Analysis of Florida's Defense Incentives, Including a Review of the Defense and Space Industries

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EXECUTIVE SUMMARY

Background and Purpose

Legislation enacted in 2013 directs the Office of Economic and Demographic Research (EDR) and the Office of Program Policy Analysis and Government Accountability (OPPAGA) to analyze and evaluate state economic development incentive programs on a recurring three-year schedule.[1] EDR is required to evaluate the economic benefits of each program, using project data from the most recent three-year period, and to provide an explanation of the model used in its analysis and the model's key assumptions. Economic Benefit is defined as "the direct, indirect, and induced gains in state revenues as a percentage of the state's investment" – which includes "state grants, tax exemptions, tax refunds, tax credits, and other state incentives."[2] EDR's evaluation also requires identification of jobs created, the increase or decrease in personal income, and the impact on state Gross Domestic Product (GDP) for each program.

Explanation of Return-on-Investment

In this report, the term Return-on-Investment (ROI) is synonymous with economic benefit, and is used in lieu of the statutory term. This measure does not address issues of overall effectiveness or societal benefit; instead, it focuses on tangible financial gains or losses to state revenues, and is ultimately conditioned by the state's tax policy.

The ROI is developed by summing state revenues generated by a program less state expenditures invested in the program, and dividing that calculation by the state's investment. It is most often used when a project is to be evaluated strictly on a monetary basis, and externalities and social costs and benefits—to the extent they exist—are excluded from the evaluation. The basic formula is:

$$\frac{\text{(Increase in State Revenue – State Investment)}}{\text{State Investment}}$$

Since EDR's Statewide Model[3] is used to develop these computations and to model the induced and indirect effects, EDR is able to simultaneously generate State Revenue and State Investment from the model so all feedback effects mirror reality. The result (a net number) is used in the final ROI calculation.

The review period covers Fiscal Years 2014-15, 2015-16, and 2016-17. In this report, the following programs are under review:

- The Military Base Protection Grant Program - MBP;
- Defense Infrastructure Grant Program – DIG;
- Defense Reinvestment Grant Program – DRG;
- Florida Defense Task Force Grants – Task Force Grants;
- Qualified Defense Contractor and Space Flight Business Tax Refund Program – QDSC; and
- Sales Tax Exemption for Manufacturing and Equipment Used in the Semiconductor, Defense, or Space Technology Production – SDST.

[1] Section 288.0001, F.S., as created by s. 1, ch.2013-39, Laws of Florida & s. 1, ch.2013-42, Laws of Florida.
[2] Section 288.005(1), F.S.
[3] See section on Statewide Model for more details.

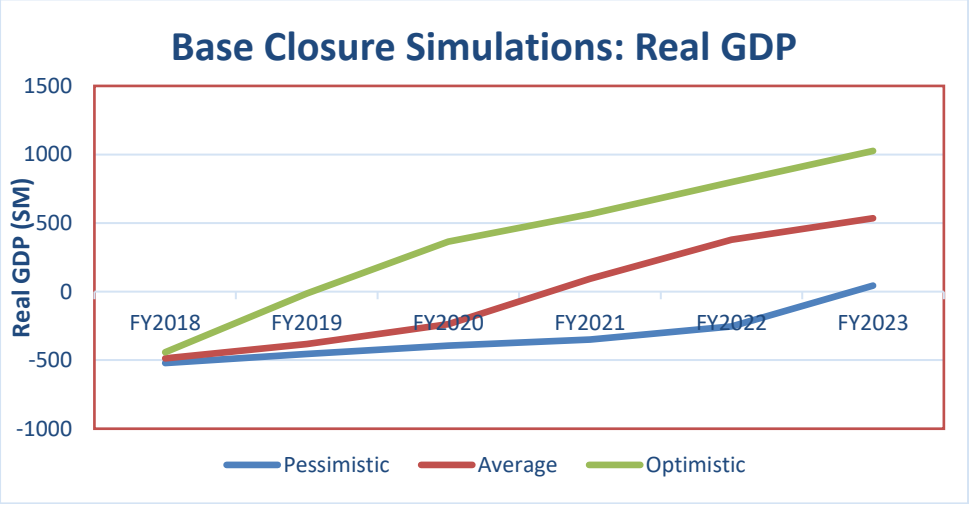
Overall Results and Conclusions

Florida is home to 20 military installations and some of the largest defense contractors in the country. In Federal Fiscal Year 2015, total federal spending on defense contracts and payroll amounted to over $17.6 billion.[4] Nationally, Florida is ranked 5th in the country in total defense spending.[5]

In the first section of the report, the analysis reviews 4 programs that consist of activities and strategies intended to preserve or expand the U.S. military base presence throughout the state, or to mitigate the impact to the local economy should bases be realigned or closed. The programs reviewed were the Military Base Protection Grant Program, the Defense Reinvestment Grant Program, the Defense Infrastructure Grant Program and the Florida Defense Task Force Grants.

The Return-on-Investment for these programs and strategies is unknown because of the difficulty in measuring the effectiveness of these programs. The programs' main goal is to prevent any significant realignment or base closure from occurring in Florida. However, there has not been a Military Base Realignment and Closure (BRAC) process since 2005. Therefore, it is impossible to evaluate how well these programs have done to prevent a BRAC base closure in Florida. In addition, no evidence was found in the academic literature to suggest that state-funded advocacy programs are effective in preventing BRAC base closures, or that the negative repercussions of a base closure are persistent over the long term.

The analysis did use the Statewide Model to estimate the economic impact of a military base closure on the Florida economy in the 6 years following the closure. The analysis ran 3 different scenarios through the Statewide Model, because the economic impact of a base closure can vary significantly. The variance is due to several factors. These include the amount of civilian job loss from the military base, the strength and diversity of the local economy, whether the base closure occurs in a rural or urban area, and the pace of the base redevelopment.[6] The graph below shows the impact to state GDP from a military base closure for all 3 scenarios.



[4] U.S. Department of Defense Office of Economic Adjustment, "Defense Spending by State, Fiscal Year 2015", 18.

[5] Ibid.

[6] A more detailed review of each factor can be found in the "The Economic Impact of Military Bases in Florida" section of the report.

As illustrated by the graph, the closure of a military base can lead to significantly different economic outcomes. The pessimistic scenario represents the "worst case" scenario, where the economic conditions are unfavorable for a recovery. In the pessimistic scenario, Florida's GDP doesn't recover until Year 6. The optimistic scenario is the "best case" scenario. All the economic factors are advantageous for a quick recovery from a base closure. By Year 3, the Florida GDP has recovered and grows stronger due to new business growth at the closed base. The average scenario represents the likeliest scenario after the closure of a military base. The average scenario estimates negative GDP growth until Year 4.

The second section of the report reviews the Qualified Defense Contractor and Space Flight Business Tax Refund Program (QDSC) and the Sales Tax Exemption for Manufacturing and Equipment Used in the Semiconductor, Defense, or Space Technology Production (SDST).[7] Both of these programs provide incentives to contractors to perform defense work in Florida. The ROI of these programs is indeterminate because it cannot be reasonably assumed that the incentives were the primary factor in the defense contractor's ability to be awarded the defense contract or the subsequent decision to complete the contract work in Florida.

Instead, the analysis looked at the economic impact of federal defense contracts to the Florida economy. The analysis shocked the Statewide Model by removing defense contracts from the state economy. The results (see the table below) show that the defense contracts contributed, on average, over $9.8 billion annually to Florida' Real Gross Domestic Product, nearly $8.0 billion annually in real Disposable Personal Income, and $171.3 million annually in state revenue. All of these numbers are higher than the results from December 2015. On average, Department of Defense contracts help employ over 20 thousand workers every year.

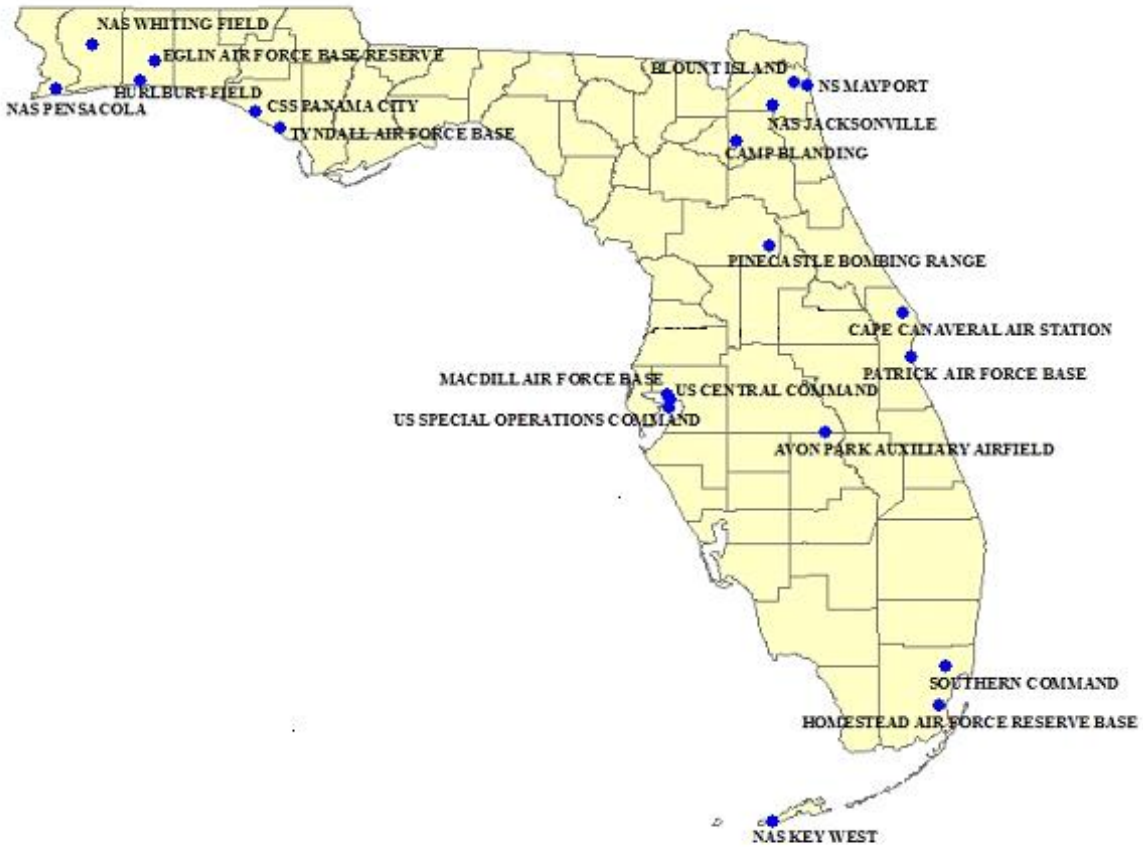
Statewide Economic Model Impact of the DEFENSE CONTRACTS (FY2014-2016)						
	Units	**2014-2015**	**2015-2016**	**2016-2017**	**Total**	**Average per Year**
Real Disposable Personal Income	Fixed 2010-11 $ (M)	7,310.7	8,038.1	8,585.1	23,933.8	7,977.9
Real Gross Domestic Product	Fixed 2010-11 $ (M)	9,919.3	9,756.2	9,752.4	29,427.9	9,809.3
	Units	**Average Per Year**				
Total Employment	Jobs	20,341				
Total State Revenues	Nominal $ (M)	171				

Finally, the analysis provides a review of the current state of the space industry in Florida. Because the space industry is inextricably intertwined with aerospace and other industries, it is challenging to carve out a separate identity unique to space. A more defined vision may be needed, that includes an emphasis on shared public-private research and development, as well as specialized training opportunities.

[7] While the QDSC program expired on 7/1/2014, the program continued to distribute incentive payments to projects that were pre-qualified before the expiration of the program.

THE ECONOMIC IMPACT OF MILITARY BASES IN FLORIDA

The U.S. Military has a significant presence in Florida. As of 2017, the U.S. Military operated 20 major installations within the state.[8] The installations cover over 521 thousand acres of land (approximately 1.2 percent of the state) and contain over 6 thousand buildings.[9] To successfully operate the bases, the military deploys over 56 thousand active duty personnel, over 36 thousand National Guard and reserve personnel and employs over 38 thousand civilians.[10] The military bases are scattered throughout the state, but personnel is heavily concentrated in four counties: Duval, Escambia, Okaloosa and Hillsborough.[11]



[8] Enterprise Florida, "Florida's Military Profile", (March 2018).
[9] Enterprise Florida, "Florida Defense Factbook 2017", (December 2017):1.
[10] Ibid.
[11] U.S. Department of Defense Office of Economic Adjustment, "Defense Spending by State, Fiscal Year 2015", 18.

