Team Orlando: Community of Progress

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ABSTRACT

Team Orlando has become an international icon for the modeling, simulation, and training community. Countless examples of cooperation demonstrate the exceptional advantage of having co-located representatives from every military branch, academia, and industry. The benefit of this community exceeds the sum contributions of the players but measuring its impact has not been straightforward. Thus to date, a clear picture of the return on investment (ROI) with associated data has not yet been accomplished. Nonetheless, the stakeholders of this community require tangible measures of impact. While those of us intimately involved with Team Orlando can easily appreciate the impact of this synergy, making it transparent and understandable to others can be a challenge.

From Operation Blended Warrior to the sharing of Army's new rapid award Training and Readiness Acceleration (T-ReX) contracting vehicle, countless collaborative stories can be told just from this year alone. But across decades, the ROI has been immense. It's time to measure it, share it, and help others create similar programs. Accordingly, this paper provides data regarding time, fiscal, and human efficiencies accomplished through the establishment of these co-located key entities. Additionally, similar benefits to the state of Florida for hosting this community is included. Beyond the tangible ROI, insights are provided into intangible benefits such as the University of Central Florida's (UCF) ability to justify the addition of their medical school, the establishment of Hagerty High School's M&S magnet to develop our next leaders, and to complete the lifecycle, we have an enormous number of retired Government and military personnel who participate substantially in this community.

Combined, this paper clarifies a process for how to measure ROI in expansive systems and provides guidance to other communities that would like to replicate. We hope that it will inspire and provide fiscal efficiency and effectiveness justification for future programs.

ABOUT THE AUTHORS

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Background

"It's about the team that can bring the people, the process, and the technology together to learn the fastest – that's the team that has the advantage" – ADM John M. Richardson – Chief of Naval Operations, April 2018 at the Defense Innovation Board public meeting

The development of a military satellite community, one that is distant from Washington, D.C., happens for a variety of strategic, tactical, political, and sometimes happenstance reasons. But regardless of why it begins, its development, growth, impact, and resilience depends on several key factors. Some of these factors are measurable and easily defensible in the world of continuous efficiency review by military and Government. However, the less overt, intangible benefits often go overlooked and it is frequently these less clear, yet more expansive, foundational impact factors that matter most.

Specifically, the relevancy and timeliness of how simulation can improve military readiness and increase lethality is important not only for cost savings but also for improved effectiveness. The underlying benefits of simulation-based education and training support deep learning, comprehension, and associated decision making (Vogel-Walcutt, Malone, & Schatz, 2013). Beyond military, the capability to teach others about highly complex, emotionally-charged, interconnected problems could truly aid in the transformation of how we educate our people both formally and informally. It can drive the development of life-long learning programs that connect K-16 education to employment or military work and it can support decision makers in complex spaces such as national issues at scale or medical planning, billing, or treatment.

"Proximity breeds collaboration, cooperation and partnership" – Lt. Gen. Thomas L. Baptiste (Ret.), President and CEO, National Center for Simulation

In short, the historical, current, and future focus and structure of Team Orlando acts as an exemplar case-study for how to build, sustain, and grow these types of communities. Many observers of the synergistic capabilities, the growth, and the impact of work being conducted in the Orlando, Florida research park area have noted the benefits of this shared space and requested insight regarding how to replicate. Born out of these requests, this paper aims to answer several key questions focused on the team organization, history, and important elements that support success. Additionally, this study made it clear that the community is ready for the next wave of evolution: an optimization and expansion of the vision and the impact. Thus, this paper provides the blueprint needed to understand, measure, replicate, and expand this system.

The Team

"The secret sauce of Team Orlando is the people that make up the teams here and their sense of community – and not just the geographic community – but a community of different skill sets that want to provide the best ideas for the nation." – CAPT Erik Etz, CO NAWCTSD

Team Orlando is an extensive satellite community of military, government, industry, and academic partners whose mission is to "provide a consolidated inter-service military entity in the Central Florida area in support of the U.S. Department of Defense's requirements for Human Performance, Modeling, and Simulation and Training." To accomplish this goal, they "facilitate research and collaboration of new technologies, programs, and processes…[to] advance a thriving and innovative environment…" Frequently referred to internally as the "coalition of the willing," it has an operating budget of $4 Billion and includes representatives from Army, Navy, Air Force, and Marine Corps as well as the University of Central Florida, the National Simulation Center, the Office of the Secretary of Defense's Advanced Distributed Learning Initiative, the U.S. Veterans Affairs' SimLearn Center and 240+ industry partners (Team Orlando Brief, 2018).

Expanding the aperture to include Cape Canaveral Air Force Station and Patrick Air Force Base, this region contributes over 166,000 jobs, nearly $12 Billion in direct spending, and helps support the state of Florida's goal to "keep Florida the most military-friendly state in the nation" (Florida Defense Factbook, 2017). It also houses over 500,000 undergraduate and graduate students at 14 colleges and universities within a 100-mile radius of Orlando making this area a national leader in innovation, technology, medicine, and educational excellence. Combined, the

primary goal of this community is to capitalize on the colocation of fiscal, human, and research resources to improve warfighter readiness through the use of simulations.

