

Protect and Grow: A Strategic Plan for Michigan's Defense and Homeland Security Economy

Executive Summary and Public Report



Presented by:
The Michigan Defense Center





RICK SNYDER, GOVERNOR

Dear Michiganders ,

Michigan has been a leader in the defense sector for decades. From the Arsenal of Democracy of World War II to our latest missions in cybersecurity and the current deployments of our National Guard, Michiganders have always answered the call to serve our great nation.

As a member of the Council of Governors, I have had the opportunity to interact with senior leaders of the White House and the United States Departments of Defense, Justice, and Homeland Security on many of the issues presented in this document. The Council is a bipartisan organization of ten governors and senior federal officials who advise the President on defense, homeland security, cybersecurity, and other important national security issues that have a state-federal nexus. In addition, I co-chair the National Governors Association Cyber Resource Center, where states come together with the federal government to share best practices on cybersecurity. Since I took office, Michigan has been a leader in cybersecurity and continues that leadership with the recently announced Cyber Operations Squadron at the 110th Attack Wing in Battle Creek.

In 2014, I directed the Michigan Department of Military and Veterans Affairs and the Michigan Economic Development Corporation to initiate the State of Michigan's first comprehensive statewide "Protect and Grow" strategy for our defense assets. This document is the result of the work. It is intended to be an evolving document, continually updated to reflect the latest in Michigan's innovation, technology, and assets.

From our great citizen soldiers of the Michigan National Guard, who live in every one of our 83 counties, to our active duty and civilian military and homeland security professionals, and the tremendous industry partners all across the state, every community was represented in this process.

I want to thank the members of the Executive Council, the Governance Board, and the Advisory Committee for the countless hours of dedication, thoughtful input, and enthusiasm for "Protect and Grow." I also want to thank our congressional delegation for coming together in a bipartisan and bicameral way to support this initiative. I am very proud of this effort and am looking forward to implementing the recommendations in this document.

Sincerely,

A handwritten signature in blue ink that reads "Rick Snyder".

Rick Snyder Governor

The Michigan Defense Center thanks all who participated and offered their guidance and expertise in this important mission. Your support has been immeasurable and we look forward to continuing our work together to successfully implement "Protect and Grow".

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Special thanks to:

Our Michigan Congressional Delegation and their staff members who fully supported and encouraged this effort.

Our military members and civil servants, whose mission in life is to protect our nation and provide the best tools to protect our service members. Thank you for your commitment as well as your thoughtful responses to our inquiries and for your willingness to collaborate and partner with the State of Michigan.

The Michigan Defense Center is an operation of the Michigan Economic Development Corporation focused on the support, protection and growth of Michigan's defense and homeland security missions and the Michigan businesses that support our nation's security and our military's safety.

In 1941 President Roosevelt called upon Michigan and her industries to equip and support our armed forces and those of our allies as America faced its greatest threat. Over the last 75 years, the enemies and battlefields have changed, but the Department of Defense (DOD) continues to look to Michigan for solutions to military requirements and expertise in engaging enemies around the globe.

In 2014, at the direction of Governor Snyder, the Michigan Economic Development Corporation (MEDC) and the Department of Military and Veteran's Affairs came together to support the Michigan Defense Center (MDC) in our recommendation to pursue a statewide, comprehensive strategy to protect and grow our military missions and the economy that supports those important national security missions.

To develop a highly effective strategy, the decision was made to seek a third party firm specializing in national and global defense issues. This firm would be required to engage in information gathering, make objective and candid assessments of the facilities, missions, industries, and opportunities in the State, report results in both a public plan and a confidential document, and make recommendations to guide Michigan's future investments in time, effort, and funding. The Matrix Design Group, in association with The Roosevelt Group, was chosen by an evaluation committee comprised of stakeholders from both the private and public sectors.

Matrix Design Group is an interdisciplinary planning and engineering firm specializing in professional consulting and technical services for federal, state, and local governments; the DOD; private sector entities; and other agencies / organizations. We recognize planning goes beyond the preparation of basic policies and maps – it is about listening to a client's needs, providing a range of innovative alternatives, and creating workable solutions specifically tailored to each client's unique situation. Their team members offer extensive government experience in working with all branches of the U.S. Armed Forces and provide expertise across the spectrum of issues facing our installations and operations today. This experience includes planning activities related to installations

and depots, space utilization, facilities needs assessments, public-private partnerships, shared services, infrastructure, and operations. They specialize in military and compatibility planning, which at a minimum includes: Strength, Weakness, Opportunities, Threats (SWOT) Analysis; Risk Assessments; Economic Impact Studies; Red Teaming; Redevelopment Plans; Joint Land Use Studies; Compatibility Handbooks; and, a full complement of BRAC planning activities.

The Roosevelt Group is a bipartisan government relations consulting firm whose staff has more than 100 years of combined Congressional experience and military service. The Roosevelt

Group represents Battle Creek Unlimited and the Northeast UAS Airspace Integration Research Alliance of which the Northern Michigan Unmanned Aerial Systems Consortium



MICHIGAN DEFENSE
CENTER

is a partner. The Roosevelt Group offers unparalleled expertise to clients in a variety of fields, including defense, homeland security, and intelligence. They provide strategic consulting, advocacy, and strategic communications services on a wide range of public policy issues. As a bipartisan group, they have access to Democratic and Republican decision-makers alike, as well as executive branch personnel at every level of seniority.

This initiative was supported by three extraordinarily important groups who guided the MDC and the consultants throughout the process. We thank the Executive Council (leaders within Michigan's highest level of government), the Governance Board (leaders in private sector economic development and government), and the Advisory Committee (industry leaders of all levels, extraordinary academics, as well as regional and local government leaders from around the state). Your knowledge and passion for our missions was vital and we look forward to continuing this journey with you and hope to draw on your expertise as we implement the strategies of this plan.

The Michigan Defense Center and our state leaders understand the tremendous impact the military, our service members and their families, and veterans have on the state of Michigan and our nation's security. It is our collective responsibility as residents and stakeholders to protect and enhance the ability of our state to not only train and mobilize our service members, but also provide them with the best and most innovative tools and solutions to ensure that their next deployment isn't a fair fight, but decidedly in our favor.

1	<i>Promote and Safeguard Acquisition, Technology, and Logistics (ATL) Capabilities at the Detroit Arsenal</i>
2	<i>Lead the Nation in DOD/State Cyber Operations Integration</i>
3	<i>Secure East Coast Missile Defense Ground Based Interceptor Site at the Fort Custer Training Center</i>
4	<i>Publicize the Importance of the Soo Locks to National Security and Advocate for Funding</i>
5	<i>Invest State Resources to Enhance Military Installations and Defense and Homeland Security Missions</i>
6	<i>Expand Training Ranges and Opportunities</i>
7	<i>Maximize the Michigan Congressional Delegation's Federal Influence and Support for Military Installations</i>
8	<i>Strengthen and Promote Link Between Defense and Domestic Auto; Establish Autonomous Vehicle Corridor on I-69</i>
9	<i>Leverage Partnership Opportunities Between Academia, Industry, Local Government and DOD/DHS Entities Within the State</i>
10	<i>Establish Innovation Center at the Detroit Arsenal</i>
11	<i>Promote and Expand Economic Gardening Tools for Michigan Companies (BTS & Proposal Writing)</i>
12	<i>Target and Invest Resources in the Following Areas of Growth: Aerospace, Advanced Manufacturing, 3-D Printing, and Autonomous Systems</i>
13	<i>Pursue Opportunities and Branding to Lead the Nation in DOD and State Sponsored Renewable Energy Solutions</i>
14	<i>Build and Promote an Asset Database to Leverage In-State Testing and Evaluation Capabilities</i>
15	<i>Study Impacts of Military R&D Tax Incentives and Best Practices in Other States</i>
16	<i>Connect Veteran Talent to Michigan Industry</i>
17	<i>Create New Branding for the Defense Industry in Michigan</i>



Protect and Grow; Public Report

Presented by the Matrix Design Group and Roosevelt Group

In July 2015, The Matrix / Roosevelt Team began our work to:

- Inventory Michigan's defense assets and missions and determine the economic impact of these activities
- Identify a strategic plan to protect current assets, missions, and jobs
- Develop a strategic plan to grow existing operations and identify and pursue new opportunities
- Engage key leaders; congressional, community, industry, association and academic stakeholders

The following is our report to the Michigan Defense Center. This public version of the report provides an overview of 17 state-wide impacting recommendations that were generated while examining Michigan's installations, specifically their strengths, weaknesses, opportunities, and threats. This public report is backed by a confidential report with significantly more detail to include recommended actions for each installation and supporting community. This document is meant to be dynamic, rather than static. We fully expect priorities to evolve over time as our nation's defense priorities advance in this ever-changing defense environment.

Dynamic Environment

Over the next ten years, the threats to our nation's security will continue to evolve rapidly and unpredictably in unforeseen parts of the world, likely undermining existing strategic initiatives such as the re-balancing of forces in the Pacific theater and the ongoing consolidation of U.S. military bases in Europe. At the same time, the Department of Defense (DOD) will continue to struggle with making force structure and end strength reductions as the full effects of the Budget Control Act and Sequestration are realized. Moreover, because Congress continues to block the DOD from retiring significant force structure, the military departments will continue to face difficult choices between funding readiness, modernization, and people programs as they develop budget recommendations.

For the past five fiscal years (FY13-FY17) the President has requested authorization for a Base Realignment and Closure (BRAC) round in the annual budget request. These requests for a BRAC have been supported by DOD leadership and some key members of Congress. The Secretary of Defense (SECDEF) recognizes the defense budget will be constrained for many years to come and BRAC will allow the Department to “realign resources currently consumed by maintaining unneeded facilities.”

If Congress does not authorize another round of BRAC in FY 2017, the “Administration will pursue alternative options to reduce this wasteful spending,” said Sen. Cochran (R-MS) in the Statement of Administration Policy, DOD Appropriations Act, 2016. Downsizing and force consolidation are coming, one way or another. During markup of the FY17 National Defense Authorization Act, the ranking democrat on the House Armed Services Committee, Rep. Adam Smith (WA) offered and later withdrew an amendment authorizing a BRAC-Like process.

Michigan's military missions have not always fared well in previous rounds of BRAC. The Army's Pontiac Storage Facility was closed in the 1988 BRAC, Wurtsmith AFB was closed in the 1991 BRAC, K.I. Sawyer AFB was closed in the 1993 BRAC, the Detroit Army Tank Plant was closed in the 1995 BRAC and the Army's Garrison Michigan at Selfridge was closed in the 2005 BRAC. The Defense Logistics Services Center in Battle Creek was recommended for closure in 1993 and the W.K. Kellogg Air National Guard Base in Battle Creek was recommended for closure in 2005, but both survived the process. However, recognizing Michigan's significant contribution to the future of the DOD and its talent pool of skilled logisticians, procurement specialists, engineers, and research and development talent, the Detroit Arsenal picked up new missions and a significant force increase of 1100 professionals in the 2005 BRAC process.