Top Military Personnel Locations in Florida, 2015	
County	**Total Personnel**
Duval	20,180
Escambia	19,900
Okaloosa	14,048
Hillsborough	12,509
Santa Rosa	7,466
Bay	6,448
Orange	5,962
Brevard	5,103
Miami-Dade	4,366
Broward	3,007

Florida military bases play an important role in the state's economy. Military bases employ local civilians; military personnel purchase homes, local goods and services; and the military bases purchase supplies from Florida businesses. The majority of a base's economic impact will occur in the local communities surrounding each Florida military base. In Federal Fiscal Year 2015, Florida was ranked 5th in the nation in total defense spending. Virginia, California, Texas, and Maryland were the only states that ranked higher.[12] However, when measured as a percent of state GDP, Florida ranks closer to the U.S average. The spending includes approximately $6.6 billion on payroll and billions more in private contracts for construction projects, services, supplies, and equipment at the military bases.[13] With respect to total payroll, Florida ranks 6th in the nation, coming in behind California, Maryland, Texas, Virginia and North Carolina.[14]

Base Realignment and Closure (BRAC)

The Base Realignment and Closure process is the current federal procedure for closing and disposing of federal military base installations in the United States. The BRAC process requires the Secretary of Defense to prepare and submit a list of military bases for closure or realignment to a BRAC commission. The BRAC commission is an independent committee composed of former lawmakers and retired military officials. The BRAC commission reviews the Defense Secretary's recommendations and submits a report that accepts, reject or modifies the base closure recommendations. Both the President and Congress have two choices – either completely accept or reject the base closure recommendations. Since 1988, the U.S. government has enacted five rounds of U.S military closures under the BRAC process.

In total, 11 Florida military facilities have been closed as a result of the 5 BRACs that occurred in 1988, 1991, 1993, 1995 and 2005.[15] These facilities have included data processing centers, a naval hospital, research laboratories, and naval air stations. The two most notable and largest closures have been the Orlando Naval Training Center and the Naval Air Station at Cecil Field. This count does not include any major realignment of forces, partial base closures or divisional restructuring that may have impacted Florida.[16] In comparison to other states, Florida has been successful in avoiding large scale base closures.

[12] U.S. Department of Defense Office of Economic Adjustment, "Defense Spending by State, Fiscal Year 2015": 63.

[13] Ibid.

[14] Ibid.

[15] The Defense Base Closure and Realignment Comission,"2005 Defense Base Closure and Realignment Commission Report", (September 2005): Appendix J.

[16] Partial base closures and realigned bases can significantly change both the total military deployment levels and the civilian employment levels at the affected base. Eglin Air Force Base was a beneficiary of a significant realignment in the 2005 BRAC

For example, California has experienced 48 facility closures with 25 of the closures being large military bases.[17]

The Economic Impact of Military Base Closures

The closure of a military base negatively impacts the local economy. However, the severity and length of the economic impact is indeterminate in advance of the event. Most academic research has found military base closures lead to an increase in local unemployment, slower or negative population growth and a negative impact on the local housing market. However, the economic impact is usually mild, very localized, and can be offset by macroeconomic factors like positive GDP growth, population growth, or a booming housing market.

In a RAND Corporation study of 3 California military base closures, researchers found the local economy around the military base were only moderately impacted by the base closure.[18] The study compared the economic health of the local area around the base with county-wide economic data. The study found slower growth; but, in general, the area around the military base performed comparably similar to the rest of the county. This led the researchers to conclude that the effects of base closure are heavily localized and do not broadly impact the regional economy. Additionally, the researchers concluded that the underlying long-term economic factors of the region play a larger role in the economic health of the local area than the local military base.

A 2005 Government Accountability Office (GAO) report on BRAC came to a similar conclusion. The report found that almost 80% of all private employment lost during the base closure had been replaced by new private sector jobs at the redeveloped base.[19] The GAO report examined both the unemployment rate and income growth rate of the counties affected by military base closures and found that these counties had, on average, both lower unemployment rates and higher income growth rates than the U.S. average since 1997.[20]

Econometric research supports both the GAO report and the RAND study. Several studies have examined the local macroeconomic effect of military base closures and have found only minimal impacts to the local economy.[21] A 1999 research paper looked at U.S. military base closures over 24 year period and found that the closure of military bases did not lead to any long-term unemployment in the local area.[22] In addition, the 1999 research paper found, on average, local per-capita income was not adversely impacted by the military base closures.[23] A 1998 U.S. Census research paper of California

process when the Army's 7th Special Forces Group moved from Fort Bragg, North Carolina to Eglin Air Force Base in Okaloosa County.

[17] The Defense Base Closure and Realignment Comission,"2005 Defense Base Closure and Realignment Commission Report", (September 2005): Appendix J.

[18] M. Dardia, K. McCarthy, J. Malkin, and G. Vernez, "The Effects of Military Base Closures on Local Communities" *National Defense Research Institute,* 1996.

[19] United State Government Accountibility Office, "Military Base Closures: Observations on Prior and Current BRAC Rounds", (May 2005): 31.

[20] Ibid. 34.

[21] A. Hultquist and T. Petras, "An Examination of Local Economic Impacts of Military Base Closures", *Economic Development Quarterly*. Vol 26(2), pg.151-161.

[22] M. Hooker and M. Knetter, "Measuring the Economic Effects of Military Base Closures", *National Bureau of Economic Research,* Working Paper 6941. 1999.

[23] Ibid.

military base closures found local employment prospects actually improved after a military base closure, with the only negative impact being an increase in business turnover.[24]

A 2003 paper examining military base realignments and closures found civilian employment increased in local areas immediately after the BRAC closure.[25] The researcher attributed it to federal assistance to the local community after the closure and the successful redevelopment of the military base. Ironically, the same study found employment loss in communities that experienced only a force reduction, not a full-base closure. The researcher speculated that these communities were harmed because they did not qualify for the same federal assistance, nor experience the base redevelopment that benefits the BRAC communities.[26]

Similar findings exist internationally as well. One study of 105 German military base closures over a period of 4 years found a very minimal impact on the local economy.[27] A study of military base closures in Sweden found no impact on local income or population growth.[28] The study concluded that civilian personnel at the military bases successfully transitioned to private market employment without having to migrate outside the local area.

In contrast, two empirical studies that are more recent have found short-run economic impacts from the closure of U.S. military bases. In a 2018 study of the 2005 BRAC, researchers found negative employment and income effects in the counties that experienced a military base closure.[29] The study found military bases with a significant amount of civilian employees and private contractors had more severe economic impacts. In a 2012 study, the researcher found that every civilian job lost due to a base closure led to 0.14 civilian jobs being lost in the local area. It should be noted that both studies found no effects outside the immediate county and that neighboring counties were not impacted at all by the base closure.[30]

There are several reasons why empirical research has found ambiguous short-term impacts and no long-term impacts from military base closures. The first reason is the economic impact of military base spending is less than a comparable amount of spending from a private firm. This is due to military bases having fewer backward linkages to the local economy than the average private company.

Similarly, military bases can be relatively isolated economies that import a high percentage of both personnel and supplies from outside the local community. [31] A 1993 study of military bases in California found that only 2.6% of the total non-payroll base budget was used to purchase supplies in the local

[24] C.J. Krizan, "Localized Effects of California's Military Base Realignments: Evidence from Multi-Sector Longitudinal Microdata", *Center for Economic Studies: U.S Bureau of the Census.*1999.

[25] H. Herzog and P. Poppert, "Force Reduction, Base Closure, and the Indirect Effects of Military Installations on Local Employment Growth", *Journal of Regional Science.* Vol 43, 2003: 459-481.

[26] Ibid.

[27] A. Payolo, C. Vance, and M. Vorell, "The Regional Effects of Military Base Realignments and Closures in Germany", *Defence and Peace Economics.* Vol 21. 2010: 567-579.

[28] L.. Andersson, J. Lundberg, and M. Sjostrom,"Regional Effects of Military Base Closures: The Case of Sweden", *Defence and Peace Economics.* Vol 18. 2007:87-97.

[29] Jim Lee, "The Regional Economic Effects of Military Base Realignments and Closures", *Defence and Peace Economics,* Vol 29. 2018: 294-311.

[30] A. Hultquist and T. Petras, "An Examination of Local Economic Impacts of Military Base Closures", *Economic Development Quarterly*. Vol 26(2). 2012: 151-161.

[31] T. Cowen and B. Webel, "Military Base Closure: Socioeconomic Impacts", CRS Report for Congress. May 2005.

county.[32] Another study found that many military bases are not only weakly integrated into the local economy, but a significant majority of the income is spent at or through the base and not in the local area.[33] In the German study, the researcher concluded that the self-sufficient and autonomous nature of the German military bases was a reason why no negative economic impact was found after a closure of a base.[34]

Another reason why negative economic impacts have been difficult to detect is that a significant amount of purchases shift away from the military base to local private markets after a base closure.[35] This helps mitigate the negative impact because private market spending benefits the local communities more than if the spending stayed on the military base. In the 1999 paper[36], the researcher argues a base closure leads local military retirees to shift purchases of goods and healthcare services to the private market because the retirees no longer have access to the base's commissary and on-base healthcare services. This shift in spending helps stabilize the local economy.

Further, any redevelopment of the closed base helps mitigate the base closure's economic impact. Infrastructure and construction employment created by the redevelopment counter the civilian employment lost when the base closed. Once completed, the redeveloped base contributes to the state economy through new economic output and employment. On average, a redeveloped base and a former military base have similar levels of civilian employment.[37]

In conclusion, a representative military base closure generally does not lead to catastrophic consequences for the local economy. Most of the academic research has found only moderate, negative short-run economic impacts. There is no evidence that these impacts last in the long-run. However, the economic impact of every base closure is different. Based on the literature review, the factors listed below determine the magnitude of the economic impact.

1. **The Percentage of the Local Community Employed at the Military Base**: Military bases that employ a relatively high percentage of the local community lead to a greater economic impact when closed. The local community experiences higher unemployment rate and a larger drop in local income. This reverberates through the local economy as consumer spending falls and businesses cut back operations due to lower demand.

2. **The Diversity of the Local Economy**: Local communities that have a diverse economy will be more immune to a base closure. A diverse economy minimizes the economic impact because the unrelated military industries provide income and employment to sustain the local community as the base is redeveloped. In addition, the other industries are both logical tenants for the vacant base and potential employers for the recently unemployed civilians.

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[32] R. Kleinhenz and A. Puri, "Negative Peace Dividend? The Economic Impact of the El Toro Base Closure and Defense Spending Cuts in Orange County", *Institute for Economic and Environmental* Studies (September 2003).

[33] T. Muller, R. Hansen, and R. A. Hutchinson, "The Local Economic and Fiscal Impact of New DOD Facilities: A Retrospective Analysis", *Logistics Management Institute. (1991).*

[34] A. Payolo, C. Vance, and M. Vorell, "The Regional Effects of Military Base Realignments and Closures in Germany", *Defence and Peace Economics.* Vol 21. 2010: 567-579.

[35] T. Bradshaw, "Communities Not Fazed: Why Military Base Closures May Not Be Catastrophic", *American Planning Association Journal. Vol 65(2). 1999:* 193-206.

[36] Ibid.

[37] United State Government Accountibility Office, "Military Base Closures: Observations on Prior and Current BRAC Rounds", (May 2005): 31.

3. **Rural vs Urban Military Base Location**: Rural communities usually experience greater economic distress than urban communities when a military base closes. Military bases in rural areas will likely be the area's main employer. In contrast, military base closures in metropolitan areas may be beneficial to the local economy as it opens up the land to more economically productive enterprises. This is especially true in urban areas where undeveloped land is limited and land prices are high.[38]

4. **The Redevelopment of the Military Base**: The redevelopment of a military base minimizes the negative economic impact of a base closure. A successful redevelopment will replace the lost civilian jobs, diversify the local economy, and increase the local tax base. In addition, the construction spending and jobs associated with the redevelopment activity can act as a short-term stimulus to the local economy.

