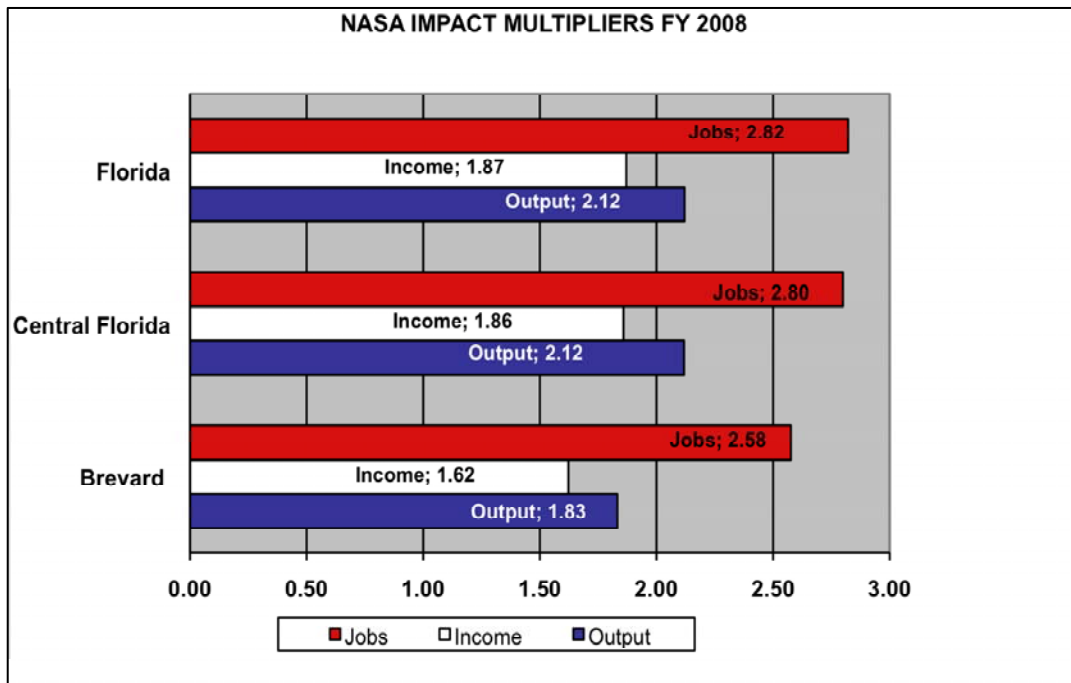


Exhibit 9

7. Summary

After experiencing a slight decline in FY 2007, the monetary injections by KSC and other NASA Centers into Florida's economy in FY 2008 showed substantial growth (6%) over that of the previous year. Based on the results of this economic analysis, it is clear that the John F Kennedy Space Center continues to be the major economic anchor for Brevard County and the surrounding Central Florida Region. Its economic presence and importance have grown tremendously over the years and has provided a great source of high quality economic diversity to Central Florida and the State's service based economies.

Notes

The following are some notes about the study and this report.

Impact Models: The economic impact analysis presented in this report is generated by a set of regional input-output models constructed by the Transportation Economics Research Institute using the Minnesota IMPLAN Groups (MIG) software package. Structural data for the models, which is updated on an annual basis, was also provided by MIG.

Study Areas: Input-output models were constructed for three geographic areas—Brevard County, Central Florida (which includes Brevard, Flagler, Lake, Orange, Osceola, Seminole and Volusia Counties) and the State of Florida.

Data Sources: All data and numbers reported and used in this study are based on reports and data files provided through the Office of KSC's Chief Financial Officer or found on the KSC internet site. Numbers reported in the impact section of the report were generated by the economic impact models constructed for this study.

Methodology and Study Details: The methods of analysis, report assumptions and detailed tables of results are available upon request.

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