History

The embryonic beginnings of Team Orlando can be traced back as far as 1941 when, then Commander Luis de Florez, an engineer and innovator, traveled to the United Kingdom to observe British aircraft simulation techniques on behalf of the U.S. Navy. Based on his observations, and extensive expertise, he authored a report that helped establish the Special Devices Division of the Navy's Bureau of Aeronautics which would later become the Naval Air Warfare Center Training Systems Division (NAWCTSD). De Florez eventually attained the rank of Rear Admiral, received numerous research, engineering, and innovation awards, was credited with over sixty inventions, and most importantly for Team Orlando, was a major advocate for the use of synthetic training environments and their efficient support of military readiness (RADM Luis de Florez, 2014). But this was just the beginning of the modeling and simulation research world. The modern version of Team Orlando was loosely established as a creative solution for shielding against possible BRAC (Base Realignment and Closure) by harnessing research, fiscal, and impact strength through collaboration. Thus, in 1985, "a triad of Government, industry, and academia" decided to "work together to share information and leverage programs and technology in the best interest of the Department of Defense and the American taxpayer" which led to the establishment of Research Park in 1988 (Team Orlando brief, 2018).

> *"There are some in this community that think after building this for 30 years that we've reached our peak…but I think we've just touched on our potential."*
> *– Dr. Neal Finklestein, Chief Engineer (NSRDEC-STTC), Office of the Deputy Director*

What started based on joint necessity and the recognition that the services and local industries were stronger together than individually, gave rise to far more than the development of partnerships for projects. It has created the petri dish to grow an educational concept that permeates every type of industry. As it became clear that simulation was going to have a growing impact not just in military but also education at large, medical training, and entertainment, there was a need to establish a community of workers that capitalized on the variety of partners present including the university, entertainment, and military/government. Thus in 2003, Team Orlando charted a Board of Directors in order to develop a battle rhythm in honor of collaboration and in 2006, the Joint Training Integration and Evaluation Center (JTIEC) was created to be the centralizing local unit for this team. In 2018, the structure remains largely the same but the joint accomplishments are numerous.

Impact

> *"You can't use a business-analogy because we're not a business model. It poses the wrong questions and requires us to answer the unanswerable. We must consider the measurable and not measurable impacts." – CAPT (Ret.) Mohler, USN, Former CO NAWCTSD*

Return on investment is a key determinant for justifying resource decisions within the Department of Defense. But conceptually, collaboration aids with a lack of redundant spending instead of direct cost savings and improved outcomes by capitalizing on varied team participants but defining "better" is hard to quantify. Further, unless these activities are well documented, regularly measured, and clear, calculating this impact post hoc poses significant challenges. Additionally, collaborative activities are frequently informal in nature such as awareness of programs in other services because local leadership regularly connects both professionally and personally, mentoring occurs ad hoc, and movement of local talent doesn't require training during on boarding because of a long history with the greater team. All of these informal interactions, when repeated at scale, can collectively create significant impact but measuring it and reporting it up the chain of command can be very difficult. In response, part of the goal of this paper was to determine an approach for defining types of impact, calculating measurable impacts based on available data, and creating a method for improved recording of future impacts.

Method

Data was collected from several sources including interviews with senior leadership, analysis of key summary reports, literature reviews, and cataloging of historical archives.

Interviews – The interview questionnaire included ten questions but was tailored to each interviewee's insights, experiences and recommendations as they pertain to Team Orlando. The goal was to obtain insights from current and past senior military leadership as well as from long-standing key contributors to the team. These included commanding officers from Army's PEO STRI, NAWCTSD, AFAMS, Marine Corps' PM TRASYS, as well as the Natick Soldier Research Development Engineering Command-STTC, Federal Law Enforcement Training Center (FLETC), Office of the Secretary of Defense's Advanced Distributed Learning Initiative (OSD-ADL), JTIEC, University of Central Florida (UCF), and National Center for Simulation (NCS). A total of 17 leaders contributed to this paper.

Reports - A variety of reports were gathered and analyzed for relevant information. These included both local and state reports such as the Florida Defense Handbook, Orlando Florida statistical data reports, and The Impacts of Modeling, Simulation and Training.

Articles and Literature Review – Relevant articles highlighting current and past collaborative events within the Team Orlando community were reviewed. Specifically, 549 articles were included in the review and 80 were identified as containing information regarding collaborative action, historical data, community involvement, and partnerships that required further analysis. Literature reviews were conducted on the following titles: Team Orlando, Florida modeling and simulation, Florida research funding, and Florida defense funding. Sorted by date and topic, data was extracted that helped define the key benefits of collaboration to support modeling and simulation research, industry, or military.