Unfortunately, a successful redevelopment process is not easy. Most redevelopment projects will encounter financial, environmental, and political challenges that delay the redevelopment. Successful redevelopments start immediately after the transfer of the land from the federal government and are completed within a couple of years. An unsuccessful redevelopment experiences an extended lag that lasts 5 to 10 years before the redevelopment project is agreed upon and construction starts.

The case studies below provide two examples of military base closures in Florida: the Naval Training Center (NTC) in Orlando and the Truman Annex Naval Station (TANS) in Key West. The NTC Orlando redevelopment has been considered a success by both the local community and urban planners. The TANS Key West redevelopment has been used as a case study of an unsuccessful military base redevelopment.

The Base Closure and Redevelopment of the Naval Training Center (NTC) in Orlando

As part of the 1993 BRAC, NTC Orlando was slated for closure due to the Navy's excess capacity for training functions. It was estimated that the Navy had two to three times the needed training capacity. The Secretary of Defense stated that there were greater economic efficiencies to be gained by consolidating training functions at the NTC in Great Lakes, Illinois. The Secretary of Defense estimated that annual savings of $75 million would result from the NTC Orlando closure.[39] The BRAC Commission agreed with the Secretary of Defense and recommended the closure of the Naval Training Center.

The Naval Training Center was a 1,000 plus acreage site located a few miles from downtown Orlando. The NTC was originally established in 1968 and was one of the three training facilities in the U.S. for Navy recruits. Around 650,000 recruits were trained at the facility during its tenure.[40] The NTC was formally closed by the 1993 BRAC process, but the actual shutdown was more gradual. The last recruits graduated in 1994, but the Navy retained a limited presence at the facility until 1999 when all military operations ceased on the property.

The city of Orlando received ownership of the land immediately after the operations ceased (1999). However, the redevelopment planning for the property conversion had been going on for years prior.

[38] M. Hooker and M. Knetter, "Measuring the Economic Effects of Military Base Closures", *National Bureau of Economic Research,* Working Paper 6941. 1999.

[39] The Defense Base Closure and Realignment Comission,"1993 Report to the President", (July 1993): 1-37.

[40] City of Orlando, "Baldwin Park/NTC Main Base: A Brief History", (July 2014): 1.

The city eventually decided on a mixed-use plan of single-family units, multi-family units (townhomes, condominiums, and apartment homes), a commercial downtown of retail and office complexes, and city parks. The development was referred to as Baldwin Park.[41] The redevelopment of any military base does not occur immediately. It can take years to mitigate the environmental hazards and to safely demolish the military buildings. Baldwin Park did not see any residents until 2002, and Baldwin Park's downtown did not open until December 2003. Ultimately, Baldwin Park's residential build-out took 6 years to complete and the commercial component took 10 years to finish.[42]

Orlando NTC was transformed into a private development that contained over 3,500 residential units, over 2 million square feet of retail and commercial space and 564 thousand feet of civic space.[43] The Orange County Property Appraiser estimates the total market value of Baldwin Park at $1.46 billion, over 3% of Orange County's total market value.[44]

The Orlando NTC redevelopment represents a successful BRAC transition. The redevelopment was successful for several reasons. First, the base was located in an urban zone with a diverse economy which could readily absorb and repurpose the Orlando NTC land. Second, the City of Orlando achieved a consensus on the development plan and moved quickly after the land was transferred over to the city.

The Base Closure and Redevelopment of the Truman Annex Naval Station (TANS) in Key West

TANS Key West was established in 1823 and remained an active military base until the Navy closed it in 1974.[45] When the military base closed, the Navy transferred the remaining 3,356 military personnel to other locations and laid off over 560 civilian workers.[46] The military base was located in downtown Key West making it a desirable property for both commercial and residential development.

Unfortunately, the redevelopment took over 20 years to complete. The redevelopment was plagued by persistent political and financial problems. First, the redevelopment agency was never able to establish a healthy relationship with the Navy. This delayed the land transfer by over 3 years and resulted in the Navy reclaiming about half the land 8 years after the initial closing due to allegations of corruption within the redevelopment agency (RDA).[47] In addition, the redevelopment agency was unable to build a consensus regarding its reuse plan. The redevelopment agency wanted luxury hotels and housing, while the community wanted public spaces and affordable housing. The resulting impasse led to the folding of the RDA and seizure of the entire property by the federal government.

In 1987, the federal government auctioned off the land to the private sector. However, redevelopment was further delayed due to environmental issues, a weak real estate market, and financial difficulties. These issues eventually led to the developer declaring bankruptcy in 1990.[48] The redevelopment started up again in 1992 when a new private development team took over. The redevelopment was finally completed in 1996. The redevelopment consisted of over 400 housing units, a hotel and commercial

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[41] Ibid.

[42] Fort Ord Reuse Authority, "Baldwin Park- Orlando Naval Training Center: Building a Sustainable Community", PowerPoint Presentation. *Retrieved from: http://www.fora.org/Presentations/RBernhardt-presentation.pdf*

[43] Ibid.

[44] U.S. Department of Defense Office of Economic Adjustment, "Naval Training Center/Naval Hospital Orlando, Florida", (October 2017). *Retrieved from http://www.oea.gov/project/naval-training-centernaval-hospital-orlando*

[45] Catherine Hill, "Measuring Success in the Redevelopment of Former Military Bases: Evidence From Case Study of the Truman Annex in Key West, Florida", *Economic and Development Quarterly.* Vol.14 (3): 267-275.

[46] Ibid: 267.

[47] Ibid.269.

[48] Ibid. 270.

space. While ultimately completed, the TANS Key West redevelopment took over 22 years to complete. This prolonged delay meant that the base sat empty and economically unproductive for those 22 years.

Tyndall Air Force Base Closure

The destruction of the Tyndall Air Force Base due to Hurricane Michael has led to a temporary closure of the base. The base closure has caused reassignments of both aircraft and military personnel away from the base. Additionally, there is uncertainty whether the Air Force will ever resume full operations at the military base. There has been a commitment by the federal government to rebuild.[49] However, two recent studies have suggested that it may be in the interest of the Department of Defense to either close Tyndall or only perform a partial rebuild of the base. The first study was a 2017 Department of Defense report that found that the Air Force had an excess infrastructure capacity of 32%.[50] The second study was a GAO report that recommended a reorganization of the F-22 fleet into larger squadrons.[51] This recommendation could be achieved by the reassignment of the F-22 squadron away from the Tyndall Air Force Base.

As of late December 2018, the United States Air Force has requested supplemental funds to rebuild Tyndall Air Force Base.[52] The proposed base rebuild would shift the base's mission away from housing F-22 squadrons in order to accommodate up to three future F-35 squadrons. The Air Force's plan estimates the rebuilding process to take more than 5 years and cost about $3 billion dollars.[53] There has been no discussion on whether total base and civilian personnel levels will be adjusted due to the changing base mission. In addition, the U.S. Congress will need to approve and appropriate the money for the proposed plan.

It is hard to estimate the economic impact of the temporary or, possibly, permanent Tyndall Air Force Base closure. As discussed already, most military base closures lead only to a short-run negative economic impact. However, this negative impact can be masked by outside economic factors. In this case, the reconstruction of the Panama City area will cause an economic stimulus to the local area and would mitigate the economic impact of the temporary base closure. In addition, if the Department of Defense decides to partially or completely rebuild the base, the additional $3 billion of reconstruction money will flow into the local economy.[54] The long-run economic impact is difficult to estimate as well. The most problematic scenario is a partial rebuild of the military base. In this scenario, Tyndall's economic impact is smaller due to a reduction in total personnel and base activity. Also, since the base remains open, no private redevelopment of the base can occur that would help mitigate the smaller base's economic losses.

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[49] "Mike Pence pledge to rebuild Tyndall Air Force Base after Hurricane Michael" *Pensacola News Journal*. October 25, 2018. *Retrieved from www.pnj.com*

[50] Department of Defense, "Department of Defense Infrastructure Capacity*" October 2017.3.*

[51] United States Government Accountability Office, "Force Structure: F-22 Organization and Utilization Changes could Improve Aircraft Availability and Pilot Training" *Report to Congressional Committees*, July 2018.

[52] Department of Defense, "Air Force proposes to base F-35s at Tyndall, Supplemental Funds need to Build Advanced Fighter Base" *Secretary of the Air Force Public Affairs.* December 07, 2018. Retrieved from www.af.mil.

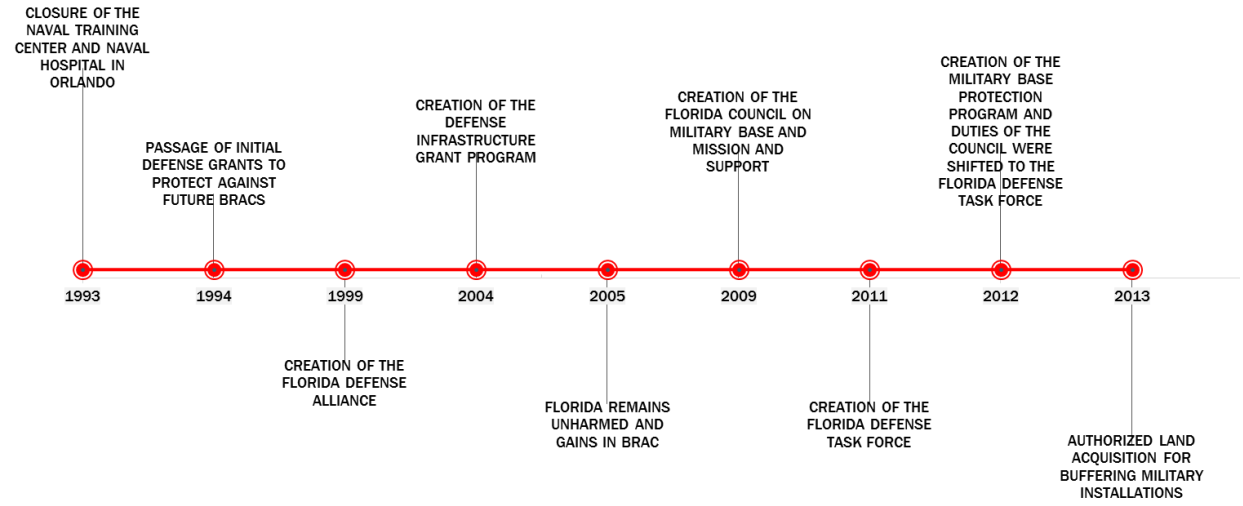
[53] Ed Adamczyk, "Air Force established offices at Tyndall AFB to guide five-year rebuilding process" *United Press International.* December 26, 2018. *Retrieved from www.upi.com.*

[54] Ibid.

THE MILITARY BASE PROTECTION PROGRAM

The Military Base Protection Program consists of activities and strategies intended to preserve or expand the U.S. military base presence throughout the state, or to mitigate the impact to the local economy should bases be realigned or closed.[55]

The impetus of the program was the 1993 BRAC process that saw both the Orlando Naval Training Center and the Orlando Naval Hospital recommended for closure. The Florida Legislature created several grant programs to support Florida's military installations and to help shield them from the adverse effects of future federal base realignment and closure actions. These grants have been in existence since 1994 (See the timeline below). Whether administered through the former Florida Department of Commerce; the former Office of Tourism, Trade, and Economic Development (OTTED); or the current Department of Economic Opportunity, grants have continued to exist, although the specific guidelines have varied. Some of these programs included the Defense Related Business Adjustment Program, the Florida Defense Planning Grant Program, the Florida Defense Implementation Grant Program, the Florida Military Reuse Planning and Marketing Grant Program, and the Retention of Military Installation Program.



Today, the Military Base Protection Program consists of 4 grant and expenditure programs that are reviewed in this report. The programs are:

- The Military Base Protection Grant Program (MBP)
- Defense Infrastructure Grant Program (DIG)
- Defense Reinvestment Grant Program (DRG
- Florida Defense Task Force Grants and Expenditures

The Military Base Protection Grant Program

In 2012, the Legislature created the Military Base Protection Program. The program has two purposes: (1) to provide funding to defense-dependent communities to secure non-conservation lands to serve as

[55] Section 288.980(1)(a), F.S.

a buffer against encroachment for military installations, and (2) to support local community efforts to engage in service partnerships with military installations. The program also has the discretion to award grants that help address emergent needs relating to mission sustainment, encroachment reduction or prevention, and base retention.