THE 217TH AIR OPERATIONS
GROUP AT BATTLE CREEK
AIR NATIONAL GUARD BASE

THE DEFENSE LOGISTICS
SERVICES CENTER AT
THE HART-DOLE-INOUYE
FEDERAL CENTER



*... each of
the military
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additional growth*

Today, there are no traditional active duty military bases in the State of Michigan. This creates a vacuum among the DOD active duty components' understanding and visibility of the opportunities that Michigan has to offer and therefore this plan focuses on this message: each of the military missions and industries in Michigan has the capacity to accommodate additional growth!

Michigan is well positioned to preserve the missions that already exist and to attract, create, and grow new opportunities. The State has support for her military installations, suppliers, and communities internally, but Michigan has lost significant influence over defense spending, strategy, and policy decisions at the national level following the retirement of senior members of the congressional delegation. No members of the current congressional delegation serve on the Armed Services or Appropriations committees, placing the State at a significant disadvantage in attracting the attention of DOD leadership, influencing Pentagon decision making and shaping the annual defense authorization and appropriations bills on Capitol Hill. While Michigan's defense-related congressional influence in Washington, DC has waned, it is important to note that Governor Snyder serves on the Council of Governors. This bipartisan panel of 10 Governors advises the President, SECDEF, and DHS Secretary on Defense, Homeland Security, and Cybersecurity issues.

Today, there are no guarantees. New missions will not simply "show up" in Michigan. While the State has the advantage of readily available opportunities, the future for the DOD is one of further consolidation and relocation to installations that are best positioned to absorb these new missions, while providing real efficiencies and cost savings to the Department. Efficiencies and cost savings take many forms and often it is the neighboring community that motivates an installation to embrace cost saving initiatives. This deftness is the impetus of the new authority provided by Congress allowing military installations to enter into intergovernmental support agreements with local governments to provide, receive, or share support services for municipal



MICHIGAN NATIONAL
GUARD, CAMP GRAYLING

functions. The Air Force's Public-Public/ Public-Private Partnership (P4) efforts have yielded such inter-governmental service agreements and have led to some fascinating recommendations, ranging from the development of solar fields and co-generation electricity plants to sharing medical, firefighting, and security services.

The expectation that the DOD will be the sole investor in military missions and activities has shifted. The new paradigm is that states are spending millions of dollars in and around their military installations because they understand the inherent and intrinsic value of military operations. More so than ever, the defense installation is a community asset to be protected, and states and communities are committing real resources to do so. Money is not always the answer. Joint planning, cooperation, and community outreach are also important. Advocacy inside the Pentagon, the White House, and on Capitol Hill can educate and enfranchise state leaders to the trends and opportunities for new missions and remind our military and congressional leaders that Michigan insists on being part of the conversation when it comes to new and relevant missions. Force structure and end strength may continue to decline as the Pentagon prepares to field a smaller force, but such a force hosts some dazzling capabilities and opportunities, and ones that will coalesce within the most efficient installations, connected to competent defense communities whom are postured and resourced to do business and solve problems with the DOD.

In addition to the challenges and opportunities identified above, the DOD recognizes its cumbersome acquisition process hampers its ability to acquire many of the 21st Century technologies needed to maintain a military advantage. In support of its Third Offset Strategy, the DOD established the Defense Innovation Initiative (DII).¹ The initiative aims to offset superior numbers and technological advances of Russian, China, and other competitors by funding and developing new technologies. The first offset was nuclear weapons, the second smart weapons, and the third seeks advances in artificial intelligence and autonomous systems. The DII will more deliberately connect industry with the DOD in areas such as autonomous systems, ground platforms, materials and manufacturing processes, and weapons technologies. Additionally, Defense Secretary Ash Carter stated the Department needs to "move at the speed of business", recognizing the expedient pace at which tech hubs around the country operate. As part of the DII, the DOD launched the Defense Innovation Unit (Experimental) – DIU(X) – establishing offices in Silicon Valley and Boston. The DIU(X) mission is to cultivate and facilitate a lasting relationship with new innovators and those who haven't traditionally worked with the DOD and help expand its innovative ecosystem of ideas.² To facility this mission, the DOD is investigating ways to circumvent the traditional acquisitions process. The DII, while still in its infancy, affords Michigan's industry – defense or otherwise – a unique opportunity to leverage its research and development, engineering and manufacturing capabilities to development non-traditional DOD business opportunities.

More so than ever, the defense installation is a community asset to be protected, and states and communities are committing real resources to do so.

¹ Secretary of Defense, Defense Innovation Initiative Memo, OSD013 – 14

² Defense Innovation Unit Experimental: <http://www.diux.mil/>

Michigan's Assets

Michigan is home to seven military locations important to our nation's security.

- **Detroit Arsenal**
- **Selfridge Air National Guard Base**
- **Battle Creek Air National Guard Base**
- **Fort Custer**
- **Defense Logistics Agency**
- **Camp Grayling Joint Military Training Center**
- **Alpena Combat Readiness Training Center**

The Detroit Arsenal is home to the Army's Tank-automotive and Armaments Command (TACOM) Life Cycle Management Command (LCMC). TACOM manages 65% of all Army equipment, spanning 32 product lines and 38,000 components. Nearly 45% of their talented 7,500 personnel workforce is made up of veterans. The garrison's geographic location in a major metropolitan area allows it to operate with a high degree of efficiency and effectiveness. The Arsenal's tremendous location provides access to an unmatched labor pool that is rich in both breadth and depth. This is further augmented by one of the nation's most impressive series of academic institutions (University of



THE DETROIT ARSENAL



Michigan, Michigan State University, and Wayne State University, just to name a few), that directly link and support the vast array of requirements generated by the Arsenal's multiple mission partners.

The following major missions are inextricably linked, with significant tie-backs to numerous defense-related clusters:

- **U.S. Army Tank Automotive Research, Development & Engineering Center (TARDEC)** – TARDEC is a TACOM Life Cycle Management Command partner responsible for critical technology functions, including: technology maturation and integration; technology subject matter expertise; systems-level engineering analysis; and systems engineering. The organization is responsible for maximizing the research, development, transition, and sustainment of technologies and integration across ground systems.
- **Program Executive Office Combat Support & Combat Service Support (PEO CS & CSS)** – one of 12 Army Acquisition Corps organizations responsible for the lifecycle management of Army equipment; responsible for more than 350 Army systems, including nearly 200 programs in active management spanning the range of Army transportation, engineering, and sustainment portfolios.
- **Program Executive Office Ground Combat Systems (PEO GCS)** – responsible for providing ground combat equipment; includes the Bradley and M109 Self Propelled Howitzer family of vehicles. It provides lifecycle logistics for the M1 Abrams and M88 vehicles, and managing acquisition, development, and sustainment for Stryker vehicles.
- **Integrated Logistics Support Center (ILSC)** – provides Life-Cycle Sustainment Management for all TACOM LCMC managed items. The center is responsible for sustaining warfighting readiness and managing a large part of the DOD's investment in warfighting as integrators of approximately 3,200 weapon systems that form the core of America's ground combat fleet capability.
- **Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD)** – advances technologies and prototypes through research and development to procurement programs providing validated chemical, biological, radiological, and nuclear (CBRN) defense products to the military services.
- **Army Contracting Command (ACC)** – responsible for acquisition support and contracting for a large number of the Army's major weapon systems, systems and equipment supporting other services, depot-level maintenance services, and foreign military sales customers. It procures research and development, systems, repair parts, and services for Combat Vehicles and Combat Vehicle Armaments.



KC-135T STRATOTANKER
STATIONED AT SELFRIDGE
AIR NATIONAL GUARD BASE

MQ-9 REAPER MISSIONS
OPERATED FROM BATTLE
CREEK AIR NATIONAL
GUARD BASE

WIND FUNNEL AT
FORT CUSTER



Selfridge Air National Guard Base is home to many diverse DOD and Department of Homeland Security units, including the Air National Guard, Army, Navy, Marine Corps, Coast Guard and the Department of Homeland Security's Customs and Border Patrol. Selfridge takes pride in having permanently assigned units from all five of the uniformed services. The Michigan Air National Guard's 127th Wing is the host at Selfridge and has elements reporting to Air Combat Command (A-10s), Air Mobility Command (KC- 135s) and Air Force Special Operations Command (107th Weather Flight). In addition to these diverse units, Selfridge is truly a joint operation and with its proximity to TACOM and TARDEC, it provides outstanding opportunities for leading edge programs such as advanced water purification and robotics. Unlike most other Air Guard bases, the Air Force owns the installation, rather than leasing from another entity. This is a significant funding challenge for the Air National Guard and puts Selfridge under the microscope in

every BRAC round. The base has experienced some growth since BRAC 2005, and their fighter, tanker, and special operations weather flight missions are relevant to the fights our nation faces today.

Battle Creek Air National Guard Base is home to the 110th Attack Wing. The Wing hosts three separate missions: Flying Remotely Piloted Aircraft (RPAs), an Air Operations Group and a Cyber Operations Squadron. The Cyber Operations Squadron is significant in that it is a recent addition to the installation. Battle Creek receives tremendous community support, has high quality and low cost infrastructure, and comprises a talented, agile workforce proven through its adjustment to several mission conversions since BRAC 2005. Battle Creek will be a pivotal partner if Fort Custer is selected as the location for an East Coast Missile Defense Site, which would be a tremendous win for the Battle Creek community and the State. Finally, Battle Creek hosts the Defense Logistics Agency's Disposition Services Training and Operations Simulation Center, and shares a fence line and many services with Fort Custer as well as the US Navy Reserve and US Marine Corps Reserve.

Fort Custer is a federally owned and state-operated Michigan Army National Guard training facility primarily used for small arms, live fire, and unit maneuver training. Fort Custer is one of the most utilized training facilities in the Midwest supporting customers from multiple services, agencies (FBI, state police, etc.), and states. In addition to many other tenants, they also have the Fort Custer Education Center which is a state of the art training and conference center with onsite billeting for over 200 guests that can service a variety of training needs. Fort Custer is one of four finalists for the potential construction of an East Coast Missile Defense Site. Finally, Fort Custer is on the cutting edge of renewable energy

hosting an operational solar field and wind funnel program, and is being considered for a DOD grant to test micro-grid technology.

The Defense Logistics Agency (DLA), housed in leased space in downtown Battle Creek at the Hart-Dole-Inouye Federal Center, is home to two key parts of DLA's operations: Disposition Services as well as Information Operations and Logistics Information Services. Nearly 1,500 employees work at the center. Disposition Services manages the usable excess property, scrap, and hazardous waste generated by military operations. Information Operations and Logistics Information Services creates the national stock numbers that identify each piece and part of military equipment and operate a 24/7 call center to help the services solve logistics problems. In addition, this site also hosts a DHS MegaCenter which monitors alarm systems, closed-circuit television networks, and wireless dispatch communications for federal facilities around the nation.