Historical Archives – The University of Central Florida is the home of the Dr. Vince and Beth Amico memorial archives for modeling, simulation, and training. It serves as a historical library depicting the development of this area of research and the transformational impact it has had on the military training community. Dating back as far as 1960, the extensive paper-based contents of these archives were cataloged including 121 books on modeling and simulation and 127 boxes of conference and workshop proceedings and journal articles.

Results

The goal was to capture a holistic view and understanding of the true impact of this satellite community. It was decided that standard methodologies which only consider cost savings fail to include the intangible and influential impacts which were expected to be the most important elements of this community. Without defining, measuring, and creating a methodology for future capture, recommendations for replication would lack clarity and accuracy. As such, data was sought in the form of resource allocation (time, team, or monetary), scientific outcomes, and historical report and then separated into conceptual groups.

Specifically, direct and indirect impacts were split into two key categories: measurable and influential. Direct measurable military impacts were defined as those that specifically improve military readiness and increase lethality. These include transitioned tools, methods, or programs. Indirect measurable impacts included money saved, improved effectiveness, and reduced redundancies achieved through collaborative activities. Direct influential community impacts included jobs created, education programs established, students graduated, and money brought to central Florida because of the local synergy. Finally, indirect influential impact was defined as intangibles such as community lifecycle opportunities from K-12 to post-retirement, positive work environment, contributions to the science of modeling and simulation, and repurposing of modeling and simulation to industries outside of military training.

Direct Measurable Military Impacts

*"Diverse teams improve outcome prediction by 58%. This is a **decisive** advantage." – ADM J.M. Richardson, Chief of Naval Operations, 14 June, 2018, Women in Defense National Conference, Washington, D.C.*

Direct measurable impacts are those that transition to the fleet and could only be accomplished through joint efforts. "Joint" in this case refers not only to the necessity of resource inputs from multiple services but also the effectiveness benefits that can be optimized only through cognitive diversity, or a variety of thought, mission focus, capability specialties, personal expertise, background, and experience. These combined efforts then result in transitionable tools, programs, or methodologies that are used to improve readiness or increase the lethality of our warfighters (see Table 1). The major partnership transitioned programs over the past 5 years include Live, Virtual, Constructive and

Operation Blended Warrior; Squad Overmatch; the Total Learning Architecture; Systematic Team Assessment of Readiness Training, and Live Training Transformation.

Table 1: Direct Measurable Military Impacts – 5 years

Year	Service	Program	Description	Citation
2013-current	Army, Navy, USMC[3], DHS[4], +3 industry partners	Squad Overmatch (SQvM)	Developed methods for optimizing warrior tactical combat casualty care capabilities using multi-service, multi-disciplinary, multi-data source collaboration	SQvM, 2016; SQvM-TCCC, 2016
1996-current	Navy, Army, USMC, USAF	Live, Virtual, Constructive	Methodologies for combining live, virtual, and constructive training environments and data to maximize resource efficiency and optimize effectiveness	Doty, 2017
2015-2017	12 Gov/Mil + 41 Industry	Operation Blended Warrior		Operation Blended Warrior, 2016
2016-current	OSD ADL[1], Navy, Army, USAF[2]	Total Learning Architecture	A set of specifications and standards used to capture learning data and create technological interoperability between training and education devices across the services and Government	DoDI 1322.26; Folsom-Kovarik & Raybourn, 2016; Strang, 2017
2015	Navy, USMC, OSD	Systematic Team Assessment of Readiness Training program (START)	Organizing framework for optimizing fidelity decisions to maximize training impact	Capriglione, 2015
2009-current	Army, USMC, Navy	Live Training Transformation (LT2)	Centralized and streamlined development and management of live training systems across settings and topics shared with multiple military collaborators	PM TRADE wins army award, 2016; PM TRADE, PM TRASYS, 2016

Note: [1]Office of the Secretary of Defense: Advanced Distributed Learning Initiative; [2]U.S. Air Force; [3]U.S. Marine Corps; [4]Department of Homeland Security

Live, Virtual, Constructive training (LVC) involves the interplay between real, virtual, and automated systems. The Navy's NAWCTSD is the principal facility driving this research and the collaboration activities. The goal is to optimize training experiences that mimic possible real scenarios but to do so while limiting resource expenditures, protecting safety, promoting access to serious possible but rare events, and the opportunity to repetitively practice without additional cost. While benefits lie in creating connectivity across these types of systems, the real advantage is when the data is connected to drive future personalized learning experiences. To study this gestalt system, numerous partners must collaborate. By way of addressing this need and to demonstrate the possible capabilities of such an interoperable system, Operation Blended Warrior (OBW) was created to showcase at the annual IITSEC conference. This demonstration allowed all the services and Government representatives to better understand the data interoperability requirements and advances, the human-in-the-loop needs and capabilities, and the overall vision for this ultimate collaborative environment (Doty, 2017; Operation Blended Warrior, 2016).