During Fiscal Year 2014-15 through Fiscal Year 2016-17, the program did not award any grants or distribute payments to any projects. In Fiscal Year 2014-15, the Florida Legislature earmarked $7.49 million to purchase 3 non-conservation lands adjacent to military bases for encroachment reasons. During the review period, sales for 2 of these non-conservation lands were completed; however, these land purchases were not made through the MBP Program and have not been included in the totals.

Payments by State Fiscal Year			
FY2014-15	FY2015-16	FY2016-17	Total
$ -	$ -	$ -	$ -

The Defense Infrastructure Grant Program

In 2004, the Legislature created the Defense Infrastructure Grant Program (DIG) in order to support local infrastructure projects deemed to have a positive impact on the military value of installations within the state. In 2015, the Department of Economic Opportunity took over administration of the grant program from Enterprise Florida (EFI). Funds are to be used for projects that benefit both the local community and the military installation. DEO accepts applications from the governing board of a county, municipality, special district, or state agency that will maintain the project upon completion. In addition, the local authority must secure matching funds equal to 30% of the grant award.

During Fiscal Year 2014-15 through Fiscal Year 2016-17, the state approved 24 DIG grants. However, due to the program's structure, the majority of the $3.97 million in DIG payments went to grant recipients approved prior to the review period. The table below summarizes the payouts by fiscal year.

Payments by State Fiscal Year			
FY2014-15	FY2015-16	FY2016-17	Total
$ 632,709.72	$ 2,084,433	$ 1,251,799	$ 3,968,943

The Defense Infrastructure Grant provides support for local infrastructure projects that address one or more of seven designated issues: encroachment, transportation and access, utilities, communications, housing, environment, and security. While these issues are designated in statute, the grant is not limited to these issues alone. In 2012, the grant also included construction, land purchases, and easements.

Examples of projects receiving funding by type of use are as follows:

> Encroachment: encroachment prevention and sustainability of Avon Park Air Force Range; Joint Land Use Plan Acquisition Funding
>
> Transportation and Access: design and construction of a turn lane; procurement and installation of traffic signal system
>
> Utilities: grant to support defense infrastructure program

Communications: further develop and modernize the Federal, State University Network

Environment: shoal river military installation buffering project

Defense Reinvestment Grant Program

In 2012, the Defense Reinvestment Grant Program (DRG) was established to replace some of the early defense-related grant programs. The DRG's purpose is to help defense-dependent communities develop strategies that would help the community protect its existing military installations. The grant is also available to help transform the economy of a defense-dependent community to a nondefense economy. Eligible applicants include cities, counties, Chambers of Commerce, or an economic development entity where the military installation is located. A 30% match is required by the local community. Activities funded can include studies, presentations, analyses, plans, marketing, modeling, and reasonable travel costs. In 2015, the Department of Economic Opportunity took over administration of the grant program from Enterprise Florida (EFI).

During State Fiscal Years 2014-15 through 2016-17, the state paid out approximately $2.0 million to 31 grant recipients.

Payments by State Fiscal Year			
FY2014-15	FY2015-16	FY2016-17	Total
$ 49,995.00	$ 696,832	$ 1,286,204	$ 2,033,031

The Defense Reinvestment Grant provides support for community based activities that address one of three designated issues: protection of military installations, diversification of a defense dependent community; or the development of plans for the reuse of a closed or realigned military installation.

During the review period, the majority of DRG dollars were spent on projects related to the protection of existing military installations. Projects related to the diversification of a defense-dependent community comprised the remaining amount. No funds were expended for projects to develop plans for the reuse of a closed or realigned military installation.

Examples of projects receiving funding by type of use are as follows:

Protecting existing military installations: Strategy, analysis and support for Force Growth of the Military; Team Eglin and military collaborative community support program; Team Eglin and military veteran collaborative community support program; facilitate Department of Defense investment and improve the quality of life for military members.

Diversify the economy of a defense-dependent community: support for Team Orlando Partnership in modeling, simulation, and training; support for economic diversification of Walton County; support of MacDill Air Force Base and local defense oriented industries.

Florida Defense Task Force Grants

In 2009, the Legislature created the Florida Council on Military Base and Mission Support. The council was charged with providing oversight and direction for initiatives and actions to protect Florida's military bases from budget cuts or closures, including identifying opportunities to expand the mission of

the state's military installations. In 2012, the duties of the Florida Council on Military Base and Mission Support were transferred to the Florida Defense Task Force, which was created in law in 2011. The Task Force was charged with making recommendations for preparing the state to effectively compete in any federal base realignment and closure action, for supporting the state's position in research and development related to or arising out of military missions and contracting, and for improving the state's military friendly environment for service members, military dependents, military retirees, and businesses that bring military and base-related jobs to the state.

Grants administered by the Task Force do not require matching funds, and there are no imposed caps. Grant applications must be sponsored by a Task Force member, and the Task Force is responsible for deciding grant awards.

During Fiscal Years 2014-15 through 2016-17, Enterprise Florida paid out approximately $6.9 million to 24 recipients. Twenty-two of these grants were awarded in the review period. Two additional grants were awarded but did not receive any funds during the review period.

Payments by State Fiscal Year			
FY2014-15	**FY2015-16**	**FY2016-17**	**Total**
$ 3,510,797	$ 2,490,392	$ 996,521	$ 6,997,709

Task Force grants provide support for local infrastructure projects that address one or more of six designated issues: economic and product research and development, joint planning with host communities to accommodate military missions and prevent base encroachment, advocacy on the state's behalf to federal civilian and military officials, assistance to school districts in providing a smooth transition for large numbers of additional military-related students, job training and placement for military spouses in communities with large shares of active duty military personnel, or promotion of the state to military and related contractors and employers. While these issues are designated in statute, the grant is not limited to these issues alone.

Examples of projects receiving funding by type of use are as follows:

> Economic and product research and development: an economic impact analysis of Florida's military and defense industry.
>
> Joint planning with host communities to accommodate military missions and prevent base encroachment: purchase of 410 acres adjacent to Camp Blanding to provide a buffer from incompatible development and encroachment.
>
> Advocacy on the state's behalf to federal civilian and military officials: contract with the Principi Group to advocate in Washington, D.C. for Florida's military missions and installations.
>
> Job training and placement for military spouses in communities with large shares of active duty military personnel: comprehensive plan to support military and veteran-connected children and families in the state of Florida.

Promotion of the state to military and related contractors and employers: marketing program targeted to aerospace and defense industries to bring jobs for veterans to Northwest Florida.

Other: establishment of a local defense community organization; construction of a seawall adjoining a military base; support for wounded service personnel to return to active duty; feasibility study of dredging the turning basin to allow safe transit for larger Navy vessels.

Comparable State Programs

In comparison to other states, Florida is perceived to be one of the leaders in the provision of state-sponsored military support.[56] In this regard, Florida offers more military assistance programs and spends more than the average across all states. The Association of Defense Communities Annual Report has a list of the 10 best practices a state can implement to support the military.[57] Florida has implemented 9 of these best practices.[58] Only South Dakota and Massachusetts received a similar ranking by the Association. The one best practice not implemented by Florida is funding for on-base infrastructure improvements. Examples of on-base infrastructure improvements include state-funded runway improvements or utility upgrades. The Table below compares Florida's best practices' ranking relative to 3 other comparable states in population size.

State-Funded Programs	Florida	California	Pennsylvania	Texas
Economic Impact/Strategic Planning Study	X	X		X
Encroachment Mitigation Planning	X	X	X	X
Funding for Encroachment Efforts	X	X	X	X
Funding For Off-Base Infrastructure Projects	X		X	X
Funding for On-Base Infrastructure Projects		X		X
Support Community-Installation Partnerships	X	X		X
Coordination with Local Organizations	X	X	X	X
Funding for Local Organizations	X		X	
Employ Lobbying Group	X			
Military Family and Veteran Issues	X	X	X	X
Source: 2006 State of Support, Association of Defense Communities				

Program Effectiveness and Conclusions

Since there has been no formal BRAC since 2005, it is challenging to measure the effectiveness of the 4 military grant and expenditure programs. Historically, Florida has experienced fewer military base closures than comparable states. One could argue that the enactment of the military programs in 1999 led to the 2005 BRAC having favorable results for Florida. However, this favorable treatment was also true in earlier BRACs that preceded the enactment of military assistance programs. The table below compares major military closures in the 5 most populous states in the nation. In comparison to these other states, Florida has witnessed the fewest number of major closures since the start of the BRAC program in 1988.

[56] Association of Defense Communities, "State of Support 2016: Highlifhts of State Support for Defense Installations", July 2016.
[57] Ibid.
[58] Ibid.

BRAC Major Closures					
BRAC Year	**Florida**	**California**	**Pennsylvania**	**New York**	**Texas**
1988	2	6	12	6	1
1991	0	11	2	0	3
1993	7	18	6	6	6
1995	2	11	7	6	3
2005	0	2	1	0	3
Total:	11	48	28	18	16

It is difficult to measure the persuasive power exerted by these grants on the Department of Defense's decision to close a military base. The decision to close a military base is at the discretion of the Department of Defense Secretary, using the military's current 20-year strategic plan as guidance. Generally, the BRAC committee agrees with the Defense Secretary's recommendations with limited modifications to the original realignment and base closure plan. Whether the Defense Secretary is aware of state endeavors to prevent military base closures and takes them into consideration has not been studied. The formal BRAC committees do consider how the base closure would impact the local community; however, military value is given priority consideration, and local impacts are only an ancillary consideration.

Additionally, the report found no concrete evidence that lobbying by local communities is effective in preventing a base closure. Many communities spend a considerable amount of money and time on lobbying and hold large public rallies to prevent base closure with mixed results. The city of Charleston unsuccessfully spent over $600,000 to prevent the closure of the Charleston Naval Shipyards in 1993.[59] In a review of the 2005 BRAC report, the committee had several stated reasons to prevent base closures, none of which related exclusively to lobbying by a local community. This is not to discount local community support, but there is no evidence to suggest that it actually prevents base closures.

[59] W. Claiborne and K. Jenkins, "Charleston Hit Hard By Military Base-Closing Panel" *Washington Post*, June 25, 1993.

METHODOLOGY

The evidence shows that a military base closure leads to a negative short-run economic impact. However, the severity and length of the impact is determined by several factors: the percentage of local civilians employed at the military base, the diversity of the local economy, whether the military base is located in a rural or urban area, and the pace of the redevelopment of the military base.[60]

The analysis ran 3 different scenarios through the Statewide Model to demonstrate how military base closures can lead to widely different economic outcomes for Florida. Each scenario involved the closure of a large military base followed by a 6-year simulation of the Florida economy after the military base's closure.

The assumptions listed below are identical for all 3 scenarios.

- The military base closure consisted of the out-of-state relocation of 9,646 military personnel and the loss of 6,711 civilian jobs at the military base. The numbers are based on the average size of the 8 military bases in Florida.[61]
- Each scenario assumes a permanent loss of spending associated with departing military personnel. According to Bradshaw, 10% of military employee income is spent in the local economy.[62] Military employee spending is estimated based on the 2015 Defense Spending by State, published by the U.S. Department of Defense.
- Each scenario assumes a permanent loss of federal spending associated with the operations and maintenance of the military base. The analysis assumes that 5.2% of all operations and maintenance expenditures are spent locally.[63] Operations and maintenance expense is estimated using the 2015 Defense Spending by State report, published by the U.S. Department of Defense.
- Each scenario assumes a temporary loss of income caused by the loss of jobs for civilian personnel previously working at the base. The reemployment rate of civilian personnel is different for each scenario, but is benchmarked on the latest Bureau of Labor Statistics study on national reemployment rates of displaced workers.[64]
- Each scenario assumes that the base redevelopment construction expenditures will nullify the loss of federal spending associated with the operations and maintenance of the closed military base. However, each scenario is different regarding when the base redevelopment begins. The construction expenditures only last for 3 years, while the loss of federal spending lasts the entire 6 years.
- Each scenario assumes that the base redevelopment will employ 5,368 civilians when completed. This employment level follows the findings of the 2005 GAO study.[65] The full

[60] A more detailed review of these 4 factors can be found in the "The Economic Impact of Military Bases in Florida" section of the paper.