Camp Grayling Joint Military Training Center (JMTC) is a full-spectrum, four-season training center, providing year round, customer-focused training support and high quality facilities that enable military commanders and civilian leaders to meet their unit readiness requirements. It is the largest National Guard training facility in the United States and is the main training facility for the Michigan National Guard. This unique asset supports DOD, law enforcement agencies, joint and international partners, and civilian customers 365 days a year. They host an impressive billeting capacity of over 6,700 students and have over 147,000 acres, 38 ranges and 58 training areas. They offer training that can integrate air, land and sea across four seasons. They are host to a number of significant exercises, including ARCTIC EAGLE, NORTHERN EXPOSURE and NORTHERN STRIKE, attended by 29 different organizations from 16 states and 2 international partners.

Alpena Combat Readiness Training Center (CRTC) is one of four combat readiness training centers in the United States. It is the largest airspace complex east of the Mississippi River (including supersonic permission over Lake Huron) and has a 9,000 foot runway that can accommodate nearly any military aircraft. Their State Partnership Program has supported United States security cooperation goals by having the Michigan National Guard engage with partner nations, including Latvia and Liberia. Alpena also partners with Camp Grayling to host Operation NORTHERN STRIKE, the only exercise of its size and scope that combines hundreds of personnel from numerous states and coalition countries to train on joint operations between air, land, and sea units.



THE DEFENSE LOGISTICS
AGENCY IN BATTLE CREEK
CAMP GRAYLING
ALPENA COMBAT READINESS

Economic Impact of Michigan's Military Footprint

Table 1. Total Employment – 105,097

Economic Measure	Economic Impact (Direct, Indirect, and Induced)
Gross Regional Product (Value added)	\$9.05 Billion
Personal Income (Total Compensation)	\$9.73 Billion
Personal Consumption Expenditures	\$7.95 Billion

One of the key tasks of the Protect and Grow Initiative was to determine a baseline economic impact of Michigan's military footprint. Due to conflicting numbers from a variety of sources around the state, an economic impact assessment utilizing industry standard economic modeling methods was employed. The study focused on three key components of military-related spending:

- 1 Military and Civilian Personnel**
(Payroll)
- 2 Procurement Dollars**
(Department of Defense and Department of Homeland Security)
- 3 Transfer Payments**
(Military Retirement Pensions and VA Expenditures)

Military and Civilian Personnel. Michigan is home to over 27,000 Active Duty, National Guard, Reserve, and Civilian personnel. These personnel impact the state's economy in various degrees. For instance, while federal active duty and civilian personnel are full-time wage earners, Traditional Guardsmen serving in both the Air and Army National Guard typically train and thus earn military pay two days a month and two weeks a year. Traditional Guardsmen can, and do, often serve more than their mandatory training, such as when deployed. Regardless, all personnel impact the state's economy through the purchases of goods and services.

Table 2 provides a breakdown of Michigan's Total Force Structure. As is evident from the table, the state is dominated by National Guard, Reserve and civilian personnel. As a result, economic impacts generated by personnel occur in all 83 counties. In all, Michigan's military and civilian personnel earned approximately \$1.3 billion in FY 2014.

SOURCE: DOD BASE STRUCTURES REPORT, MICHIGAN DEPARTMENT OF MILITARY AND VETERANS AFFAIRS, AND US COAST GUARD (9TH DISTRICT)

Table 2. Total Force Structure

Component	Quantity
Active (DOD and Coast Guard)	2,089
National Guard	10,030
Reserve	5,421
Civilian	9,729
Sub-Total	27,269

Procurement Contracts. With only 7% of its force classified as active duty, Michigan's core contribution to our nation's defense lies primarily with its manufacturing and technical capabilities. During FY 2014, nearly \$2.5 billion in defense-related prime contracts were performed in-state. Of these contracts, over 70% were performed within the Transportation Equipment Manufacturing (TEM) and Professional, Scientific, and Technical Services (PSTS) sectors. The average annual earnings for each sector in 2015 was \$74,000 and \$76,500, respectively.³ As a comparison, in 2015, Michigan's average wage, across all sectors, was close to \$47,000, meaning that 70% of DOD contracts that were performed in-state were done so in sectors that earned, on average, 65% higher wages than the state average.⁴

However, these sectors are diverse in their industrial make-up and include a variety of sub-sectors with earnings substantially higher than the state's average. When each sector is parsed into its constituent sub-sectors, the earnings picture becomes even more striking (see Table 3). Nearly 95% of all contracts in the TEM sector were performed in the Military Vehicles, Tank, and Tank Component Manufacturing (MTTC) sub-sector. The average annual earnings for this sub-sector is close to \$98,000 – nearly 110% higher than the state's average. This is a telling statistic in that over 50% of the \$2.5 billion in DOD contracts performed in-state were done so in the MTTC sub-sector.

Chart 1. Michigan's DOD Procurement Dollars by Industry

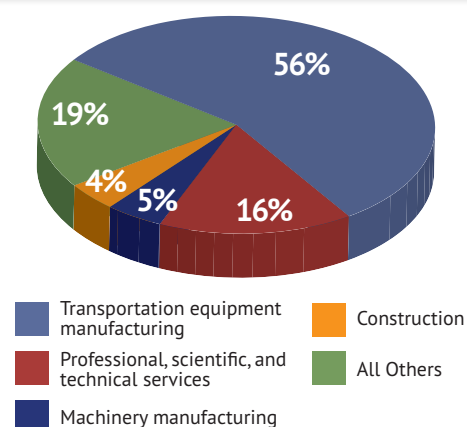


Table 3. TEM Sector

Transportation Equipment Manufacturing (TEM) Sub-Sectors	FY 2014 DOD Prime Contracts	Average Earnings
<i>Military Vehicles, Tank, and Tank Component Mfg.</i>	\$1,257,659,000	\$97,755
<i>Aerospace Product and Parts Manufacturing</i>	\$55,802,000	\$66,318
<i>Motor Vehicle Parts Manufacturing</i>	\$34,757,000	\$69,766
<i>Motor Vehicle Body and Trailer Manufacturing</i>	\$6,872,000	\$65,648
<i>Ship and Boat Building</i>	\$1,202,000	\$57,462
<i>Motor Vehicle Manufacturing</i>	\$1,008,000	\$87,831
<i>All Other Transportation Equipment Mfg.</i>	\$704,000	\$50,084
Total	\$1,358,005,000	\$73,903

SOURCE: ECONOMIC MODELING SPECIALIST, INC. (EMIS), DATA 2016.1 FINAL RELEASE: MARCH 11, 2016

³ Economic Modeling Specialist, Inc. (EMIS), Data 2016.1 Final Release: March 11, 2016.

⁴ Ibid

When analyzing the PSTS sector (Table 4), 72% of contracts performed therein were within the Architectural, Engineering, and Related Services (AES), Scientific, Research, and Development Services (SRD), and the Computer Systems Design (CSD) sub-sectors. Combined, these sub-sectors earn an average of \$86,000 per year or 82% higher than the state average.

Table 4. PSTS Sector

Professional, Scientific and Technical Services (PSTS) Sub-Sector	FY 2014 DOD Prime Contracts	Average Earnings
<i>Architectural, Engineering, and Related Services</i>	\$141,059,000	\$80,139
<i>Scientific, Research and Development Services</i>	\$96,692,000	\$109,381
<i>Public Relations and Related Services</i>	\$89,827,000	\$66,763
<i>Computer Systems Design</i>	\$38,641,000	\$84,797
<i>Management, Scientific, and Technical Consulting Services</i>	\$15,731,000	\$67,241
<i>Other Professional, Scientific, and Technical Services</i>	\$3,589,000	\$40,6021
Total	\$385,539,000	\$76,707

SOURCE: ECONOMIC
MODELING SPECIALIST, INC.
(EMIS), DATA 2016.1 FINAL
RELEASE: MARCH 11, 2016

The procurement data for Michigan's defense industry clearly demonstrates that it performs the vast majority of its contracts in industrial sectors that produce high-wage, value added jobs. The high concentration of contracts in these sectors is a function of the historical relationship between Michigan's automotive sector, engineering talent and defense-related industries. At the core of this relationship is the Detroit Arsenal, which awarded nearly \$1.5 billion in acquisition, manufacturing, and Research, Development, Testing and Evaluation contracts to Michigan based companies in FY 2014. Of the \$2.5 billion in DOD contracts performed in-state, the Arsenal was responsible for awarding nearly 60% - solidifying the Arsenal as the prime economic driver for Michigan's defense industries.

Transfer Payments. Michigan is home to over 650,000 veterans, of which nearly 30,000 are retired military service personnel.⁵ Both populations, directly and indirectly, contribute significantly to Michigan's economy. As veterans and military retirees spend their federal compensation and pension payments, these dollars ripple through the Michigan economy impacting a variety of economic sectors. For FY 2014, the Department of Veterans Affairs (VA) spent approximately \$3.75 billion on services for veterans throughout the state. These dollars were expended in the form of compensation, medical care, education, and facility construction and operations. Moreover, Michigan's military retirees received nearly \$575 million in retirement pensions from the DOD and DHS. Combined, the VA and DOD spent over \$4.3 billion on veterans' services and military retiree pensions in Michigan during FY 2014.

While the federal dollars that these populations attract are substantial, it should be noted that both populations also contribute significantly to a trained, educated workforce. As of 2014, of the 650,000 veterans and retired military service personnel residing in Michigan, 50% were working age – nearly 7% of the state's labor force. This statistic is important as many veterans are highly skilled, experienced members of Michigan's workforce, providing local industry a pool of talent from which to draw.



Table 5. VA and DOD Transfer Payments, Michigan (FY 2014)

Expenditure Type	2014 Dollars (Millions)
<i>Veterans Compensation & Pension Payments (VA)</i>	\$1,983
<i>Medical Care (VA)</i>	\$1,421
<i>Education & Vocational Rehabilitation/ Employment (VA)</i>	\$233
<i>General Operating Expenses (VA)</i>	\$53
<i>Insurance & Indemnities (VA)</i>	\$46
<i>Construction (VA)</i>	\$18
<i>Military Retiree Pensions Payments (DOD and Coast Guard)</i>	\$574
<i>Total</i>	\$4,327

SOURCE: DEPARTMENT
OF VETERANS AFFAIRS,
DEPARTMENT OF DEFENSE
OFFICE OF THE ACTUARY

⁵ It should be noted that retired military service personnel residing in-state are a sub-set of the larger veterans population. Because only military retirees receive pensions from the DOD/DHS, they are considered separate populations for modeling purposes.

Employment: estimates of the number jobs, both full-time and part-time, inclusive of employees, sole proprietors, and active partners.

Gross Regional Product:

The market value of all goods and services produce by labor and property in the region.

Output: The sum of output for private non-farm industries, state and local government, federal civilian, federal military, and farm sectors.