The Squad Overmatch (SOvM) study provides key methodologies and tools to improve tactical combat casualty care. Based on the finding that nearly a quarter of combat casualties are potentially survivable but occur prior to receiving medical intervention, the Army, as well as other military and government organizations, are interested in determining how we can better train our personnel for field intervention. Accordingly, SOvM was named the #1 priority for PEO STRI in 2013 and 2014, nationally recognized as the Army Modeling & Simulation's #1 Team Training program of the year in 2014, and received the Team Orlando Collaboration award in 2016. Focused on optimizing warriors, a program of this magnitude could not exist without extensive collaboration of military branches, personnel expertise, multiple scientific disciplines, and data interoperability because simply sharing of outcome metrics or concepts improves readiness but synergy optimizes capabilities. To that end, SOvM included 3 military branches (Army, Navy, USMC), personnel with expertise in 6 different areas (technology development and integration, data interoperability, medical training, instructional science, psychology, and military tactics), and integration of data from 6 major categories (personal history, real-time physiological markers, personal resilience metrics, learning, tactical ratings, observation reports).

The Total Learning Architecture (TLA) is a set of specifications and standards defining interoperability between apparatus, systems, data, and content. It connects several interrelated projects that share certain features. Each project

has a similar vision (i.e., to develop an interoperable, data-driven learning ecosystem), and each commits to using an agreed-upon set of interoperable data formats and application programming interfaces (APIs) to make their respective apparatus function in combination. From a technology perspective, the Experience Application Programming Interface (xAPI) is considered to be one of the primary TLA specifications. This specification allows learning data to be tagged and recorded in an external learning record store (LRS) which can then be extracted by the next program to drive adaptations for learning pathways. These specifications and the TLA architecture are being transitioned to the Navy's Ready Relevant Learning program, tested with Army personnel, and informing the Air Force Learning Services Ecosystem (AFLSE). More broadly, these specifications are being tested in large-scale multi-national exercises (e.g., Viking '18) and informing the extension of domestic collaborative programs to international space (e.g., Operation Coalition Warrior).

The Live Training Transformation (LT2) Product Line is an Army-led (PM TRADE) program that builds and maintains live training systems for home and deployed settings focused on a wide variety of topic areas from live-fire tactics to resilience (PM TRADE, PM TRASYS, 2016). In FY15, cost avoidance was estimated at nearly $24M based on streamlining product development. Coordination of LT2 has been managed by the Consolidated Product Line Management Next program which received the Lean Six Sigma Excellence Awards Program (LEAP) Process Improvement Award in 2016 for its impact on ensuring excellence while balancing efficiency (PM TRADE wins army award, 2016). While the USMC has an official Memorandum of Agreement (MOA) in place to share these products (2009-2021), extensive additional collaborators from Team Orlando have been involved including: the U.S. Army Research Lab, Federal Law Enforcement Training Center, U.S. NAWCTSD, U.S. Army PEO STRI Project Manager Instrumentation, Targets, Threat Simulators, and SOF Training Systems; Project Manager, Integrated Training Environment (PM ITE); and Joint Project Management Office Medical Modeling and Simulation (PM TRADE, PM TRASYS, 2016).

The Systematic Team Assessment of Readiness Training program (START) is an enabling project that provides repeatable, traceable process guidance for optimizing fidelity decisions for maximizing training impact. This procedure transitioned to USMC Aviation, USMC Ground, Crane simulation, OSD combat medical analysis of simulation alternatives, Operational Flight Trainer and Reconfigurable Flight Training Device, and JNLWD escalation of force and non-lethal weapons simulation. (Capriglione, 2015).

> *"We have the autonomy that allows us to communicate directly. The situational awareness would not have been shared in a more formalized setting and it would have been a more deliberate and formal process to get access to the GOTS (Government Off-the-Shelf) software." – Col. Yates, PM TRASYS*

Taken together, efficiency requirements, joint operation expectations (National Defense Strategy, 2018), and multi-domain warfighting are key drivers for human, technological, data, and content interoperability. Stove-piped programs, units, research, departments, and contracts make the necessary collaboration for success an impossibility. However, the co-location, informal communication environment, and expectation of coordination between the services, academia, and industry in the Team Orlando area not only make it possible to reduce redundancies but additionally, create the needed environment for coordinated capability advancement. The aforementioned projects would not have been possible without significant integration between partners but more specifically, if continuous formal obstacles were in place to impede this goal, the bureaucracy would have stopped even the most dedicated.

Indirect Measurable Military Impacts

While transitioned programs are the primary focus when measuring impact, it only occurs at the very end of the research and development cycle. Without the foundational research, the larger scale projects would be a leap too far to be justified with any assurance of success. In other words, it is economically unwise to focus only on the end state. To prepare for the future battlespace, we must also invest in research to anticipate future needs and to develop support for future warfighters. As such, increasing capability through the advancement and extension of supporting programs and research areas is a slower, but equally necessary and supportive activity. Table 2 reflects the current intangible military impacts and focuses mostly on collaborative activities such as research and working groups.