[61] Individual base deployment and employment numbers obtained through the Department of Defense's Military Installations website. The directory can be found at: http://www.militaryinstallations.dod.mil

[62] T. Bradshaw, "Communities Not Fazed: Why Military Base Closures May Not Be Catastrophic", *American Planning Association Journal. Vol 65(2). 1999:* 193-206.

[63] The percentage was based-on work done in T. Muller, R. Hansen, and R. A. Hutchinson, "The Local Economic and Fiscal Impact of New DOD Facilities: A Retrospective Analysis*", Logistics Management Institute.* (1991) which estimated that only 2.6% of all base expenditures were spent locally. The EDR analysis doubled the 2.6% to account for a larger geographic location (Florida), not just the local community around the military base.

[64] The latest BLS displaced workers summary can be found at https://www.bls.gov/news.release/disp.nr0.htm.

[65] United State Government Accountability Office, "Military Base Closures: Observations on Prior and Current BRAC Rounds",

redevelopment takes 5 years from the start of construction to occupancy. In each year, the number of jobs is increased by 20%. The redevelopment contains a mixture of aerospace, retail and professional employment. The analysis used the redevelopment of Cecil Field and NTC Orlando as models for the industry mix.

The economic impact of the base closure will be different for each scenario. A description of all 3 scenarios and the different assumptions used for each is provided below.

The Pessimistic Scenario: The pessimistic scenario is a "worst case" simulation. In this scenario, the military base is located in a rural Florida county without a diversified economy. The redevelopment of the military base is delayed significantly and does not occur until the 5th year of the simulation. In this scenario, the local economy experiences sustained unemployment and income loss as the reemployment rates for former civilian workers is one-half the national average.

The Average Scenario: This simulation represents the most probable scenario to occur if a military base closes in Florida. In this scenario, the military base closes in a rural area with a diverse economy. The redevelopment of the military base begins 3 years after closing. In this simulation, the local economy recovers at a moderate pace. The reemployment rate of former base workers follows the national average rate. Additionally, the base redevelopment quickens the pace of the recovery through construction expenditures and new employment at the redeveloped base.

The Optimistic Scenario: This simulation represents a best case scenario after the closure of a military base in Florida. The base closure occurs in an urban environment with a diverse economy. The base redevelopment occurs within a year after the base closure. In this scenario, the reemployment rate is double the national average due to the strong, local economy. The short-run unemployment and income impacts are further minimized by the immediate initiation of construction expenditures and new employment opportunities at the redeveloped base.

(May 2005): 31.

THE STATEWIDE MODEL

Statewide Model

EDR used the Statewide Model to simulate the economic impact of a military base closure in Florida. The Statewide Model is a dynamic computable general equilibrium (CGE) model that simulates Florida's economy and government finances.[66] The Statewide Model is enhanced and adjusted each year to reliably and accurately model Florida's economy. These enhancements include updating the base year the model uses, as well as adjustments to how the model estimates tax collections and distributions.[67]

Among other things, the Statewide Model captures the indirect and induced economic activity resulting from the closure of a military base. This is accomplished by using large amounts of data specific to the Florida economy and fiscal structure. Mathematical equations[68] are used to account for the relationships (linkages and interactions) between the various economic agents, as well as likely responses by businesses and households to changes in the economy.[69] The model also has the ability to estimate the impact of economic changes on state revenue collections and state expenditures in order to maintain a balanced budget by fiscal year.

When using the Statewide Model to evaluate a military base closure, the model is shocked[70] using static analysis to develop the initial or direct effects attributable to the closure. In this analysis, the annual direct effects (shocks) of the military base closure took the form of:

- Removal of spending associated with the military base procurement contracts
- Removal of spending associated with military personnel
- Removal of income associated with the loss of civilian employment at the military base

The amount of these annual negative direct effects differs for each of the 3 scenarios.

The removal of both spending and income is slowly mitigated over the 6-year time period by direct effects (positive shocks) from:

- Construction spending associated with the redevelopment of the military base
- Output associated with new employment at the redeveloped base.

The amount of the annual positive direct effects differs for each of the 3 scenarios.

In conjunction with the direct effects, the model estimates the additional—indirect and induced—economic effects generated by the military base closure and base redevelopment. This includes the

[66] The statewide economic model was developed using GEMPACK software with the assistance of the Centre of Policy Studies (CoPS) at Monash University (Melbourne, Australia).

[67] Reports prior to January 1, 2017 have used 2009 as the base year. Reports as of January 1, 2017 have used 2011 as the base year.

[68] These equations represent the behavioral responses to economic stimuli – to changes in economic variables.

[69] The business reactions simulate the supply-side responses to the new activity (e.g., changes in investment and labor demand).

[70] In economics, a shock typically refers to an unexpected or unpredictable event that affects the economy, either positively or negatively. In this regard, a shock refers to some action that affects the current equilibrium or baseline path of the economy. It can be something that affects demand, such as a shift in the export demand equation; or, it could be something that affects the price of a commodity or factor of production, such as a change in tax rates.

supply-side responses to the base closure, where the supply-side responses are changes in investment and labor demand arising from the closure. Indirect effects are the changes in employment, income, and output by local supplier industries that provide goods and services to support the direct economic activity. Induced effects are the changes in spending by households whose income is affected by the direct and indirect activity.

All of these effects can be measured by changes (relative to the baseline) in the following outcomes:

- Personal income
- Florida Gross Domestic Product
- Gross output
- Household and Government consumption

Key Assumptions
The following key assumptions are used in the Statewide Model to determine the outcomes of the scenarios. Some of the assumptions are used to resolve ambiguities in the literature, while others conform to the protocols and procedures adopted for the Statewide Model.

1. The analysis assumes the data used to estimate military base employment, wages, and spending is accurate and a reasonable approximation when used to simulate a military base closure. The data comes from multiple sources including the Department of Defense Office of Economic Adjustment, the Government Accountability Office, and academic research. The data was not independently audited or verified by EDR.

2. The analysis assumes the data used to estimate base redevelopment expenditures and the reemployment of civilian personnel is accurate and a reasonable approximation when used to simulate Florida's recovery from a military base closure. The data comes from multiple sources including the Department of Defense Office of Economic Adjustment, the Government Accountability Office and academic research. The data was not independently audited or verified by EDR.

3. The analysis assumes, given the time span under review, applying discount rates would not prove material to the outcome.

4. The analysis assumes a 6-year time period for each scenario.

5. The analysis assumes all military personnel at the military base will be relocated immediately after the base closure to a base outside of Florida. In addition, the employment openings associated with the spouses of departing military personnel will be taken by Florida residents without any time lag.

6. The analysis assumes the relevant geographic region is the whole state, not individual counties or regions. The model takes account of and makes adjustments for the fact that industries within the state cannot supply all of the goods, services, capital, and labor needed to produce the state's output.

Key Terms

In the pages that follow, diagnostic tables describing the composition and statistics of the military base closure analysis precede the discussion. Key terms used in the tables are described below:

Personal Income (Nominal $(M)) – Income received by persons from all sources. It includes income received from participation in production as well as from government and business transfer payments. It is the sum of compensation of employees (received), supplements to wages and salaries, proprietors' income with inventory valuation adjustment (IVA) and capital consumption adjustment (CCAdj), rental income of persons with CCAdj, personal income receipts on assets, and personal current transfer receipts, less contributions for government social insurance.

Real Disposable Personal Income (Fixed 2011 $(M)) – Total after-tax income received by persons; it is the income available to persons for spending or saving.

Real Gross Domestic Product (Fixed 2011 $(M)) – A measurement of the state's output; it is the sum of value added from all industries in the state. GDP by state is the state counterpart to the Nation's gross domestic product.

Consumption by Households and Government (Fixed 2011 $(M)) –The goods and services purchased by persons plus expenditures by governments consisting of compensation of general government employees, consumption of fixed capital (CFC), and intermediate purchases of goods and services less sales to other sectors and own-account production of structures and software. It excludes current transactions of government enterprises, interest paid or received by government, and subsidies.

Real Output (Fixed 2011 $(M)) – Consists of sales, or receipts, and other operating income, plus commodity taxes and changes in inventories.

PROGRAM FINDINGS

The Pessimistic Scenario

Statewide Economic Model Impact of the Military Base Closure and Redevelopment (FY2018-2023)

		FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	Total
Personal Income	Nominal $ (M)	(758.0)	(700.0)	(640.0)	(583.0)	(489.0)	(235.0)	(2,647.0)
Real Disposable Personal Income	Fixed 2010-11 $ (M)	(691.5)	(627.8)	(567.8)	(511.5)	(422.5)	(212.7)	(2,342.4)
Real Gross Domestic Product	Fixed 2010-11 $ (M)	(413.6)	(356.7)	(308.8)	(271.0)	(190.9)	(44.4)	(1,171.8)
Consumption by Households and Government	Fixed 2010-11 $ (M)	(737.5)	(669.7)	(605.4)	(553.1)	(464.2)	(246.2)	(2,538.6)
Real Output	Fixed 2010-11 $ (M)	(520.9)	(454.9)	(393.5)	(348.9)	(254.7)	43.9	(1,408.0)

The pessimistic scenario represents a “worst case” scenario. The Florida economy does not recover in the 6-year period after the base closure. The recovery is stalled due to several reasons. First, the local community was too dependent on base employment and did not have other industries to quickly rehire laid-off civilian base workers. This situation prolonged local unemployment and the drop in local income.

Second, the pessimistic scenario assumes a significant delay in the redevelopment of the base. The base redevelopment does not start until the fifth year. As discussed previously, the redevelopment of the base can act as an economic stimulus through the introduction of new construction expenditures. In addition, the completed redevelopment contributes new output and employment to the local economy. The delay meant that the economic benefits did not start appearing in the simulation until the very end of the period. Please note that by Year 6, the economy is showing signs of a recovery as real output is positive and real GDP is close to 0.

The Average Scenario

Statewide Economic Model Impact of the Military Base Closure and Redevelopment (FY2018-2023)

		FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	Total
Personal Income	Nominal $ (M)	(703.0)	(588.0)	(439.0)	(157.0)	97.0	233.0	(854.0)
Real Disposable Personal Income	Fixed 2010-11 $ (M)	(641.4)	(527.1)	(390.8)	(150.3)	62.5	168.5	(837.2)
Real Gross Domestic Product	Fixed 2010-11 $ (M)	(382.8)	(297.9)	(183.4)	54.4	257.0	361.8	191.9
Consumption by Households and Government	Fixed 2010-11 $ (M)	(686.4)	(568.2)	(424.8)	(169.6)	48.9	152.0	(961.7)
Real Output	Fixed 2010-11 $ (M)	(486.9)	(381.8)	(237.6)	93.4	378.3	535.1	387.4

The average scenario represents what EDR believes to be the most probable scenario after a military base closure. The Florida economy experiences a short-run negative impact followed by an economic recovery. The recovery accelerates in Year 3 with the redevelopment of the military base. An economic boost is experienced in subsequent years through new output and jobs at the redeveloped base. Compared to the pessimistic scenario, the average scenario’s economic downturn is not as severe in Year 1 and Year 2, because former base employees find new employment at a quicker rate. Therefore, income loss is not as large in the average scenario as it is in the pessimistic scenario.

The Optimistic Scenario

Statewide Economic Model Impact of the Military Base Closure and Redevelopment (FY2018-2023)

		FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	Total
Personal Income	Nominal $ (M)	(678.0)	(274.0)	91.0	267.0	472.0	687.0	1,243.0
Real Disposable Personal Income	Fixed 2010-11 $ (M)	(621.2)	(258.3)	57.4	202.6	367.4	532.6	901.7
Real Gross Domestic Product	Fixed 2010-11 $ (M)	(348.0)	(26.6)	249.8	380.7	543.8	704.9	1,852.7
Consumption by Households and Government	Fixed 2010-11 $ (M)	(661.4)	(279.8)	46.8	187.1	355.6	527.1	836.8
Real Output	Fixed 2010-11 $ (M)	(442.2)	(12.5)	364.0	565.8	797.6	1,026.3	2,741.2

The optimistic scenario is a 'best case" scenario. The economy is only negatively impacted for the first two-years after the base closure. Afterwards, the base redevelopment, which starts early in Year 1, and the output associated with new firms at the redeveloped base boost the Florida economy. In addition, the initial negative impacts are not nearly as severe when compared to the average and pessimistic scenarios. This is due to the laid-off civilian base employees finding alternative employment at a rate higher than the national average. This helps prevent a large drop in personal income.