Personal Income: Income received by person from all sources. It is the sum of compensation of employees, supplements to wages and salaries, proprietor's income, personal income from assets, and personal current transfer receipts (social security payments, military retirement's pensions, VA compensation, etc.)

Personal Consumption Expenditures: The goods and services purchased by all persons.

Total Economic Impacts

Understanding how the three components of military-related spending impact the state's economy is an important aspect to protecting and growing Michigan's current military missions and defense industries. The total economic impact of these activities includes how the initial defense-related expenditures – whether it be through payroll expenditures, procurement contracts, or transfer payments to Veterans and military retirees – ripple through the economy creating indirect and induced economic effects.

■ **Direct Economic Effect:**

It is a series (or single) of production changes or expenditures made by producers/ consumers as a result of an activity or policy

■ **Indirect Economic Effect:**

The impact of local industries buying goods and services from other local industries as a result of the direct expenditure

■ **Induced Economic Effect:**

The response by an economy to an initial change (direct effect) that occurs through re-spending of income received by a component of value added

In order to estimate these impacts, the REMI PI+ econometric model was used, which estimates a series of impacts to the state's production and consumption measures associated with military-related spending.⁶ It is estimated that all defense-related spending for FY 2014 supports over 105,000 job throughout the state, added more than \$9 billion in Gross State Product, and created nearly \$10 billion in Personal Income. Finally, the personal income generated by Michigan's defense-related activities supports nearly \$8 billion in personal consumption expenditures throughout the state.

Table 6. Total Economic Impacts Associated with Michigan's Military Footprint

Economic Measure	Current Dollars
Gross Regional Product	\$9.05 Billion
Output	\$16.44 Billion
Personal Income	\$9.73 Billion
Personal Consumption Expenditures	\$7.96 Billion

REMI PI+ MICHIGAN COUNTIES V1.7.7 (BUILD 4068)

⁶ The REMI model is unique with regard to traditional input-output models in that it estimates how an exogenous economic shock to a region impacts a variety of economic variables across a multitude of regions. It does so by applying Computable General Equilibrium techniques and use of the New Economic Geography theory to adjust the outputs of a standard input-output model. As such, REMI is able to adjust for potential migration, consumption, and production patterns stemming from the initial economic shock. This differs from traditional input-output models where the multipliers used to determine indirect (secondary) and induced (tertiary) economic effects assume a constant return to scale for all production and are static across space and time.



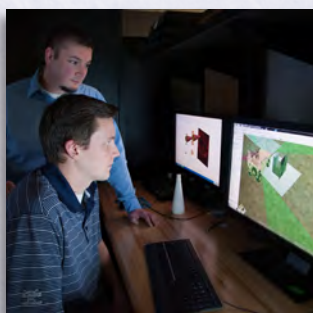
THE 110TH ATTACK WING
AT THE BATTLE CREEK AIR
NATIONAL GUARD BASE WILL
BE ONE OF FOUR NEW SITES
FOR A CYBER OPERATIONS
SQUADRON

Cyber

Michigan is at the forefront of cyber operations and civilian population cyber awareness. Through documents such as the Michigan Cyber Initiative 2015 and the Michigan Cyber Disruption Response Strategy, state government is defining roles and responsibilities for responsible cyber operations amongst its public sector, its business and academia, and its citizens, including the first of its kind Michigan Civilian Cyber Corps (Mi3C). The recent addition of Army National Guard Cyber Protection Team (CPT) and Air National Guard Cyber Operations Squadron (COS) gives Michigan the opportunity to set the national standard for integrating cyber operations between DOD Cyber Teams and State cyber operations assets, supported by Michigan based research and development from academia and industry. We explore this in one of our recommendations.

Michigan has tremendous intellectual capacity in cyber across academia and industry, specifically linked to the auto industry. Coupled with the unmanned aircraft systems presence, Michigan is uniquely poised to conduct research and development, testing, prototyping, and exercise and training on all aspects of cyber security associated with the operations of land and air vehicles, both manned and autonomous. Industry-led organizations such as the Michigan Automotive & Defense Cyber Assurance Team (MADCAT) are setting the example of developing professional networking environments through collaborative forums such as periodic workshops, panel discussions, and training sessions focused on cybersecurity and disaster preparedness. The National Defense & Industry Association (NDIA) in Michigan is also bringing together cyber professionals through forums such as their Cyber Summit and Michigan Defense Exposition. The Merit Networks led Michigan Cyber Range is another massive effort to connect academia, industry and state government organizations to collaborate on cyber training, emerging





CYBER TECHNOLOGY IN THE
AUTO INDUSTRY
TARDEC INNOVATIONS

technology, and awareness education. The common goal of all of these organizations is to enhance Michigan's place in the cyber community and to make Michigan the top choice for cyber businesses and young graduates from cyber related college programs.

This strong footing for cyber collaboration will serve as the foundation for growth opportunities in supporting cyber operations for both the state and its DOD component. As we explored all aspects of the industry across the state, we know that each of them has a cyber component. Each of the following areas have opportunities which should be explored for investment and are often considered foundational to many of the discrete recommendations made later in this report:

Auto Industry: While there is cyber expertise in other areas of the country such as Silicon Valley in California, Michigan hosts decades of experience and expertise in the auto industry. Cyber technology is portable and can be brought to Michigan, but the reverse, taking the auto innovation, manufacturing, and R&D expertise to California, is an unimaginable proposition. The solution lies in the collaboration between the Michigan-based universities that breed cyber innovation and auto industry engineers. This collaboration will bring new "cyber" original equipment manufacturers (OEM) to the region to drive solutions to security issues surrounding cyber-enabled vehicles. Michigan's "I-69" corridor provides the OEMs a proving ground for technologies, which brings solutions to market at the speed necessary to keep pace with the rapidly expanding cyber threats, and allows other partners, such as the military, to shape requirements of the end product.

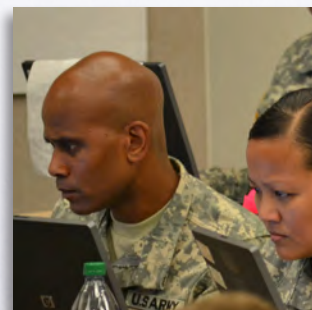
DOD Prototypes: TARDEC has a long history of rapidly prototyping potential solutions, enabling the delivery of solutions to military unique challenges more quickly than a normal military acquisition cycle. Through a strong open partnership between TARDEC, the auto industry, and the emerging cyber OEMs, this same methodology would be used to create solutions for securing vehicles used in battlefield conditions from proliferating cyber threats. Another key military unique function is protecting cargo tracking information in the trucking industry. FedEx, UPS, and other trucking companies have created a network to track packages in order to increase efficiency and customer satisfaction. But while that may be useful for tracking a doggy bed ordered by a customer from PetCo, making the movement of ammunition from a depot to a forward operating location is information an adversary wants and thus needs to be protected. Collaboration and TARDEC prototyping of academia developed technology integrated with industry provided tracking systems will make the live testing and proving of cybersecurity capabilities on the I-69 corridor more successful and efficient, enabling TACOM to field a solution in a rapid manner. These kinds of military unique challenges make Michigan the right place for tight collaboration between academia, industry, and the military.

Unmanned Aerial Systems: The same unique military situation is found in the UASs that are flown daily by the DOD for various missions such as adversary tracking, high value target identification, tracking, targeting, surveillance, reconnaissance, and intelligence. These missions produce critical information used by decision makers on the battlefield;

but if allowed to be in the hands of the adversary, it could cause harm to friendly troops in the region. Methods to protect and deliver data collected by UASs will continue to be challenged by adversary cyber capabilities, so continuous counter cyber capabilities will need to be developed, tested, and employed by our own CPTs. Having Army and Air Force trained and equipped Cyber Teams in Michigan coupled with UAS manufacturers and test ranges again makes Michigan the right place for tight collaboration between academia, industry and the military. As the use of UASs in civil applications such as natural disaster recovery and law enforcement operations, the transfer of knowledge between CPT and Mi3C teams would be paramount to integrating these capabilities into daily State operations.

Modeling and Simulation: One of the greatest challenges in cyber operations is understanding and controlling second and third order effects caused by attacks and counter attacks. Second order effects can be evaluated during simulations of cyber operations. Once evaluated, cyber tool providers can modify their code and cyber operators can put control parameters around their tactics, techniques and procedures (TTP) to control these effects, making their intended effect still happen, but keeping collateral damage to a minimum. Properly modeling a cyber environment and simulating cyber operations in that environment are critical components of any development and training program. Already on the Michigan Cyber Range, the ALPHAVILLE simulation environment is a great foundation for developing and testing new cyber defense tools that would, after passing effectiveness and control tests, be rolled into the virtual tool kits of Mi3C and CPT teams for training and operational use on live Michigan networks. As ALPHAVILLE grows in maturity, it would offer additional opportunities for software companies to develop and test new tools, thus attracting cybersecurity software companies to the region.

Connected Innovation: Because of the vast computing environment established in the Michigan Cyber Range, software companies in Marquette or Grand Rapids can access the maturing ALPHAVILLE including models of UAS command and control links, and software coders in the UAS industry could simulate threats and effects of malware on these systems to develop and test defensive tools. Once proven, they could take these same tools out to their live UAS ranges and test them in a live environment before taking them to production and training cyber operators on their use. In a similar manner, cyber defense of ground vehicles could be developed and tested by software companies from anywhere in the State on the Michigan Cyber Range. As an example, again as the ALPHAVILLE environment expands to include vehicle and autonomous vehicle models, a software company in Marquette that has developed a cyber sensor to detect and isolate malicious code in the automatic braking systems being fielded on vehicles today could test their software without leaving the Upper Peninsula. Processes should be put in place to allow models of ground and aerial vehicles to develop, test, and field solutions to cyber issues that exist today.



TRAINING EXERCISES FOR
ARMY CPT SOLDIERS



ALPHAVILLE, PART OF THE
MICHIGAN CYBER RANGE
INFRASTRUCTURE



CYBER FORENSICS

Innovation Center: The examples above illustrate where academia, industry, and government organizations can find common ground to solve cybersecurity issues. An Innovation Center, as discussed in an independent recommendation later in the report, would be the hub of modeling and simulation to expand the development and testing of cyber capabilities in areas of expertise already know as foundational research and development to Michigan. However, the Innovation Center could be much more than focused on UAV and auto cybersecurity technologies. This center could be the place to showcase any Michigan-based emerging cyber technologies. The issues that plague cybersecurity operators today – visibility of network activity, detection and identification of advanced persistent threats, malware proliferation across networks, behaviors of malware in disparate cyber environments such as IPv4, IPv6, wireless, and ICS networks, etc – would be simulated or emulated at the center, giving software designers realistic environments to develop and test their code. These software designers would be from across the research and development community within Michigan including industry, academia, and government organizations, all collaborating in the Innovation Center environment. Additionally, experts from the Mi3C and CPT teams would be available for testing and could then smoothly transition mature tools into team training and operations.