Table 2: Indirect Measurable Military Impacts

Year	Service	Collaborative Activity	Impact	Citation
2003-current	Army, Navy, USMC, USAFA, OSD ADL, NCS, UCF, FLETC	Executive Board of Directors(EBOD) and Board of Directors (BOD)	Maintain awareness across service; Promote strategic coordination	Team Orlando Brief, 2018
2003-current	Army, Navy, USMC, USAFA, OSD ADL, NCS, UCF, FLETC, DHS, UCF	Cyber, Innovation, and LVC Working Groups and STEM Coordination Group	Promote collaboration; Reduce redundancies	Team Orlando Brief, 2018
2017	Army, Navy, USMC, USAF, OSD, State of Florida	Joint government-owned office space - Cost $42M	Cost reduction	Florida Cabinet approves, 2017
2017	Army, Navy, USMC, USAF, NCS, OSD, FLETC	Other Transaction Authority (OTA) – Training and Readiness Accelerator (TReX)	Army sponsored but joint usable funding vehicle for promoting rapid prototyping and collaboration	TReX, 2017
2013-current	Army, Navy, USMC, USAF, NCS, OSD, FLETC + all Team Orlando members	Industry Capability Days	Provides legal connectivity between industry and military and Government to promote effectiveness and efficiency	Next industry capability day, 2017
2015	Army, Navy, USMC, USAF	Small Business Information Forum Initiatives (SBIFI)		Small business information, 2015
current	Army, Navy, USMC	Procurement Administrative Lead Time (PALT)		Procurement Administrative Lead Time, 2018
2011-current	Navy, National Defense Industry Association	Signed Official Charter		National Defense Industrial Association, 2018
current	Army, Navy, USMC, USAF, NCS, OSD, FLETC + all Team Orlando members	Training & Simulation Industry Symposium (TSIS)	Promotes sharing of strategic military goals for scientific and procurement	TSIS, 2016
current		Combined Professional Associations Group (CPAG)		CPAG members, 2018

"We need to collaborate with safety – collaboration versus individual efforts – that's where it's value added to the tax payer." – Col. Epstein, AFAMS Commander

Within this community, the Team Orlando Executive Board of Directors is a revolving group of the local senior military leaders. They formally meet annually to provide strategic guidance to the Board of Directors (BOD) which represents the tactical level leadership of each branch and the strategic leadership of the complementary Government and research programs. The BOD formally meets monthly to discuss progress toward collaborative strategic goals and planning needs. Informally, these individuals meet regularly throughout the year at research and industry-focused activities. The goal is to balance the need for continuous contact and guidance with the benefits of informal discussions, coordination, and idea generation. In interviews with the contributing authors, it was frequently noted that ease of access and lack of formal requirements for communication was a significant reason for the success of this community.

Influential Community Impact

"It's not just about DoD it's also the industry – protection of the greater good creates goodness for the simulation summit – translating DoD to first responders, medical, etc." – CAPT(Ret.) Takagawa, Former CO NAWCTSD

The primary goal of the Team Orlando satellite community is to research and develop modernized training and education programs, methodologies, and tools for our military personnel. But while this goal was being met, a significant number of indirect benefits to the community were serendipitously achieved. Some of the most obvious benefits include job creation and economic growth. In fact, Orlando has recently been named the top STEM growth community in the nation (Fleming, 2018). Additionally, I/ITSEC is the largest modeling, simulation, and training conference world-wide and is hosted annually in Orlando. 15,000 industry, academia, and Government participants

not only learn about developments in modeling and simulation but also participate in collaboration activities, meet with senior leadership and congress members from Washington, D.C., and inspire youth and teachers to consider future jobs in this area. Also in support, 14 major colleges and universities exist within 100 miles of Orlando, providing 500,000 students for steady workforce development. With the success at the adult level, the impact began to trickle down to younger students resulting in the development of children's technical conferences, high school certificate programs, competitions, and awards, and formal agreements with local school systems. Ultimately, the goal is to support feeder programs to the colleges preparing students with interest and aptitude for simulation work and research. The larger impact to the local, national, and international communities means greater advancement in the foundational research without additional cost to the military. It also creates a life-cycle of education, employment, and post-retirement mentorship opportunities that optimizes individuals interested in this work.