The optimistic scenario can be achieved in Florida if certain factors are present. First, the local area economy must be strong and diverse. A diverse economy minimizes the economic impact because the non-military industries provide employment opportunities for laid-off civilian base employees and are the natural tenants for any redeveloped base. In urban areas where undeveloped land is scarce and expensive, a military base closure can be beneficial as it opens up new land for firms wanting to expand, potentially relieving commercial rent costs.

Second, the base redevelopment needs to be initiated immediately. Base redevelopments act as minor economic stimuluses to the local area and help offset the negative impacts from the base closure. In the Orlando NTC case study, the city of Orlando had already developed a comprehensive development plan for the closed base. When the base actually closed and the land was transferred over to the city, the redevelopment started immediately.

Florida's military base protection programs address both of the issues discussed above. Defense Reinvestment Program's grants can be used for projects that diversify the economy of defense-dependent community or projects that develop plans for the reuse of a closed or realigned military installation. In EDR's review period, some of the grants funded diversification projects. No grants were used for base reuse; however, this should not be surprising since Florida has not experienced a base closure since the 1990s.

THE ECONOMIC IMPACT OF THE DEFENSE INDUSTRY IN FLORIDA

Florida's defense industry is one of the largest in the country. According to the latest report by the Department of Defense, Florida defense contractors received approximately $11 billion in contracts in Federal Fiscal Year 2015.[71] The table below lists both the defense contractor and the amount awarded to that contractor. Approximately two-thirds of all private defense contracts in Florida are assigned to Orange, Brevard or Okaloosa Counties. The Lockheed Martin Group is Florida's largest defense contractor. The company has over a dozen locations in Florida, including a significant location in Orange County that specializes in missile and fire control systems.

Contractor	Amount Awarded in FFY2015
Lockheed Martin	$2.5B
Raytheon	$576.1M
General Dynamics	$526.6M
Huntington Ingalls	$507.5 M
Harris	$225.1 M
Jacobs Engineering Group	$195.2 M
Honeywell	$178.0 M
Hellfire Systems	$160.9 M
Indyne	$142.7 M
Finmeccanica	$140.2 M

Florida ranked 6th in total defense contracts awarded in Federal Fiscal Year 2015.[72] Two of the states ranked higher than Florida, Virginia and Maryland, had the geographic advantage of being close to Washington D.C.

State	Amount Awarded in FFY2015
Virginia	$36.0 B
California	$34.7 B
Texas	$27.4 B
Maryland	$13.6 B
Massachusetts	$11.2 B
Florida	$11.0 B
Pennsylvania	$10.3 B
Alabama	$9.2 B
Missouri	$9.1 B
Connecticut	$9.0 B

[71] U.S. Department of Defense Office of Economic Adjustment, "Defense Spending by State, Fiscal Year 2015", 18.
[72] Ibid.

The private sector defense industry contributes significantly to the Florida economy. This is due both to its relatively large presence in Florida and the types of employment. A 2016 aerospace and defense labor market study estimated that over 57,000 Floridians with average annual salaries of over $80,000 are employed in the private defense industry.[73,74] In addition, this industry is concentrated in sectors of the economy which typically have large indirect and induced impacts like manufacturing and research and development. The 2016 labor market study estimated that the indirect and induced effect of the defense industry created over 134,000 additional jobs in Florida.

The Qualified Defense Contractor and Space Flight Business Tax Refund Program

The Qualified Defense Contractor and Space Flight Business Tax Refund Program (QDSC) was established in 1996 to encourage the creation and/or retention of high-wage jobs (defined as 115 percent or more of the area or statewide annual wage) in the defense and space industries.[75] Incentive awards range from $3,000 to $8,000 per job.[76] Unless waived by DEO, 20 percent of the award must be provided by the city or county government in which the project is located. The QDSC program expired July 1, 2014.[77]

The QDSC program was a performance-based incentive tied directly to defense or space flight business contracts. Businesses qualified for the program in three ways: (1) contract or subcontract consolidations that resulted in either a 25 percent increase in employment or at least 80 new Florida jobs; (2) defense production conversion projects that resulted in a net increase in nondefense employment at the applicant's facilities in Florida; or (3) reuse projects that resulted in the creation of at least 100 jobs for contracts with a duration of two or more years.

QDSC Per-Job Award Thresholds			
		Eligible Award	**State Liability**
Base Award with Minimum Wage Criteria, or		$3,000	$2,400
Base Award if Located in a Rural County		$6,000	$4,800
If Wage is 150% of Average Annual Wage, or	+	$1,000	$800
If Wage is 200% of Average Annual Wage	+	$2,000	$1,600
Maximum Per-Job Award		**$8,000**	**$6,400**
Maximum Award Per-Business, Every Year			**$2,500,000**

The QDSC program was a grant program subject to annual appropriation, with the grant award determined by the interaction between the number of qualifying employees, geographic location of the jobs, and certain taxes paid to both state and local governments. Each QDSC project had a performance-

[73] In comparison, the average annual salary in Florida was around $44,050 in 2016.

[74] Deloitte, "US Aerospace & Defense Labor Market Study, February 2016.

[75] For review of the space industry, please see next section.

[76] Section 288.1045, F.S. The per-job award increases from the $3,000 base when wages exceed 150 percent of the area or statewide annual wage, and when projects are located in specified locations. These included a rural county, an Enterprise Zone, or until 6/30/14, in any of the eight counties that were disproportionately affected by the BP Gulf Oil Spill: Bay, Escambia, Franklin, Gulf, Okaloosa, Santa Rosa, Walton and Wakulla Counties. From 7/1/11 through 6/30/14, DEO could waive wage or local financial support eligibility requirements for Disproportionately Affected Counties.

[77] While the QDSC program expired on 7/1/2014, the program continued to distribute incentive payments to projects that were pre-qualified before the expiration of the program.

based contract, which outlined specific milestones that had to be achieved and verified by the state prior to payment of funds.

During the review period, the QDSC program paid out over $2.2 million to projects that were prequalified prior to the expiration of the program.

Payments by State Fiscal Year			
FY2014-15	**FY2015-16**	**FY2016-17**	**Total**
$545,000	$1,180,000	$549,233	$2,274,233

Conclusions

The analysis does not include a return on investment for QDSC two reasons. First, the QDSC program expired before the start of the review period, with all payments going toward projects that were pre-qualified outside the study window. Second, the program failed the same "but for" requirement that prevented a return on investment analysis from being done in the prior report. In this regard, the "but for" test cannot reasonably be met because the state incentive cannot be deemed the primary or even the determining factor in the federal government's or private business' decision to engage in a defense contract in Florida. This assertion fails because the businesses engaged in applying for the incentive are not making job creation or retention decisions based solely on the incentive award. These businesses are engaged in bidding for a variety of federal and/or private procurement contracts, and this bidding likely would not cease if the incentive was not offered. To this point, businesses are still engaged in bidding for federal contracts even though the QDSC program expired in 2014. While the QDSC award reduces a business' operating costs and allows for a more competitive bid, it is likely the incentive is paying for jobs that would have been created or retained in the state anyway.

Sales Tax Exemption for Machinery and Equipment Used in the Semiconductor, Defense, or Space Technology Production (SDST) Program

The Sales Tax Exemption for Machinery and Equipment Used in the Semiconductor, Defense, or Space Technology Production (SDST) was first created in 1997.[78] When it was originally established, the exemption was limited to silicon technology production and research and development. In 2000, the law was amended[79] to remove any reference to silicon technology, and to add semiconductor, defense, or space technology production and research and development to the exemption. Research and development was removed from this part of the statute in 2006. The current program exempts sales tax on the purchase of machinery and equipment used in the production processes of businesses engaged in the production of semiconductor, defense, or space technology products for sale or use.

In order to be granted an SDST exemption, a business must first apply to DEO. DEO reviews the application and, if approved, forwards an approval certification to DOR. DOR then issues the tax exemption certificate to the business. The SDST exemption is available for two calendar years and can be used retroactively for the three years prior to the date the application was submitted. Businesses may request a renewal of the exemption every two years by submitting a letter to DEO, certifying under oath, that there has been no material change in the conditions or circumstances entitling the business to the original certification. A business certified to receive this exemption may elect to designate one or

[78] Section 288.012(5)(j), F.S., Ch. 97-278 s.11, Laws of Florida.

[79] Ch. 2000-351, Laws of Florida.

more state universities or community colleges as recipients of up to 100 percent of the amount of the exemption for which they qualify.

Industrial machinery and equipment used in semiconductor, defense, or space technology facilities to design, manufacture, assemble, process, compound, or produce semiconductor, defense, or space technology products for sale or for use by these facilities are exempt from 100 percent of the sales tax imposed. Section 212.08(5)(j)(7), F.S., defines the following:

- "Semiconductor technology products" means raw semiconductor wafers or semiconductor thin films that are transformed into semiconductor memory or logic wafers, including wafers containing mixed memory and logic circuits; related assembly and test operations; active-matrix flat panel displays; semiconductor chips; semiconductor lasers; optoelectronic elements; and related semiconductor technology products as determined by DEO.

- "Defense technology products" means products that have a military application, including, but not limited to, weapons, weapons systems, guidance systems, surveillance systems, communications or information systems, munitions, aircraft, vessels, or boats, or components thereof, which are intended for military use and manufactured in performance of a contract with the United States Department of Defense or the military branch of a recognized foreign government or a subcontract which relates to matters of national defense.

- "Space technology products" means products that are specifically designed or manufactured for application in space activities, including, but not limited to, space launch vehicles, space flight vehicles, missiles, satellites or research payloads, avionics, and associated control systems and processing systems. The term does not include products that are designed or manufactured for general commercial aviation or other uses even though those products may also serve an incidental use in space applications.

During the review period, 17 different companies used a SDST exemption. Out of the 17 companies, 12 of them were in the defense industry, 1 was in the space industry and 4 were in the semi-conductor industry. The total value of the tax exemptions was $19,971,742.

Total Tax Exemption by Calendar Year				
CY 2014	**CY2015**	**CY2016**	**CY2017**	**Total**
$7,409,767	$8,691,994	$1,906,468	$1,963,514	$19,971,743

While the state cost for the exemptions is estimated to be $19.97 million during the period, it is likely that this is an understatement due to the reporting cycle of the businesses. Renewal applicants are required to submit the value of any tax exempt purchase, of which the exempt amount is calculated, for the two calendar years prior to requesting the renewal. Given that not all businesses are required to report every year and not all businesses renew every two years, there are years when a business may not report any purchases to DEO. This results in gaps in actual purchases, which can be seen when looking at the annual totals of taxes exempted. While spending appears higher in calendar years 2014 and 2015 than the later years, this may be a function of the reporting cycle of the businesses and not a reduction in overall usage of the SDST exemption

The primary beneficiaries of the SDST exemption are businesses involved in the production of defense technology products. Defense technology facilities accounted for $15.12 million or 75 percent of all taxes exempted. Semiconductor facilities accounted for approximately $1.99 million or 10 percent.

Program Effectiveness and Conclusions

Similar to the QDSC analysis, the analysis does not include a return on investment for the SDST exemption. This incentive is eligible to any business in Florida that is engaged in the production of semiconductor, defense, or space technology products. There are no other requirements to obtain the exemption, and it is not contingent upon the "but for" criteria required in many of the state's economic development incentive programs. The SDST exemption cannot reasonably be deemed the primary or even the determining factor in the business' decision to purchase machinery and equipment. To remain competitive in the industry, these businesses need to maintain existing capacity and/or upgrade their machinery and equipment as technology changes or conditions otherwise warrant. Moreover, the majority of businesses who have applied for and been granted the exemption are federal contractors; meaning that their machinery and equipment purchases are directly related to the federal contracts that they are awarded. As stated earlier, the competitive advantage yielded by the amount of the forgone state taxes to any one business is unlikely to be a determining factor in the federal government's decision to award a procurement contract. Further, other state incentives exist that provide viable alternatives for at least some of the participants.

Observations Regarding Defense Incentives in Other States

Two of Florida's largest competitors for defense contracts are California and Texas. In Federal Fiscal Year 2015, California received $34.7 billion and Texas received $27.4 billion in defense contracts. Neither California nor Texas have economic programs that exclusively target defense contractors; however, each state does offer incentives that are used by defense firms. Similar to SDST, both states offer a sales tax exemption on machinery and equipment used in the manufacturing of defense goods. The California exemption includes R&D costs, which until 2006, SDST also exempted.