Cyber Forensics: The suggested Innovation Center could also act as a hub for developing forensic techniques. At any crime scene, preserving evidence is paramount in finding and prosecuting perpetrators. This is no different in cybercrime, but is often overlooked due to the urgency of restoring services. For example, consider a power plant whose power production control system has been compromised, and all power generation has been terminated. This would be devastating to the community whose power has just been shut down, and the company, as well as community officials, would want power production capabilities to be brought back on line as quickly as possible. Depending on the time of year, this could be a life or death situation. Michigan's Cyber Disruption Response Plan would be put into action to have the right Mi3C team activated to gain control of the situation, helping the power facility mitigate the cyber threat and restore operations. While that is happening, the second part of the Mi3C team would be gathering evidence on the network for law enforcement use. Given a robust simulation capability at the Innovation Center, Mi3C teams could walk through this scenario to optimize their TTPs for service restoral and forensics gathering long before the event happens at a real power generation plant.

School House: A joint venture between Army and Air Force units of the Vermont National Guard established a school house in 2009 at Norwich University to train National Guard and Air National Guard units of cyber warfare capabilities and cyber weapon systems. This is the facility that supplies standard pipeline training to Army and Air Force Guard cyber units, but with the steady increase in demand to bring Cyber Protection Teams (CPT) up to mission ready status as quickly as possible, Michigan, specifically the Training Center at Fort Custer, is positioned to absorb the excess needs

and create follow-up hands-on training opportunities to the classroom training at Norwich. With the vast capabilities of the Michigan Cyber Range, a modification that connects both Fort Custer and the Norwich location directly to the range would enable co-course instruction followed by realistic cyber capture the flag exercises between the two sites. In addition to expanding the existing Guard training capabilities at Norwich and creating a realistic exercise environment through establishing Fort Custer Training Center as a CPT training facility, it would also double as the primary training facility for the Mi3C. This move would enable both CPT and Mi3C teams to have the best training available on a highly capable environment, housed in a modern training center that currently has capacity to spare. Connect this with the Innovation Center and ALPHAVILLE simulation capabilities and Michigan will lead the way in cutting edge cybersecurity training and Defensive Cyber Operations (DCO) TTP development.

Unique Training/Exercise Environments: As cyber technology evolves, more and more military equipment is dependent on connectivity to conduct missions. With this dependency comes the imperative that cyber defenders ensure freedom of movement in cyberspace to mission assurance of this equipment. As discussed, both the Army and the Air Force operate unmanned aerial systems (UAS), and there is a rapidly growing need to incorporate autonomous vehicles in ground-based missions as well. While the Training Center might be considered “more of the same” compared to the Guard cyber training already established in Vermont, Michigan offers two very unique training environments to hone DCO skills and TTPs in vehicle and UAS defense.

The I-69 corridor offers a unique “lab” for DCO capabilities to be tested against various kinds of cyber threats against vehicles, which would in turn translate to capabilities that would be incorporated in DCO operations to protect military supply convoys and troop movements. For instance, new technologies of TTPs that would protect the tracking information that can be obtained as supply vehicles loaded with cargo pass through radio frequency (RF) capturing devices ensuring the integrity of the data used for friendly cargo and blue force tracking while denying the adversary the same. Additionally, DCO capabilities that protect autonomous or manned vehicles could be tested in the same environment to ensure the safety of the vehicles and their operators. While there are other vehicle cyber labs such as the initiative at Moffett Field in California, the I-69 corridor offers a highly realistic environment in which DCO tools can be tested and TTPs can be developed and practiced.

In addition to the I-69 corridor offering an environment for DCO tool testing on terrestrial vehicles, the northwestern Michigan corridor offers a similar range capability for the UAS community. Numerous companies, fueled in part by the innovation of Northwestern Michigan University, have made this area the centerpiece of drone manufacturing and testing. Already connected to the Michigan Cyber Range, this area could become the proving ground for DCO capabilities designed to protect UAS Command and Control (C2)



DRONE
(Photo by Lars Ploughmann,
CC BY SA 2.0, Flickr.com)

links as well as UAS sensor links from cyber attack. As law enforcement moves more into the use of drones for their activities, this training will be useful to Mi3C teams as well as the CPTs.

Cyber in Dense Urban Training: Cyber warfare should be included in any dense urban training scenario in three major categories. These three categories are DCO capabilities to counter C2 cyber attacks, DCO capabilities to counter infrastructure attacks, and the effects Offensive Counter Operations (OCO) and DCO capabilities on social media. First, as the Army Rangers and Delta Force soldiers quickly learned in Mogadishu, Somalia, urban warfare requires different C2 than that of open battlefield warfare. In confined spaces of a city, poor C2 – or C2 that has been compromised by a cyber attack – can lead foot soldiers and convoys into an ambush. DCO capabilities to counter an adversary's attempts to degrade, disrupt, or deceive friendly C2 systems should be integrated into exercise operations to allow DCO operators realistic training. Second, cyber attacks on infrastructure could be devastating to urban warfare environment. Scenarios as simple as hacking the transportation network and turning all city traffic lights to green to hacking the water treatment system and creating a backflow of waste water or hacking the security cameras that are all over a city in order to track troop movements to hacking the electric power plant creating a full city power outage are all very realistic. These, and others, should be exercised to allow DCO operators to exercise counter cyber capabilities and to ensure non-cyber forces have contingency plans in place. Third, today's society is full of mobile devices connected to social media. There isn't an event that happens without a tweet or Facebook post within seconds, and the concentration of mobile devices in cities exacerbates this situation for urban warfare planners and operators. CPTs should be given the opportunity to counter cyber attacks and adversary information operations conducted toward using social media to deceive the public in order to shape the battlefield to their advantage. For example, what are the effects on protecting the lives of civilians fleeing the urban battlefield if it's tweeted by the adversary that the main egress bridge from the city has been destroyed? Or how much panic will be created if adversary Facebookers are posting that the water system is contaminated with poison? These are facts of modern warfare and will be more prevalent in an urban environment, so must be included in realistic dense urban training scenarios.

AN AERIAL PHOTO OF THE COMBINED ARMS AND COLLECTIVE FACILITY (CACTF) IN CAMP GRAYLING. THE CACTF IS AN URBAN OPERATIONS COURSE FOR THE MILITARY TO CONDUCT TRAINING EXERCISES THAT WILL PROVIDE PRACTICAL SITUATIONS FOR SMALL AND BATTALION SIZED UNITS.



Moving Forward

The State of Michigan has an excellent opportunity to increase its prominence and value to the DOD. The path to success for the Protect and Grow Initiative starts with understanding and accepting the strategic goals of the plan combined with a commitment to pursue implementation of the recommendations.

The MDC (through the network of stakeholders assembled, to include the Executive Council, the Governance Board, and the Advisory Committee), should pursue the following action items:

- Educate, update, and secure support from the community and military leaders to advance strategic recommendations
- Continue to assess the changing national security strategy, political, and fiscal environments and the impact on the military missions and economic base in Michigan
- Refine investment proposals by gathering detailed input from multiple stakeholders (necessary to create “win-win” scenarios) and develop advocacy support
- Explore and initiate “deal building” for Enhanced Use Leases (EUL) and Private-Public/ Public Partnership (P4) opportunities that identify potential private sector businesses that will support and enhance the missions in Michigan
- Conduct detailed analysis assessing the weaknesses and competitive advantages of “near peer” states as it relates to Michigan’s intended growth areas
- Develop options that assist the DOD with creating more joint and interagency training opportunities to reduce costs and increase effectiveness and productivity
- Formulate plans to leverage a future round of BRAC (or a continuation of “shadow BRAC) and provide a roadmap to the Pentagon for relocating and consolidating missions from other states into Michigan
- Advocate on behalf of the local missions and installations with the Pentagon, Armed Services, Military Commands, Capitol Hill and the next President’s Administration

While it is easy to identify areas of mission growth (cyber, autonomous systems, missile defense, enhanced training), attracting these activities requires a dynamic strategy that includes close coordination between all Michigan installations, active engagement before the DOD and military services, ongoing coordination with the Michigan congressional delegation, and significant stakeholder involvement. Stakeholder actions should include the examination of other potential federal and state partners, joint activities with industry and the private sector, and the integration of academia to share expertise and resources.

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Strategic Recommendations

The recommendations that follow have been vetted and enhanced by the Protect and Grow Advisory Committee based upon the perceived value of the recommendation and if the committee believed the state and stakeholders should invest funds in the near future to pursue the recommendation.

Promote and Safeguard Acquisition, Technology, and Logistics (ATL) Capabilities at the Detroit Arsenal

The Detroit Arsenal is home to an array of acquisitions, technology, and logistics capabilities with synergy and symbiosis between the DOD, industry, and academia. An education campaign should target the contributions of all mission partners to this interconnected enterprise. Target audiences include the community, the congressional delegation, major industrial partners, and members within DOD. Major points include:

- The TACOM Life Cycle Management executed over \$1.6B in contracts performed in Michigan, of which over \$109 million went to Michigan small businesses
- There are over 7,500 employees at the Detroit Arsenal with an economic impact to Michigan of \$900 million
- TARDEC laboratory and operations have facilities and equipment that value more than \$1B

TACOM LCMC has an essential life-cycle of ground and support systems for joint warfighters. The research, development, and engineering (technology) leads to development, production, and fielding (acquisition) that carries into (logistics) support and sustainment and back into the technology and acquisitions. This life management cycle pulls from and feeds into academia, industry, and the supply chain. By integrating these systems, the Detroit Arsenal allows the DOD to maintain its technological edge over our adversaries in order to win our nation's wars.