Table 3: Influential Community Impacts

Year	Institution	Type	Impact	Citation
2018	Jobs (East Central Florida) Fiscal Impact	Employment Economy	166K jobs $12Billion	Florida Defense Factbook
1967	Interservice/ Industry Training, Simulation and Education Conference (I/ITSEC)	World's largest modeling, simulation, and training conference	15K industry, academia, government and 300 exhibits	Roche, 2017
N/A	Bethune-Cookman, Embry-Riddle, FIT, Florida Poly, Florida Southern, Full Sail, Lake Sumter, Rollins, Seminole State, Stetson, UF, USF, U Tampa, Valencia	Colleges and Students	500K students 14 Colleges/Universities	Team Orlando Brief, 2018
2017	Orlando Economic Partnership	Industry and community promotion	Helps attract and promote Orlando as the #1 STEM job growth city in the nation	Fleming, 2018
1982	UCF - Institute for Simulation & Training; M&S Program (2001)	MS and PhD degrees; Research Grants	358 MS, 89 PhD, 30+ Professors $18M+ annually	UCF M&S Program
1996	Florida High Tech Corridor Council	Engaging students in technology and M&S research	Research: 398 Faculty, 3,300 Students StemCONNECT: 4K Students Funding + Matching: $657K	Florida High Tech
2016	Asian Pacific Simulation Alliance & Serious Games	Partnership	Expands serious gaming capabilities internationally	SGS&C, 2016
2010	VHA's Simulation Learning, Education and Research Network	Military Medical Simulation	Supports simulation-based research and low-cost medical training for the Veteran's Health Administration.	VHA, 2012
2006	UCF Medical School	Research and Education	5 Medical Research Groups 480 Students Funding $9M annually	UCF's College of Medicine
2012	Nemours Hospital	Research and Community Service	$2.7B for higher standards for children's medical care $18M community research	Annual Report to Donors, 2015
2017	U.S. National Tennis Association	Research and Community Impact	100 courts; 80-100K visitors annually; First member of Lake Nona's Sports Innovation & Performance District	Milano, 2013; USTA, 2015; USTA, 2017
2015	Orange Technical College and NCS	Education outreach	Dedicated M&S Facility	Orange County Tech College
2015	National Center for Simulation	M&S certification	280 High School Students 25 Teachers	NCS, 2018
2015	Hagerty High School	M&S Program	250 Students	Hagerty High School

current	Florida STEM Counsel	Youth Programs Robotics Club	Coordinates pre-college STEM education; Sponsors the #1 in Florida Robo-Knights	Central Florida STEM, 2018
2014	Golfview Elementary	STEAM Program	3-year federal grant: $11.5M divided across 4 schools	Ryan, 2014
2006	Otronicon	Orlando Science Center hosts annual youth simulation conference	Community inspiration and supports STEM careers	Otronicon

Replication

> *"**It's the synergy – real, imagined, and potential of what the Team Orlando model can do** – we take a lot of it for granted but others are really envious." – CAPT (Ret) Mohler, Former CO NAWCTSD*

The compilation of these data across historical documents, current and past projects, input from senior leadership, and the larger impact of the community resulted in a set of key components needed to replicate a community like Team Orlando. They include (1) setting goals/defining requirements, (2) obtaining and facilitating funding, (3) strategic, tactical, foundational, and developing team members, (4) collaboration-focused structure and attitude, (5) community lifecycle, (6) positive work environment, (7) motivation to collaborate, and (8) vision.

Set goals, Define requirements

> *"We are focused on research based, data driven training". – Mr. Mike Robbs,*
> *Federal Law Enforcement Training Center*

It is imperative for success that the focus of the community have a clear goal that answers a requirements-driven need in the greater community and it is necessary that this satellite team have the expertise to be the leaders. Without these two complementary components to drive focus, the team will lack purpose, a combined value system to drive decisions, and the impetus and drive to be resilient to fiscal constraints allowing individual needs to erode the system.

Funding source and vehicle

> *"Why award two contracts when you can have one and have two groups buy off of it"*
> *– Col. Walter Yates, PM TRASYS*

Clearly, programs need fiscal support to survive and grow. However, unique to public sector work is the additional need for a vehicle to transfer money. Often referred to as the "color of money," military and Government dollars are tagged with different descriptions such as RDT&E which stand for Research, Development, Test, and Evaluation. With each of these tags comes a set of rules for spending and these are determined by Congress. Additionally, a program director cannot simply decide to spend money on something, they must follow a significant number of rules on how to demonstrate that their decision is in the best interest of the taxpayer, is fairly applied, and uses an approved vehicle for payment. These activities can take months to years to complete depending on the size of the award, color of money, project goals, and vehicle access. Therefore, having access to financial streams is not enough to support success. A complementary team of financial managers, processes for joint spending, and vehicles that support rapid award capabilities creates a necessary synergistic underlying supportive pathway for success.

Team Members

> *"You need a Government contract with the right kind of people, scientists. You have to have a school.*
> *It has be a research school and then you need an industry that needs what we're producing and we need what they are putting out. We have the perfect storm here – all the components we need to make this happen.*
> ***It's a force multiplier**." – Dr. Kristy Murray*

Much discussion during interviews focused on the need for the metaphorical "three-legged stool" – Military/Government, Academia, and Industry. Each of these pieces of the puzzle are necessary to ensure the connectivity required to motivate and connect these disparate entities. Each of these pieces are necessary for system

functioning and success. Team Orlando was not a completely planned community, it was organically grown. But replication would occur either in the form of transforming a current system or developing one from scratch. In the case of transformation, missing entities must be added but co-location may be a challenge. In these cases, additional complementary communication tools and planned face-to-face visits would be necessary to ensure system effectiveness. Modern communication capabilities make regular meetings easily possible across time and space but they do not negate the face-to-face time primarily because what was observed in Team Orlando was how impactful, and important, informal communication is for a system like this. It not only helps different participants be aware of complementary work, but it also improves the social and political connectivity.