Programs comparable to QDSC include the Texas Enterprise Fund and the California Competes Tax Credit Program. The Texas Enterprise Fund is a "deal-closing" cash grant program to companies considering a new project site where Texas is competing with other out-of-state sites. Since FY2006, the Texas Enterprise Fund has awarded $41 million to defense contractors. The California Competes Tax Credit Program is an income tax credit for businesses considering a significant investment in California. Between FY's 2013-14 through FY 2016-17, the program has awarded over $25 million in tax credits to defense contractors in California.

METHODOLOGY

Both programs provided incentives to the private sector defense industry to retain and expand their operations in Florida. While this analysis does not include a ROI for either of these programs, EDR believes a simulation of the defense industry's economic impact to the state is a useful alternative. To this end, the simulation looks at the economic impact of the annual contracts from the Department of Defense to Florida's defense businesses.

The analysis relied on USASpending.gov website to run data queries on defense contracts that were performed in Florida during Fiscal Years 2014-15, 2015-16 and 2016-17. During all 3 Fiscal Years, Florida defense contractors were awarded over $10 billion in defense contracts. The contracts were heavily concentrated in the aerospace industry, computer systems technology industry and professional services industry. However, 53 out of the 62 private industry categories in the Statewide Model were affected by at least one defense contract award during the review period.

THE STATEWIDE MODEL

Statewide Model

EDR used the Statewide Model to simulate the economic impact of defense contracts in Florida. The Statewide Model is a dynamic computable general equilibrium (CGE) model that simulates Florida's economy and government finances.[80] The Statewide Model is enhanced and adjusted each year to reliably and accurately model Florida's economy. These enhancements include updating the base year the model uses, as well as adjustments to how the model estimates tax collections and distributions.[81]

Among other things, the Statewide Model captures the indirect and induced economic activity resulting from defense contracts in Florida. This is accomplished by using large amounts of data specific to the Florida economy and fiscal structure. Mathematical equations[82] are used to account for the relationships (linkages and interactions) between the various economic agents, as well as likely responses by businesses and households to changes in the economy.[83] The model also has the ability to estimate the impact of economic changes on state revenue collections and state expenditures in order to maintain a balanced budget by fiscal year.

When using the Statewide Model to evaluate the defense industry in Florida, the model is shocked[84] using static analysis to develop the initial or direct effects attributable to defense-related contracts. In this analysis, the annual direct effects (shocks) of the defense contracts took the form of:

- Removal of Florida-based Department of Defense contracts.

In conjunction with the direct effects, the model estimates the additional—indirect and induced—economic effects generated by the defense contracts. This includes the supply-side responses to the existence of contracts where the supply-side responses are changes in investment and labor demand. Indirect effects are the changes in employment, income, and output by local supplier industries that provide goods and services to support the direct economic activity. Induced effects are the changes in spending by households whose income is affected by the direct and indirect activity.

All of these effects can be measured by changes (relative to the baseline) in the following outcomes:

- State government revenues and expenditures
- Jobs
- Personal income
- Florida Gross Domestic Product
- Gross output

[80] The statewide economic model was developed using GEMPACK software with the assistance of the Centre of Policy Studies (CoPS) at Monash University (Melbourne, Australia).

[81] Reports prior to January 1, 2017 have used 2009 as the base year. Reports as of January 1, 2017 have used 2011 as the base year.

[82] These equations represent the behavioral responses to economic stimuli – to changes in economic variables.

[83] The business reactions simulate the supply-side responses to the new activity (e.g., changes in investment and labor demand).

[84] In economics, a shock typically refers to an unexpected or unpredictable event that affects the economy, either positive or negative. In this regard, a shock refers to some action that affects the current equilibrium or baseline path of the economy. It can be something that affects demand, such as a shift in the export demand equation; or, it could be something that affects the price of a commodity or factor of production, such as a change in tax rates.

- Household consumption
- Population

Key Assumptions
The following key assumptions are used in the Statewide Model to determine the outcomes of defense contracts. Some of the assumptions are used to resolve ambiguities in the literature, while others conform to the protocols and procedures adopted for the Statewide Model.

1. The analysis assumes that the data used to estimate total defense contracts in Florida is accurate and a reasonable approximation. The data comes from USASpending.gov, which is the official source for U.S. Government contracts. The data was not independently audited or verified by EDR.

2. The analysis assumes that given the time span under review, applying discount rates would not prove material to the outcome.

3. The analysis assumes the relevant geographic region is the whole state, not individual counties or regions. The model accounts and makes adjustments for the fact that industries within the state cannot supply all of the goods, services, capital, and labor needed to produce the state's output.

Key Terms
In the pages that follow, diagnostic tables describing the composition and statistics of the analysis precede the discussion. Key terms used in the tables are described below:

Personal Income (Nominal $(M)) – Income received by persons from all sources. It includes income received from participation in production as well as from government and business transfer payments. It is the sum of compensation of employees (received), supplements to wages and salaries, proprietors' income with inventory valuation adjustment (IVA) and capital consumption adjustment (CCAdj), rental income of persons with CCAdj, personal income receipts on assets, and personal current transfer receipts, less contributions for government social insurance.

Real Disposable Personal Income (Fixed 2011 $(M)) – Total after-tax income received by persons; it is the income available to persons for spending or saving.

Real Gross Domestic Product (Fixed 2011 $(M)) – A measurement of the state's output; it is the sum of value added from all industries in the state. GDP by state is the state counterpart to the Nation's gross domestic product.

Consumption by Households and Government (Fixed 2011 $(M)) –The goods and services purchased by persons plus expenditures by governments consisting of compensation of general government employees, consumption of fixed capital (CFC), and intermediate purchases of goods and services less sales to other sectors and own-account production of structures and software. It excludes current transactions of government enterprises, interest paid or received by government, and subsidies.

Real Output (Fixed 2011 $(M)) – Consists of sales, or receipts, and other operating income, plus commodity taxes and changes in inventories.

Total Employment (Jobs) – This comprises estimates of the number of jobs, full time plus part time, by place of work. Full time and part time jobs are counted at equal weight. Employees, sole proprietors, and active partners are included, but unpaid family workers and volunteers are not included.

PROGRAM FINDINGS

Statewide Economic Model Impact of the Florida Defense Contracts (FY2014-2016)

		2014-2015	2015-2016	2016-2017	Total		Average per Year
Personal Income	Nominal $ (M)	8,935.0	9,861.0	10,571.0	**29,367.0**		**9,789.0**
Real Disposable Personal Income	Fixed 2010-11 $ (M)	7,310.7	8,038.1	8,585.1	**23,933.8**		**7,977.9**
Real Gross Domestic Product	Fixed 2010-11 $ (M)	9,919.3	9,756.2	9,752.4	**29,427.9**		**9,809.3**
Consumption by Households and Government	Fixed 2010-11 $ (M)	8,539.1	8,772.8	9,102.5	**26,414.5**		**8,804.8**
Real Output	Fixed 2010-11 $ (M)	14,664.7	13,999.4	13,983.0	**42,647.1**		**14,215.7**
		2014-2015	**2015-2016**	**2016-2017**	**Total**		**Average per Year**
Total State Revenues	Nominal $ (M)	171.9	163.1	179.0	**514.0**		**171.3**
Average Employment	Jobs	20,341.0					

The Department of Defense contracts contributed, on average, over $9.8 billion annually to Florida' Real Gross Domestic Product, $7.9 billion annually in real Disposable Personal Income, and $171.3 million annually in state revenue. These contracts, annually, amounted to about 1.09% of Florida's total GDP and .88% of Florida's total real Disposable Personal Income. Additionally, defense firms employed around 20 thousand individuals to fulfill the defense contracts awarded in Florida every year.

The defense contracts benefitted Florida due primarily through the sheer volume of contracts and the total annual amount awarded to Florida-based companies. In the 3 fiscal years, this amounted to over $30 billion worth of contracts. In comparison to the rest of the nation, Florida ranked 6th in the total amount of contracts awarded by state.[85]

Additionally, Florida's economy benefitted by the concentration of defense contracts in aerospace manufacturing. Aerospace manufacturing firms have larger economic multipliers than the average Florida company. Larger economic multipliers means more indirect and induced economic impacts in Florida from every dollar spent on aerospace manufacturing contracts.

[85] U.S. Department of Defense Office of Economic Adjustment, "Defense Spending by State, Fiscal Year 2015", 18.

THE SPACE INDUSTRY IN FLORIDA

History

Florida's space industry started in the early 1960s when NASA and the Department of Defense established a space center (subsequently named John F. Kennedy Space Center (KSC)) in Brevard County. The KSC was the primary launch base and control center for NASA space vehicles. The KSC control center handled the launches of NASA space vehicles, while the Mission Control Center in Houston, Texas controlled the space vehicles after liftoff. The NASA missions at KSC included the Mercury program (1959-1963), Gemini program (1963-1966), Apollo program (1961-1972), and the Space Shuttle program (1981-2011).

In 2004, the federal government initiated the end of the Space Shuttle program as part of a larger plan to replace the shuttle with a different space program called Constellation. However, the Constellation was eventually cancelled in 2011 and a new vision of space exploration was announced that placed an emphasis on public-private partnerships and the encouragement of a private, commercial space industry.

This new vision of space exploration led to significant changes at KSC. Historically, the space industry was driven by federal funding of NASA with most space industry employees being federal employees. The partial privatization of the industry led to a significant reduction of the NASA workforce in Brevard County. Additionally, Florida started competing with other states to attract the growing private, commercial space industry.

Florida Initiatives

The Florida Legislature has enacted a number of laws to maintain Florida's position as a leader in the space industry. These programs include economic incentives to the space industry and the expansion of Space Florida, the state's economic development organization for the space industry.

Florida offers specific incentives to the space industry. The Qualified Defense Contractor and Space Flight Business Tax Refund Program (QDSC) was established in 1996 to encourage the creation and/or retention of high-wage jobs (defined as 115 percent or more of the area or statewide annual wage) in the defense and space industries. Incentive awards ranged from $3,000 to $8,000 per job and payments were made over four years. The QDSC program expired on July 1, 2014.

The Sales Tax Exemption for Machinery and Equipment Used in Semiconductor, Defense, or Space Technology Production (SDST) was first created in 1997.[86] When it was originally established, the exemption was limited to silicon technology production and research and development. In 2000, the law was amended[87] to remove any reference to silicon technology and to add semiconductor, defense, or space technology production and research and development to the exemption.[88] The present day exemption is for the purchase of machinery and equipment used in the production processes of businesses engaged in the production of semiconductor, defense, or space technology products for sale or use. In the review period, one company in the space industry used this exemption.

[86] Section 288.012(5)(j), F.S., Ch. 97-278 s.11, Laws of Florida.
[87] Ch. 2000-351, Laws of Florida.
[88] Research and development was removed from this part of the statute in 2006. Ch. 2006-57, Laws of Florida.

The Manufacturing and Spaceport Investment Incentive (MSII) Program was created in 2010 to encourage capital investment and job creation in manufacturing and spaceport activities in the state. The program was intended to relieve a portion of the sales tax burden on existing manufacturers that were not eligible for the standard manufacturing machinery and equipment sales tax exemption. The latter program had requirements for increased productive output that some manufacturers were unable to meet. The MSII program offered a refund of sales taxes paid on purchases of eligible equipment placed into service in Florida in excess of the entity's base year purchases (2008). The MSII program was a temporary program that was only available from July 1, 2010, to June 30, 2012. The program received an allocation of $19 million for sales tax refunds in Fiscal Year 2010-11 and $24 million in Fiscal Year 2011-12, for a total of $43 million.