Lead the Nation in DOD/State Cyber Operations Integration

As previously discussed in the report, Michigan is at the forefront of cyber operations and civilian population cyber awareness. Michigan should make it their objective to have seamless integration of Army and Air National Guard Cyber Protection Teams (CPT) with MI Cyber Civilian Corps (Mi3C) teams' daily operations to secure Michigan networks. Michigan should work towards integrated capability development, implementation, and training in order to deliver continuous consistent defensive cyber capabilities to State leadership. Michigan should have semi-annual integrated CPT/Mi3C Cyber Disruption Response exercises. Finally, Michigan should direct support to other State initiatives to develop, test, and integrate cutting edge cyber capabilities through robust ties to State research and development activities. A vision of the future should be: CPTs have the authority to use Army and Air Force provided capabilities on State networks; there is a



THE PROTOTYPE
INTEGRATION FACILITY
AT THE U.S. ARMY TANK
AUTOMOTIVE RESEARCH,
DEVELOPMENT AND
ENGINEERING CENTER, IN
WARREN, MICHIGAN

MICHIGAN CYBER RANGE

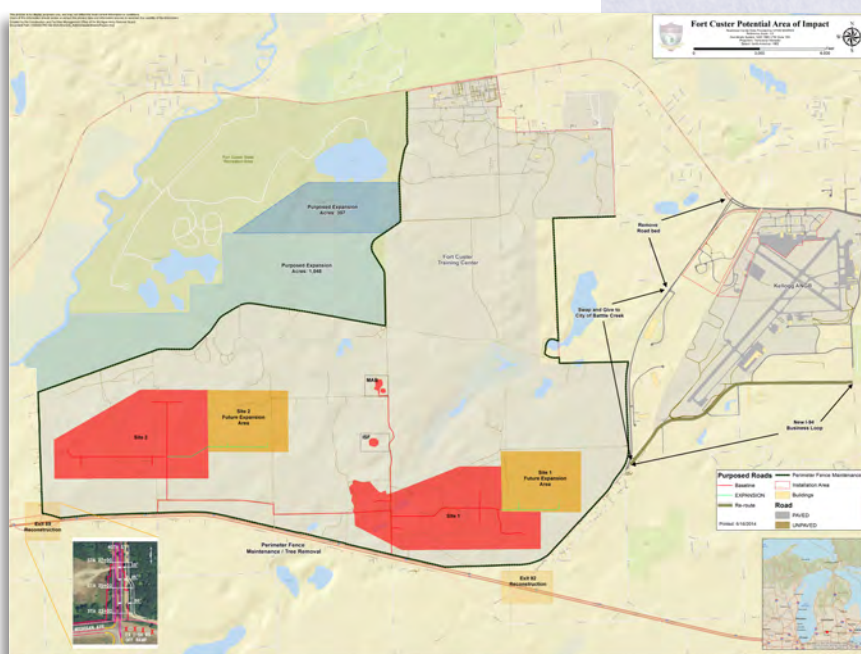
C2 exercise that integrates Michigan Operations Center C2 over existing Mi3C teams and takes control of Guard CPTs including sharing of real-time information and intelligence from Federal, State and Industry sources; there is an exercise specifically for Michigan's Cyber Disruption Response Plan; and there are fully integrated Mi3C/CPT daily operations under centralized C2 across the full range of defensive cyber operations for the State.

As discussed in other sections, organizations such as the MADCAT, the NDIA, and Merit Networks through the creation of the Michigan Cyber Range are laying the foundation of both professional and physical networking capabilities throughout the state. In support of the growing demands of Mi3C and CPT daily operations, this foundation will enable academia, industry and State government to collaborate on rapidly developing, prototyping, testing, and fielding cyber capabilities in areas such as ground and aerial vehicles, autonomous vehicles and cargo movement, modeling and simulation, and cyber training including in dense urban operations. Michigan has unique expertise and experience that can be leveraged in all of these areas, and will make the State the first choice for emerging cyber businesses and young graduates from cyber related college programs.

Secure East Coast Missile Defense Ground Based Interceptor Site at the Fort Custer Training Center

The DOD's Missile Defense Agency (MDA) was required by the Fiscal Year 2013 National Defense Authorization Act to conduct a Missile Defense Siting Study on potential Ground Based Interceptor sites. Following site visits, Michigan's Fort Custer Training Center is a leading contender to host a future Missile Defense Ground Interceptor Site. An Environmental Impact Study (EIS) is now underway with a Draft EIS expected to be released in June 2016. The DOD is conducting environmental impact studies at four possible locations, and a final decision on proceeding with a new Ground Based Interceptor site is likely to

rest with the next administration. Senior representatives from the MDA have identified strong federal, state, and local government support as mitigating factors to be included in the study. Michigan should generate strong turnout for public hearings on Fort Custer as a Ground Based Interceptor Site, prepare an advocacy strategy to ensure consistency of message and public, expert, and governmental support for a Ground Based Interceptor Site at Fort Custer, and designate a core team responsible for ensuring that all requests for information and other needs of the MDA are met as it completes its assessment and



selects a preferred location. Success for this recommendation will be the recognition of the Fort Custer Training Center as the preferred location for the East Coast Missile Defense Ground Based Interceptor Site in the Final EIS.

Publicize the Importance of the Soo Locks to National Security and Advocate for Funding



SOO LOCKS AND
INTERNATIONAL BRIDGE

The Soo Locks, located in the St. Mary's River off the coast of Sault Ste. Marie, MI, are a vital asset to Michigan's economy and our national security. These locks provide passage for cargo moving between Lake Superior and the lower Great Lakes. It is estimated that approximately 80 million tons of cargo pass through the locks annually, of which the vast majority is US mined iron ore. In fact, 99% of all US iron ore is mined in Michigan and Minnesota, with 79% being shipped through these locks. While the Soo Locks are a series of four parallel locks, only two are fully operational. More importantly, only one – the Poe Lock – is able to handle the larger 1,000' freighters which transport the majority of goods across the Great lakes. Fully 70% of the traffic at the Soo Locks utilizes the 48 year old Poe Lock. It is estimated that a new lock would cost nearly \$600 million to complete; however, since approved by Congress in 1986, only \$17 million has been appropriated for construction. Concerningly, a March 2016 analysis by the Department of Homeland Security (DHS) suggests that due to the current demands on mid-west rail and trucking infrastructure, using these modes for the temporary transit of the bulk commodities transported through the locks would be impossible. Because of the lack of adequate supply chain redundancy, DHS estimates that if a sudden shutdown were to occur, approximately 75% of US integrated steel production would cease within 2-6 weeks. Because US integrated steel production is vital to the US manufacturing supply chain – including the nation's defense supply chain, DHS estimates that almost 11 million jobs throughout the US would be threatened due to the loss of production. With the USACE conducting an updated Benefit-Cost Ratio study of constructing the new lock, a major roadblock to advancing the project has been cleared. However, to keep this momentum, an opportunity exists for the USACE, DHS, State of Michigan, local governments and private enterprise to enter into a Public-Public, Public-Private (P4) partnership.

Invest State Resources to Enhance Military Installations and Defense and Homeland Security Missions

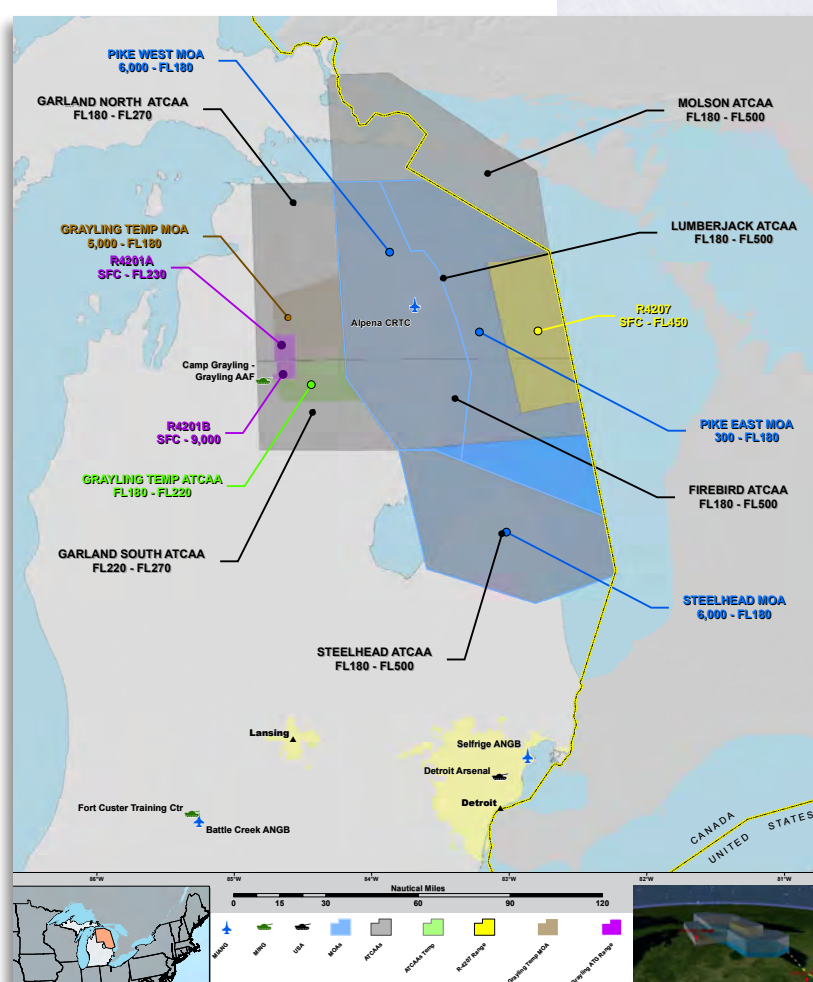
According to recent data, 74% of states play an active role in encroachment planning around military installations, with 61% of states providing financial support for encroachment mitigation. Another 52% of states provide funding for on-base infrastructure projects, and 61% of states fund off-base infrastructure projects. Several states have passed military bond bills to support defense missions and installations. While bonding authority may not be desirable for the State of Michigan, an annual appropriation of funds could

be used to match congressional and local contribution and leverage innovative Public-Public, Public-Private Partnerships, better known as the “P4” Community Partnership Initiative, supported and recently enhanced by Congress. Michigan should create and fund a state-level investment program to enhance the military value of each installation, mitigate vulnerabilities that could arise in a future round of BRAC, and position the facilities for next-generation systems and missions. Simultaneously, this will build partnerships across governments and with the private sector to promote job growth and economic development at and around each site, giving discretion to the Governor and local communities to select investments based on mutual benefits and discussions with the federal government. Efforts to advance this recommendation are already underway.

Expand Training Ranges and Opportunities

Michigan has tremendous ranges and airspace capabilities and capacity, but suffers from a lack of throughput which would drive down per unit operation costs. Michigan has the opportunity to set the standard for joint training by leading emerging future force development requirements.

Given the critical strategic trend of rapid urbanization, 66% of the world's population is projected to reside in urban areas by 2050. The Army and DOD are focused on developing training solutions to enable forces to operate in these dense urban areas/megacities. Michigan's training facilities and unique geography, to include littoral elements, support world-class training opportunities in an operational environment that replicates the challenges anticipated in the future. Thus, Michigan is postured to become a leading dense urban area/megacities training destination for the joint force; to innovate with industry in urban capabilities development and simulation training; and to partner with academia to study global dense urban/megacities challenges. Michigan, its National Guard, and Air National Guard have an opportunity to grow the defense mission and take the lead nationally in this area by supporting this critical concept and capability effort for the DOD through partnerships with Michigan First Responders, the Department of Homeland Security, academia, industry, as well as the Joint, Inter-organizational, and Multinational (JIM) communities.