Collaboration Structure

It's all about partnerships – the ability to not duplicate – the ability to see what others are doing – the ability when someone goes out and sees something in industry to share it – Dr. Neal Finklestein

Partnerships are key and if an area has the opportunity to build a satellite community, significant attention should go to planning ways to not only create the building blocks of the system (feeder programs, university research, funding agency, industry capabilities, military and government leadership) but also to *how* all of these programs will connect. Presence alone is not sufficient. Relationships must be cultivated and supported and must lead to intentional formal partnerships in order to drive accountability and maintain stability when leadership changes occur. While Team Orlando needs military/government, industry, and academia, what is actually needed is simply the right players that when combined create all the necessary components for success. Beyond components, formal and informal opportunities for discussions create the space for fostering a growth-collaboration-focused team.

Lifecycle

"The lifecycle of this community develops, attracts, and retains talent throughout the system."
– Dr. J.J. Walcutt, Director of Innovation, OSD's Advanced Distributed Learning Initiative

Without a plan for continuously growing and attracting new talent, a system will be a predictable failure. It will be a momentary good idea but will be limited in time and space as well as impact. A healthy system intended for growth requires fresh input from those receiving the latest education – but then mentored by the experienced individuals leaving the system. This cycle achieves several goals. First, it creates easy opportunities for entrance into the system either by being involved in a K-12 learning experience or by entering at the collegiate or expert level. For those at the younger ages, they benefit from learning the newest ideas and get exposure early to scientific exploration benefits. For those entering at the collegiate level, internships and entry-level jobs abound in an organized system. The university benefits from the ability to provide scholarships and attract the best talent while the students benefit from the ability to ensure their education is real-world focused and leads to not only employment but jobs with high growth and income potential. Military and Government organizations benefit from the ability to hire individuals already indoctrinated into the system and immediately ready to meaningfully apply their skills. For those entering at the highest levels, the system benefits from the addition of new ideas, of cognitive diversity and the entering experts benefit from a system set up to provide the needed education and mentorship about the unique capabilities, structure, and collaboration of this system. Finally, post-retirement, the options available to continue working in this system support re-growth. A significant number of retiring military personnel segue to industry partners, bringing with them the knowledge, experience, and expertise to optimize industry focus and outcomes. Many of these individuals will also work with non-profit programs that support collaboration between the system components or that provide mentoring for students. This fluid, flexible path creates a unique opportunity for continuous learning and purpose. It provides the internal structure needed to retain talent through continuous challenge and individual growth opportunities, as well as ensure team members remain local without losing energy, focus, interest or fulfillment.

Environment

You're constantly in receiving mode if you are just listening – Col. Epstein, Commander AFAMS

One should never underestimate the impact of a positive work environment. Significant research has found that work effectiveness and efficiency is highly affected by the positivity of the workplace (Laschinger, Wong, Cummings, & Grau, 2014; Grawitch, Ballard, & Erb, 2015). Public sector workers benefit from these same experiences and for

those whose job it is to think outside-of-the-box, an environment of psychological safety is necessary (Capt. Kroger, USAF). Supported at the very top of the military ranks as well as across the Government (e.g., Office of Personnel's Federal Executive Institute), it is being increasingly recognized that creating an environment where excellence is rewarded, individual ideas are appreciated, and where innovation is encouraged is a necessary environment that must be created, cultivated, and protected. Team Orlando provides one of the best exemplars of this environment. The unrestrained, informal communication that can and does occur across the senior leadership, with the larger community, and academic and industry partners cannot be understated. The ability to share without fear will always ensure the best possible ideas are shared and ultimately will result in the most effective solutions.

<u>Motivation to collaborate</u>

> *We just fell into wins – it's just a natural outcome of our collaboration.*
> *– CAPT Hill, Executive Officer NAWCTSD*

For Team Orlando, the concern of a BRAC was the initial motivation to collaborate based on the belief that they were all stronger together than fighting separately. Following the September 11th attacks, there was further coordination based on the need to improve the physical protection of the space. Joint protection offered the optimized safety solution as well as the most fiscally sound one. However, while fear may be a great motivator to begin collaboration, there must be a concrete impetus to continue it.

Interviews across the current and former leadership commonly reported that while the synergy of Team Orlando was clear on paper, the focused and intentional sharing of information was less organized. It was noted that the structure is magnificent. The positivity externally is tangible. However, differing requirements from each organization and a need to constantly respond to requests from outside the area hinder the team's ability to operate truly cohesively. That said, the research conducted to write this paper clearly demonstrates enormous impact for the warfighter, wise use of fiscal resources, and a greater impact on the local, national, and international space. So why is this the case? Because even without strict structure and clear vision, the co-location, informal connections, and personal motivation to work together toward common goals unintentionally results in improved outcomes. Imagine though if this process and community were more intentionally connected, organized by joint goals, and driven by a joint vision?