Space companies receive other Florida incentives. These incentives are not specifically targeted to the space industry, but many space companies qualify for them. During the review period, one space company qualified for the Quick Action Closing Fund Program. In addition, space companies have received financial incentives from local economic development agencies.[89]

Space Florida

In 2006, the Florida Legislature passed the Space Florida Act, which consolidated Florida's existing space entities (Florida Space Authority, Florida Space Research Institute and the Florida Aerospace Finance Corporation) into one organization named Space Florida. Space Florida's mission is to promote aerospace commercial development by facilitating necessary financing, spaceport facilities and operations, research and development, workforce development and education programs.[90]

Space Florida has been given multiple authorities and tools to achieve its mission. First, Space Florida has financing tools that can lower a company's overhead and operating costs. An example of this type of financing is a synthetic lease. A synthetic lease is an operating lease where the asset can be taken off the company's balance sheet and the lease payments recorded as an expense. However, the company can still gain the tax benefits from depreciating the asset. This financial tool allows the company to show a lower liability on its financial statements, but still receive the tax benefits from depreciating the property.

Second, Space Florida finances facilities and machinery and equipment of new or expanding aerospace companies. In conjunction with commercial banks, Space Florida will finance 20 to 25 percent of the project, while the bank finances the remaining balance. Space Florida can also provide assistance in obtaining an operating lease (under Financial Accounting Standards number 13) for the financed assets.

Finally, Space Florida works in conjunction with The Florida Department of Transportation (FDOT) for needed space infrastructure. As NASA and the United States Air Force (USAF) have been reducing their use of the Kennedy Space Center and other installations at Cape Canaveral, the unused facilities have been repurposed for commercial space activity.[91] Space Florida issues a "Call for Projects" in April of every year and matches private funding dollar-for-dollar. FDOT designates space flights and spaceports as a mode of transportation and gives them the same designation within FDOT as existing modes of transportation like roads and airports. FDOT can fund spaceport projects through the Spaceport

[89] Both Blue Origin and Embraer received financial incentives from Brevard County.
[90] Ch. 2006-60, Laws of Florida.
[91] Florida Spaceport Improvement Program, FDOT – 2017 Project Handbook

Improvement Program or through other programs such as the economic development transportation projects under s. 339.2821, F.S. The current FDOT work program anticipates funding $250 million in spaceport projects for the period Fiscal Year 2018-19 through Fiscal Year 2022-23.[92] The Spaceport Improvement Program facilitates and funds projects that do the following:

- Improve aerospace transportation facilities
- Integrate airports and spaceports
- Improve space transportation efficiency and capacity

The following table reflects the state funded FDOT adopted work program for Spaceport projects:

Florida Department of Transportation
Workmix - 8883 Spaceport Capacity Projects
State Funded
As of July 1, 2018

Description	2018	2019	2020	2021	2022	2023	Total
Spaceport Planning and Development		$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000
Brevard - Space FL Horizontal Launch Cargo Processing		$8,600,000					$8,600,000
Statewide Spaceport Program Development	$2,400,000	$1,500,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$11,900,000
Brevard - Space FL Launch Complex Improvements	$28,500,000	$5,000,000					$33,500,000
Brevard - Space FL Shuttle Landing Facility Improvements		$5,000					$5,000
Brevard - Space FL Processing & Range Facility Improvements		$24,300,000	$7,000,000	$5,000,000	$6,000,000	$5,000,000	$47,300,000
Brevard - Space FL Common Use Infrastructure		$37,566,110	$5,000,000	$5,500,000	$7,274,302	$9,723,172	$65,063,584
Brevard - Space FL Launch Complex Improvements & Passenger/Cargo		$9,000,000	$5,000,000	$4,000,000	$2,000,000	$5,000,000	$25,000,000
Brevard - Space FL Horizontal Launch/Landing Facilities		$1,639,800	$5,000,000	$5,500,000	$10,000,000	$10,000,000	$32,139,800
Spaceport		$18,563,307			$3,000,000	$100,000	$21,663,307
Total	$30,900,000	$107,174,217	$25,000,000	$23,000,000	$31,274,302	$32,823,172	$250,171,691

Space Florida currently operates, has helped finance and/or owns multiple facilities that are used by both private and public space entities. These facilities[93] include:

- The Reusable Launch Vehicle Hangar – a partnership with NASA
- Protection and storage of ISS hardware, shuttle equipment, Orbiter satellites, and the Columbia Space Shuttle
- Embraer Engineering & Technology Center
- Exploration Park
- Northrop Grumman expansion in Brevard County
- One Web Satellite Manufacturing Plant
- Apollo Saturn Center
- Space Shuttle Atlantis Center
- Horizontal Integration Facility (HIF)
- Launch Complex 41
- Operations and Checkout Facility at Kennedy Space Center
- Shuttle Launch Experience at Kennedy Space Center

[92] Florida Department of Transportation, "FDOT FY19-FY23 Adopted Work Program" 07/01/2018.
[93] http://www.spaceflorida.gov/facilities

Observations Regarding Other States

Every state offers incentives to attract businesses and promote economic growth. Specific Industries are targeted with incentives provided on a local level as well as on a state level. Incentives can be tailored to the individual company or more generally. Most incentives are financial, like offering businesses lower taxes and decreased costs associated with conducting business, but there are also regulatory incentives like those used by Virginia and Florida. In 2007, Virginia was the first state to offer the Space Industry regulatory incentive and in 2008 Florida quickly followed suit with the Informed Consent for Spaceflight Act which, in the event of an accident or incident, limits the spaceflight provider's liability.[94]

The Federal Aviation Administration (FAA) has licensed 11 sites nationally for commercial launch and reentry sites. The sites are located in California, Virginia, Alaska, Florida, New Mexico, Oklahoma, Colorado and Texas.[95] There are multiple factors that can persuade a company to location in a particular location.[96]

States can develop a university/industry development zone, which encourage companies and universities to locate in close proximity and shared facilities and infrastructure and personnel. Companies have also worked in conjunction with local and state governments to create training facilities to meet the unique instruction needs. For example, Alabama, nine universities and community colleges and Airbus worked together to create the Alabama Aviation Education Center to develop the aviation and aerospace workforce and encourage youths to pursue careers in aerospace.[97] Another example of a collaborative public and private facility can be found at the Advanced Manufacturing Research Centre (AMRC) at The University of Sheffield in England. The AMRC is a research facility that partners with the university and Boeing and other companies to provide research, training and apprenticeships that meet the needs of the aerospace industry.

Another tool is a space authority that can have unique assets or authority and serve as an advocate for the space industry to state and federal authorities. Spaceports are not an incentive, but can be the most persuasive factor in deciding a location due to their subsidized cost-savings for business and the preference for a coastal location.

Florida enjoys the benefit of having a developed space transportation industry and the advantage of location. The following chart compares states with licensed spaceports and each state's relative advantages for the space industry:

State	Coastal State	Space Authority	Spaceport	Legislative Incentives	Space Trans. Applicable Incentives
Alaska	X	X	X		X
California	X	X	X	X	X
Colorado			X		X
Florida	**X**	**X**	**X**	**X**	**X**
New Mexico		X	X	X	X
Oklahoma		X	X		
Texas	X	X	X	X	X
Virginia	X	X	X	X	X

Source: Federal Aviation Administration's report, *State Support for Commercial Space Activities*; *2017 Texas Aerospace, Aviation and Defense*

[94] Unlike Virginia law, the Florida law has no sunset date.

[95] https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=19074 accessed 09/14/2018

[96] State Support for Commercial Space Activities – Federal Aviation Administration

[97] http://www.madeinalabama.com/2017/05/alabama-aviation-education-center/ accessed 09/26/2018

While most states have some form of space authority, almost none have the reach and flexibility of Space Florida.[98] Because of its longstanding spaceflight tradition and history, its existing infrastructure, geographical location, space authority and transportation program, Florida is a leading state for the space industry.

The State of the Space Industry in Florida

The space industry contributes to the Florida economy. NASA currently has over 2,000 employees in Florida.[99] The KSC visitor center is a popular tourism destination and attracts over 1.7 million tourists annually.[100] The popularity of the space center benefits Florida through additional tourism spending in the state.

Several top space companies launch rockets out of Florida and are currently establishing manufacturing facilities in Florida. The larger space companies in Florida include Blue Origin, SpaceX, Boeing, One Web and Lockheed Martin. A list of notable projects can be found below:

- Lockheed Martin is contracting with NASA to assemble the Orion Spacecraft at Kennedy Space Center. Orion is a crew vehicle to be used for deep space exploration. The first unmanned mission is expected in 2019, and the first crewed flight in 2021.[101]
- Boeing has upgraded and utilized the Orbiter Processing Facility for the USAF X-37 Program. The X-37 program is a space plane used for low orbit missions.[102] All X-37 mission have launched from the Cape Canaveral Air Force Base.
- SpaceX has developed and launched the Falcon 9. The Falcon 9 is a reusable rocket for cargo transport.[103] The Falcon 9 is launched from the Cape Canaveral Air Force Base.
- Boeing has contracted to develop the CST-100 Starliner.[104] The Starliner is a commercial low orbit crew vehicle. The Starliner will be launched from the Cape Canaveral Air Force Base.
- Blue Origin is building a $200 million space launch and manufacturing facility at Exploration Park in Brevard County.[105] Blue Origin will launch its New Glenn Orbital Rocket from the Cape Canaveral Air Force Base.[106]
- OneWeb is building a high-volume satellite manufacturing facility at Exploration Park in Brevard County.

It is difficult to accurately measure the total level of employment in the Florida space industry. This is due to the fact that most space companies are also aerospace companies. These aerospace companies design and build commercial and military aircraft in addition to their space-related activities. However, the analysis did look at the aerospace industry in Brevard County as a signal of the overall health of the

[98] Conversation with Frank DiBello, President and CEO and Bernie McShea, Senior Vice President Business Development & Marketing of Space Florida, September 25, 2018

[99] https://www.bls.gov/careeroutlook/2016/article/careers-in-space.htm

[100] https://www.floridatoday.com/story/tech/science/space/2017/05/02/ksc-extends-visitor-complex-contract/101217210/

[101] https://www.lockheedmartin.com/en-us/products/orion.html

[102] https://www.space.com/25275-x37b-space-plane.html

[103] https://www.spacex.com/falcon9

[104] http://www.boeing.com/space/starliner/

[105] https://www.floridatoday.com/story/tech/science/space/2017/12/13/blue-origin-officially-moves-into-new-glenn-rocket-factory-ksc-florida/948899001/

[106] https://www.nasaspaceflight.com/2016/09/blue-origin-new-glenn-orbital-lv/

space industry. As the Table below shows, over the past three years, aerospace employment has grown by over 10% annually. In 2016, the average salary of these aerospace jobs was $107,047.

Annual Aerospace Employment and Average Wages in Brevard County					
	2012	**2013**	**2014**	**2015**	**2016**
Total Employment	4,908	4,888	5,096	5,960	6,506
Average Wage	$96,095	$101,777	$110,409	$101,308	$107,047
Source: Enterprise Florida					

Meeting the Future Needs of the Space Industry

The greatest challenge facing the expansion of the commercial space industry in Florida is the need for a more qualified and skilled workforce. According to Space Florida CEO Frank DiBello, Florida does not provide enough aerospace-related degrees. This leads to a shortage of qualified candidates for the aerospace industry.[107] Instead of training a new generation of aerospace workers, Frank DiBello fears that aerospace companies will take employees away from other companies.[108] This situation would lead to a chronic labor shortage and significantly higher labor costs for the space companies in Florida. In addition to more aerospace-related degrees, retraining is particularly important in the space industry due its constantly evolving and highly technical nature.

Other states and countries have developed successful programs to enhance the local workforce and encourage a greater collaboration between aerospace companies and the local educational system. Some states have developed university/industry development zone, which encourage companies and universities to locate in close proximity to each other and to share facilities, infrastructure and personnel. For example, in Alabama, nine universities and community colleges are working together with Airbus to create the Alabama Aviation Education Center. The center's mission is to develop an aviation and aerospace workforce in Alabama and to encourage youths to pursue careers in the aerospace industry.[109]

Another example of a collaborative public and private facility can be found at the Advanced Manufacturing Research Centre (AMRC) at The University of Sheffield in England. The AMRC is a partnership between the university and Boeing. The center gives any aerospace manufacturer access to the newest machinery, testing equipment and manufacturing technology. In addition, the center provides aerospace apprenticeships and a vocational engineering student program.[110]

[107] https://www.floridatoday.com/story/tech/science/space/2017/05/09/dibello-florida-must-grow-aerospace-talent-pipeline/101428348/ accessed 09/17/2018

[108] Ibid.

[109] http://www.madeinalabama.com/2017/05/alabama-aviation-education-center/

[110] https://www.amrc.co.uk/ for more information.