Public-Public Public-Private (P4) partnership opportunities in this area include:

- Partnerships between DOD and Michigan universities to become a global leader in urbanization studies by creating a “Dense Urban Studies Center” to study the global challenges associated with urbanization and develop the next generation of military leaders
- Partnerships between government and industry to drive innovation in R&D to develop critical capabilities necessary to operate in dense urban/megacities environments and to mitigate operational risks
- Partnerships between First Responders, Homeland Security, JIM, and the Army and Air Force (Active, Guard, and Reserve) to conduct city/state/national/international scenario wargames with the most advanced virtual, constructive and gaming capabilities to ensure Michigan becomes a leader in simulation capabilities related to dense urban/megacities spaces
- Partnerships between the Army and Air Force (Active, Guard, and Reserve) and JIM by expanding the Urban Training Facility at Camp Grayling Joint Maneuver Readiness Center, and by utilizing the Alpena Combat Readiness Complex, Selfridge, Battle Creek, Fort Custer, the Michigan Cyber range, and Michigan’s various subterranean facilities to enable integration of all domains while training in a dense urban/megacities environment

Maximize the Michigan Congressional Delegation’s Federal Influence and Support for Military Installations



UNITED STATES CAPITOL

Michigan has lost significant influence over defense spending, strategy and policy decisions following the retirement of members from the congressional delegation. No members of the current congressional delegation serve on HASC, SASC, HAC-D, or SAC-D committees, placing the State at a disadvantage in attracting the attention of DOD leadership and influencing Pentagon decision making. Michigan should secure representation from the Michigan congressional delegation on the House and Senate Armed Services and Appropriations Committees. Michigan should also strengthen the relationship between the congressional delegation and the State’s military installations and raise the profile of Michigan’s military installations with DOD leadership. First steps include effort to institutionalize congressional delegation (“CODEL”) visits for Members of Congress and congressional staff to Michigan’s military installations; provide regular briefings to the Military Legislative Assistants (MLAs) for each member of the Michigan delegation; develop a comprehensive list of legislative priorities for submission at the beginning of the annual authorization and appropriations budget processes; and seek high profile ways to support DOD and service-specific strategic objectives on Capitol Hill and through the news media and social media. Success in this arena will be a return to an environment

where the DOD actively seeks the support of Michigan's congressional delegation to support and partner on key priorities.

Strengthen and Promote Link Between Defense and Domestic Auto; Establish Autonomous Vehicle Corridor on I-69

Michigan organizations have links with the domestic auto industry that are not fully interdependent. Improving the relationship between defense and the domestic auto industry will create allies that can solidify the need for keeping all ground vehicle defense efforts in SE Michigan. Michigan has not fully realized the opportunity to lead the nation in the testing of autonomous ground systems and the cyber defense capabilities of these assets. The I-69 corridor can support development of defense and domestic ground systems/vehicles. In conjunction with the I -69 corridor, an opportunity exists for the State of Michigan to assist in the establishment of the American Center for Mobility (ACM) at the former Willow Run plant. The State, working with the private sector, should redevelop portions of Willow Run into a shared R&D center and test track for autonomous vehicles. This facility would jointly serve the military, defense and auto industries, suppliers and related technology companies. With federal grant dollars being awarded to Ann Arbor SPARK to develop a concept plan for the ACM, the state can leverage its considerable resources to help turn the concept plan into a reality. While this is a recommendation, we know that efforts are already underway; MEDC, MDOT and TARDEC are organizing the first TARDEC platooning exercise for mid-June 2016. In addition to this exercise, a working group should be established to develop the lines of effort necessary to drive this effort to full operational capability. Cooperative Research and Development Agreements (CRADA) between academia, industry, and government can be established to ensure free flow of ideas with protection of intellectual property. We believe this effort can ensure that the ground vehicle R&D effort in Michigan will work to improve its interdependence with leading automotive OEMs. Moreover, this interdependence will have a direct, positive impact on DOD decisions to relocate missions in a potential future BRAC.



DETROIT-BASED WALBRIDGE DEVELOPMENT PLANS TO REDEVELOP A MAJORITY OF THE 332-ACRE FORMER WILLOW RUN POWERTRAIN PLANT SITE INTO A CONNECTED VEHICLE RESEARCH CENTER.

Photo Courtesy of RACER Trust

Leverage Partnership Opportunities Between Academia, Industry, Local Government and DOD/DHS Entities Within the State

Michigan has the opportunity to leverage industry, local community support, academia and its military capabilities and resources to reduce operating and service costs at Michigan installations while creating significant value to all parties involved. Public-Public/Public-Private Partnerships (P4) are the avenue to bring this to fruition. Recent changes to legislation have opened opportunities for military installations and communities to partner like never before. In addition to saving resources, P4 opportunities can supplement limited public sector capacities to meet the growing

demand for infrastructure development. We know there are under-utilized areas on Michigan installations that are ripe for partnership. Michigan can pursue this via two different avenues: an Air Force led, internally-driven effort, or a community/state led, externally-driven effort. Both can be successful, but leadership is the key.

When it comes to P4 initiatives, just getting started is often considered a measurable success. This is because every P4 effort begins by bringing together all potential stakeholders from the local community to share concerns, requirements, and opportunities. After action surveys show that this dialogue often has unintended benefits for all parties. Long term success will be achieved when all of the military installations in the state have successfully undertaken robust P4 opportunity analysis and execution.

Establish Innovation Center at the Detroit Arsenal

Many Innovation Centers exist in Michigan, but none are focused solely on Defense. Michigan has the opportunity to solidify the importance of the Detroit Arsenal and further its interdependence with the auto industry and academia by establishing a public/public and public/private (P4) Innovation Center focused on the defense, automotive, and cyber industries. Academia can contribute researchers, industry can contribute research and development funding, and government can contribute requirements (TARDEC), oversight (TARDEC), and facility management (TACOM). The Innovation Center could also serve as a “learning lab” for Science, Technology, Engineering, and Math (STEM) based programs and would be a net jobs creator.

Michigan could follow in the steps of Massachusetts, who has capitalized on a similar opportunity by creating their Innovation Bridge. This state-sponsored collaborative business portal will create relationships between academic institutions, industries, and federal partners while enhancing missions and providing new business opportunities. Another example is the Doolittle Institute in Florida. Here industry, academia, and government collaborate on science and technology challenges to create innovative solutions. The results with commercial potential can then be shared with regional, state, or national companies enhancing each partner’s prospects. Furthermore, the institute creates training opportunities to develop workforce skills as well as exposing students to STEM learning events.

Michigan should establish a working group of all stakeholders for a P4 effort, championed by TARDEC/TACOM, and facilitated by the MDC, to construct a facility where industry, government, and academia can collaborate to address defense-wide automotive and cyber solutions that benefit all constituents. A preliminary windshield tour and discussions with various stakeholders demonstrated several parcels adjacent to the Detroit Arsenal that would be a suitable site and available for redevelopment.



NEW TECHNOLOGY,
SCIENTISTS AND ENGINEERS,
TARDEC, WARREN MI

TARDEC’S SOLDIER
INNOVATION WORKSHOP
PULLED TOGETHER
SOLDIERS, TRANSPORTATION
DESIGN STUDENTS, AND
ENGINEERS TO DEVELOP
FUTURE GROUND VEHICLE
CONCEPTS

Promote and Expand Economic Gardening Tools for Michigan Companies (BTS & Proposal Writing)

The Michigan Defense Center has developed two key economic gardening tools designed to support Michigan companies interested in doing business with the federal government. The first tool is the Bid Target System (BTS). This is a web based tool application that helps to 1) quickly identify and prioritize federal contract opportunities, 2) save time and money in the pursuit of federal contracts, and 3) leverage business intelligence to prioritize opportunities. The second tool is the Proposal Writing Service, which is a program that builds on the framework of BTS by providing matching grant funding to assist Michigan companies in writing a bid response to a DOD or DHS contract opportunity. MDC should invest in promotion of these products to leverage the significant return on investment offered by their expanded use.



Target and Invest Resources in the Following Areas of Growth: Aerospace, Advanced Manufacturing, 3-D Printing, and Autonomous Systems

The burgeoning DII creates an opportunity to increase collaboration and investment in areas of aerospace, advanced manufacturing, including 3-D printing and robotics, and autonomous systems. Michigan already has significant capabilities in both academia as well as industry that are developing these growth areas highly demand by the DOD.

- ▶ **Aerospace:** Since 2010, Michigan's Aerospace Industry has experience nearly 70% growth in employment –most of which occurred in the Aircraft, Aircraft Engine and Engine Parts Manufacturing industries. In FY 2014 nearly \$56 million in aerospace-related DOD contracts were performed in Michigan. While constituting only 2% of all in-state DOD contracts, the significant growth in commercial (non-defense) aerospace employment indicates the industry has growing capacity to branch into defense-related aerospace. Furthermore, Michigan's academic institutions are producing the talent necessary to grow its aerospace industry endogenously. With the 4th and 62nd ranked aerospace/aeronautical engineering schools in the country, the University of Michigan and Western Michigan University are producing the premier talent necessary for Michigan-based aerospace industries to continue this growth.
- ▶ **Advanced Manufacturing:** Michigan excels in developing and utilizing advanced manufacturing techniques within certain manufacturing sectors. While not technically an economic sector, advanced manufacturing can best be described as industries' use of advanced processes and materials to increase productivity and manufacture high-tech, value-added products. Michigan has led the country in the development and application of these techniques – specifically 3-D printing and robotics. The state's research and development sectors that utilize these advanced techniques have grown over 32% since 2010, with an average annual earnings of nearly \$85,000.

In 2014, Grand Rapids and Detroit were both ranked in the Top 5 of US cities for advanced manufacturing by Change the Equation, a non-profit group that emphasizes STEM literacy in education. This can be credited to the enthusiastic support by Michigan's University Research Corridor that invests significant dollars in R&D focused on advanced manufacturing processes. These efforts have attracted DOD investment dollars at University of Michigan's S. M. Wu Manufacturing Research Center, as well as state-based companies like Visca, LLC and Niowave Inc.



► **3-D Printing:** A byproduct of advanced manufacturing, 3-D printing is revolutionizing the manufacturing industry throughout the world, and Michigan has been a leader in this arena. In 2013, surgeons saved the life of a 3-month-old baby after they surgically implanted a scaffold-like tube to hold his airway open. The tube was designed and then printed using 3-D printing technology at the University of Michigan. This revolutionary technology is being sought in numerous industries, where it will allow flexibility and rapid changes to design and manufacturing. The DOD is seeking this advanced manufacturing capability to customize products to particular situations or missions. Additionally, 3-D printing reduces the DOD's dependency on cumbersome logistical supply chains by allowing spare parts to be produced on ships and austere locations. Canals, a market research firm, anticipates a rapid growth in the global market for 3-D printers by 45.7 percent, from \$2.5 billion in 2013 to \$16.2 billion in 2018. Michigan's 3-D printing capabilities is primed to take advantage of the anticipated demand by both defense and nondefense-related industries.