<u>Vision</u> –

> *"If you can't draw the vision, you can't create the impact. We have to define where the train is going."*
> *– VADM(Ret.) Harms, Former Chief Learning Officer of the Navy*

Fear of a BRAC may have started it. Informal collaboration may have sustained it. But vision is what will propel Team Orlando into an optimized future that not only grows the local community but which also extends the modeling and simulation capabilities to education and training across the nation. This vision must be clarified at two levels: enabling structure and thought leadership.

> *"Instead of being super tactical, it's time to transition Team Orlando vision." – CAPT(Ret.) Takagawa*

Currently, Team Orlando has benefited from ad hoc, versus optimized, collaboration. There is synergy when needed but not with long term intent. Regularity of community, a routine cadence, with discussions about current challenges and future capabilities is needed because if the focus is just on creating tools, the team will not act as the forward-leaning and thinking community that is needed. Team Orlando may have developed synergy by initial necessity, or one may argue by accident, but as it evolves, it needs to become purposeful, strategic in form and vision.

> *"We must think beyond our local area to include Washington and we must transform to a hub of excellence with a cohesive mindset – a cooperation to produce." – Ms. Hagerman, Director JTIEC*

To develop this cadence, a physical separation from these military installations is required. It is necessary to develop a fresh perspective, cultivate innovative thought, and focus without bureaucratic constraints. But to ensure that this off-site program maximizes its impact reach, the expenditure of tax dollars, and becomes self-sustaining, the vision for how the local brand can be utilized beyond the initial customer base must originate from a goal of great enough importance to be needed by many related industries. It must be the type of focus that creates a significant evolution in

society and requires innovation. The goal for Team Orlando is to evolve and extend the way we conduct training and education in order to optimize readiness as well as optimize time to readiness.

"Simulation is worth a thousand words." – Dr. Neal Finklestein

Simulation is the training medium of the future. It adds depth and color to complex problems, reduces oversimplification, and supports outcome prediction (Vogel-Walcutt, Malone, & Schatz, 2013). In a world where data overload is no longer a possibility but instead, a constant reality, methodologies that provide conceptual clarity while managing cognitive load will be necessary tools across all aspects of life.

"Being able to learn is key so that we're not trying to go out and learn buzz words, rather focus on the capability to learn, and acquiring that so that we're always able to stay at the forefront of the latest technology and the latest cultures." – ADM Richardson, Chief of Naval Operations, April 2018 at the Defense Innovation Board public meeting

To date, modeling and simulation techniques have been primarily used for military educational and training purposes but are increasingly being employed in medical, athletic, psychological, and entertainment models (Dubbels, 2016). This is not just a fad concept because the underpinnings of the methodologies are ground strongly in cognitive science. In the future, learning will occur anywhere, anytime, and across content areas. Known in the field as the Future Learning Ecosystem (Out-think, Out-learn, Win, 2017), personalized information will be constantly accessible and oftentimes unavoidable making it vital for individuals to be able to filter data noise and focus on key points and then connect all these concepts to each other in a meaningful way (Vogel-Walcutt, Ross, Phillips, & Stensrud, 2016).

"The department will transition to a culture of performance and affordability that operates at the speed of relevance. Success does not go to the country that develops a new technology first, but rather, to the one that better integrates it and more swiftly adapts its way of fighting." – Secretary James Mattis

Transformation at scale requires time, energy, and financial resources to enable innovation. But vision from the expert teams will drive the holistic change across our nation. What is needed for the evolution of training and education no longer involves incremental changes but rather, it is time to re-imagine learning in the defense arena and then share that vision across all educational experiences. Life-long learning must include all stakeholders across the lifecycle (K-16, Labor, and Military) and extensive infusion of modeling and simulation techniques.

"Simulation is not just a course, it's embedded in everything we do."
– Mr. Henry "Hank" C. Okraski, SES, USN (Ret)

As Team Orlando decisively represents the global modeling and simulation leaders, the vision of the future, and associated pathway to success, should be led by this team (Orlando modeling and simulation, 2017). The ability to transform education from a passive to an active process while capitalizing on the ability to provide access to unlived simulated experiences combined with the ability to model future outcomes or problems will be one of the most profound impacts for optimizing decision making both within and outside the defense community.

"Rapid technological change includes developments in advanced computing, big data analytics, [and] artificial intelligence…– the very technologies that ensure we will be able to fight and win the wars of the future. [These] new commercial technologies will change society, and ultimately, they will change the character of war." - James Mattis, U.S. Secretary of Defense, House Armed Services Committee written statement for the record, Monday, June 12, 2017.

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