► **Autonomous Systems:** Michigan has emerged as a center for autonomous operating systems research and development. The State and its partners – Michigan Economic Development Corporation, University of Michigan, Business Leaders of Michigan and Ann Arbor SPARK – is developing the American Center for Mobility (ACM) at former Willow Run site. The Center will leverage the nearby Mcity and the intellectual capabilities of the University of Michigan to accelerate the development and testing of autonomous vehicles. Further south, TARDEC, with its enormous R&D infrastructure, is aggressively developing, testing, and integrating technologies for unmanned ground systems. Future collaboration between the state, the private sector, and the DOD can leverage these assets and act as a force multiplier in bringing these technologies to market – both for commercial and defense-related sectors.

Considering Michigan's growth in aerospace, considerable engineering talents, advanced manufacturing capabilities, research and development assets, and world class academic institutions, it is recommended that Michigan continue to aggressively invest resources in areas highly demanded by the DOD's DII, including aerospace, advanced manufacturing, 3-D printing and autonomous systems. These investments should be targeted to further researching each growth area to better understand their industrial make-up, barriers to

entry, the strengths and weaknesses of Michigan firms operating in these arenas, and the development of area-specific strategies to cultivate growth of business and future business opportunities.

Pursue Opportunities and Branding to Lead the Nation in DOD and State Sponsored Renewable Energy Solutions

Michigan is building on its historic auto manufacturing strengths to grow its renewable energy industry – providing new employment for the state's highly skilled workforce. The military installations in Michigan are ideal partners for renewable energy opportunities. As Michigan expands its clean energy production, the DOD provides the ideal incubator for success on Michigan military installations: space, support, investment, and opportunity. Michigan should secure economic and legislative incentives for renewable energy investment opportunities and leverage P4 Opportunities between Michigan Army and Air National Guard units and Academia/Industry. Academia can contribute ideas, industry can test and develop new concepts, and the military installations can be the energy demand and support. Michigan should establish a working group of various stakeholders to explore and prioritize opportunities for organic and renewable energy projects, secure State-level and National Guard senior leader support, and create and publish a vision and marketing campaign. Success in this endeavor will be having all of the military installations in the state contributing to Michigan's renewable energy production goals in ways that make them benchmarks for the military and incubators for industry. Simultaneously, the installations are working towards being net-zero and are contributing energy back to the grid. An ultimate measure of success would be where academia and industry, even those from out of state, choose Michigan National Guard bases as partners in future renewable opportunities because of the reputation of success and willingness to put forth the required effort.

Build and Promote an Asset Database to Leverage In-State Testing and Evaluation Capabilities

Mapping Michigan's significant testing and evaluation (T&E) facilities and capabilities to include, testing and proving grounds, labs, evaluation facilities (commercial and government) and universities is important. Currently, there is no central repository that documents these locations and explains their capabilities and capacities. This prevents full understanding and access to these facilities by outside agencies, thereby limiting Michigan's opportunity to attract high-tech government and industry business to the state. Michigan should establish a small working group to research best practices and to identify similar efforts across the state. Based on these findings, develop a web-based, T&E database and task all stakeholders to provide feedback to a series of information requests to ensure the specifics of the capabilities are clearly understood.



THE WIND FUNNEL AND SOLAR PANELS AT FORT CUSTER, WHICH ARE PART OF THE GREEN ENERGY EFFORTS OF THE MICHIGAN NATIONAL GUARD

Study Impacts of Military R&D Tax Incentives and Best Practices in Other States

As of January 1, 2012, the State of Michigan replaced the Michigan Business Tax (MBT) with the Corporate Income Tax (CIT). This reform eliminated the taxing structure of the MBT, which was reportedly designed to incentivize business investment with an overly complex series of business income taxes and gross receipt taxes, while offering tax credits for targeted investments, compensations, and R&D expenditures. In contrast, the CIT is a flat rate of 6% on qualified C Corporation's income, with income being apportioned based on a 100% sales factor. Furthermore, the CIT provides a Small Business Alternative Tax Credit offering a lower tax rate on income from qualified small businesses. However, as part of simplifying the tax structure, the state has eliminated most all tax credits for qualified investment, including R&D. Although the CIT has earned Michigan improved business tax climate rankings, we recommend conducting an academically driven, comparative fiscal impact analysis of competing states' corporate tax structures with regard to their R&D tax incentives. Considering that over 40 states offer some form of R&D tax credit, determining if Michigan's competitors hold a comparative advantage with regard to their R&D tax policies would assist the state to devise competing strategies. If conducted with methodological rigor, the study would determine whether R&D tax credits, in conjunction with the CIT, would increase R&D intensity in-state while attracting out-of-state investment, thus generating both jobs and further innovation. Success would not be measured by the outcome of the study, but rather by providing the State with statistically validated assurances that either R&D tax credits offer Michigan a competitive advantage or they do not, thus allowing for appropriate strategies to be devised.

Connect Veteran Talent to Michigan Industry



There is a highly trained and disciplined workforce of veterans leaving military service. In order to attract these individuals, Michigan should partner with VA transition programs to capture these personnel into the workforce. A proven incentive that will draw separated personnel to Michigan is through a successful job market focused on utilizing skillsets learned during service in the civilian sector.

Veterans are a growing segment of the workforce with tangible skills and a technical aptitude that can be assets to any business. Many states are actively "recruiting" transitioning veterans and introducing initiatives to entice retiring and separating service members to settle in their cities and towns. If Michigan wants to retain as well as draw in these individuals, it is essential to continue to implement and publicize workforce development programs for veterans. Attractive programs include partnering with companies that offer certifications/license as well as internships, apprenticeships, and/or employment opportunities at the end of

the program. The DOD's fielding of Michigan's innovative technologies provides a unique opportunity to reinvest the human capital back into those industries. Veterans are trained and proficient on robotics and 3-D printing. They have taken advancements in tactical vehicles from garrison to the battlefield. Veterans are perfectly suited to advance R&D of both current and future technologies, as they have utilized these technologies from training and target. Building on their recent and relevant experience, they bring a wealth of knowledge that will bolster any developing program.

Create New Branding for the Defense Industry in Michigan

The DOD's Defense Innovation Initiative (DII) aims to identify and invest in emerging technologies to bolster America's military dominance. In previous decades the DOD was dependent on military labs for R&D of new capabilities. However, today's commercial advancements in robotics, autonomous operating systems, and 3D printing create more opportunities for the military to rely on the private sector to generate the capabilities needed for modern forces. Much of this innovation is developed in either academia or in small start-up firms in desperate need of capital to bring their technologies to market. Venture capital firms, with their investment dollars and expertise, provide a means for small, private-sector firms to mature their technologies and act as a conduit to transfer these technologies to the DOD by way of the DII. Michigan has an opportunity to leverage its innovation production and attract further investment dollars by developing a state-wide branding of its research and development capabilities – both defense and non-defense related. Using utility patents as an indicator of innovation, Michigan out produced its mid-west competitors on both an absolute and per capita basis in 2014. However, the state ranked third in venture capital (VC) investment behind Illinois (\$1 billion) and Ohio (\$300 million). Creating a new branding for Michigan will allow the State to compete with its regional counterparts, such as Illinois who market areas of their state as the "Silicon Prairie." While the Protect and Grow Initiative is focused on developing Michigan's defense assets, it is recommended that this branding opportunity does not decouple defense from the rest of Michigan's R&D activities, including those the private sector and academia. Promoting the State as a whole acts as a force multiplier which may lead to future collaboration between academia, non-defense industries and the DOD. Success can be seen as Michigan receiving national recognition and accelerated promotion as a regional leader for technological innovation. This will include Michigan universities receiving the recognition they deserve for developing talent and conducting world class research; lower tiered suppliers who focus on R&D activities having increased opportunities to access much needed venture capital and business development expertise; and out pacing competitors in venture capital investment, thus generating increased economic impacts and delivering Michigan-bred technologies to market sooner.

The MDC believes that each recommendation will strengthen Michigan's ability to make it through the next BRAC round, and improve our overall position to grow in the future.

Conclusion

This Protect and Grow Initiative validated the need for State and local cooperation, civilian and military partnership, balanced engagement, and priority of effort. As the consultants, we praise Michigan, and particularly the MEDC and Michigan Defense Center, for pursuing this effort. We are in this business across the United States and rarely see this level of dedication. We are grateful to have had this opportunity to identify, review, and recommend actions the State and communities can take in the support of military installations and activities; service members, families, and veterans; and surrounding localities in efforts to sustain and protect military installations, grow Michigan-based military missions, and improve quality of life. As a result of this comprehensive research and analysis of Michigan's military installations and missions, we determined the State is well-suited to protect and grow its current military mission sets.

While it is uncertain when the next round of BRAC will occur, it is certain is that this next round will focus on cost reduction and the enhancement of military value. As such, the recommendations contained throughout this report focus on the following principles:

- Maximizing the value and use of existing facilities and resources across all branches of service and all sectors, specifically high-tech, R&D and universities; assisting the services in reducing cost of operations
- Investing in infrastructure to facilitate new missions; further collaboration and partnership between the state, local communities, and military installations on issues of mutual interest
- Improving the way in which our nation trains and develops its military forces; enhance the military services' ability to train and operate forces in future operational environments
- Enhancing quality of life for our service members, their families, and our veterans

We believe that each recommendation will strengthen Michigan's ability to make it through the next BRAC round, and improve your overall position to grow in the future. We view this Protect and Grow Initiative as a beginning, not an end, and will endeavor to execute the recommendations if given the opportunity.



Prepared by:

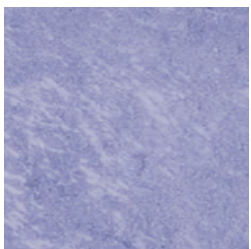
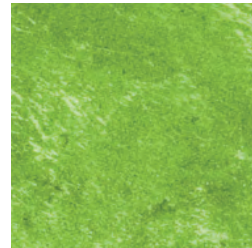
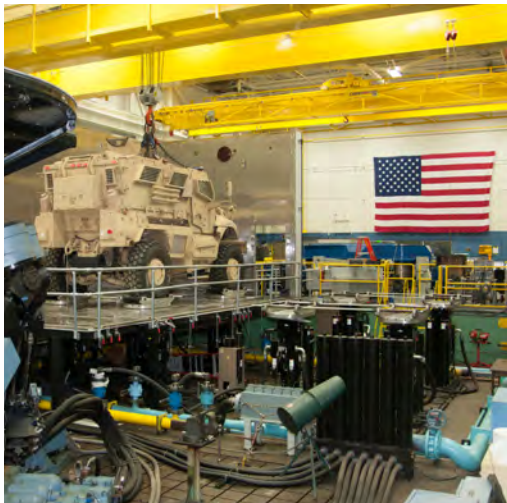
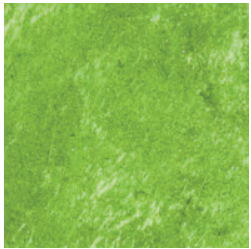
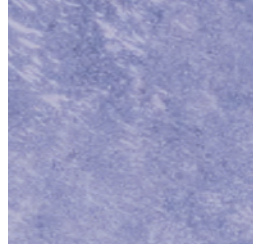


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