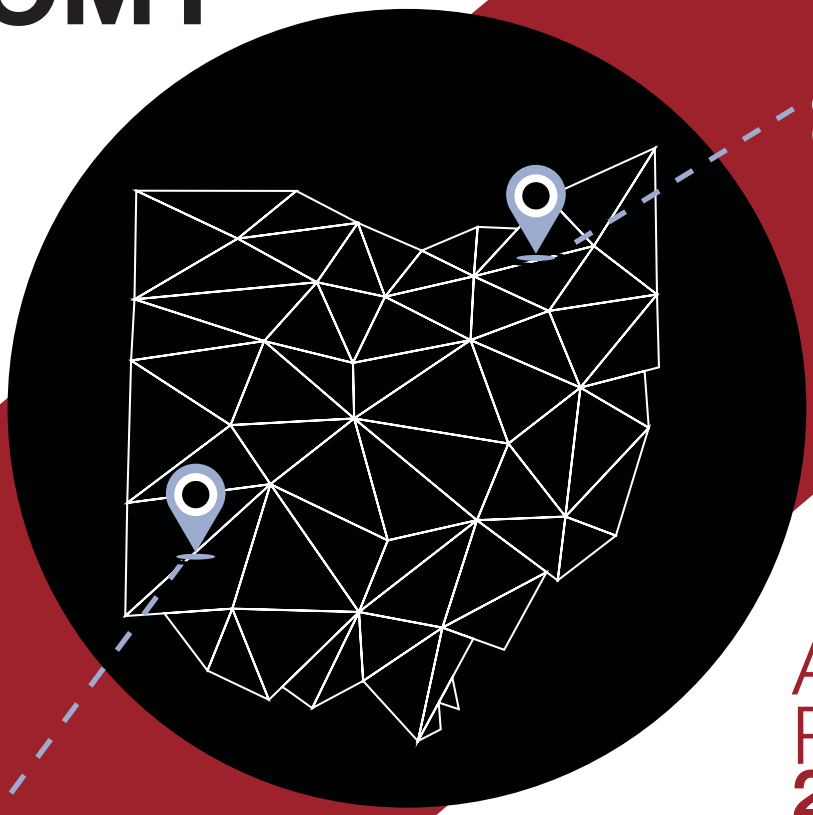
BUILDING OHIO'S AEROSPACE **INNOVATION ECONOMY**



ANNUAL REPORT **2018**

OHIO **AEROSPACE INSTITUTE**

OAI
Ohio Aerospace Institute

CEO

LETTER FROM THE **OAI CEO**

I'm honored to step into the role of president and CEO of this great organization with such a rich history. All of us at OAI owe our gratitude to Mr. Jeff Rolf, who retired as president and CEO at the end of fiscal 2018. During his tenure, Jeff began OAI's transformation into a more modern organization focused on making connections that lead to meaningful innovation. His fresh perspective, sincerity, altruism and industrial experience left a positive imprint on OAI and secured a financial position from which the organization can blossom.

As OAI approaches its 30th anniversary, I see a rich future ahead. Ohio is the birthplace of aviation and home to many astronauts. It is a leader in the global aviation supply chain. OAI exists to constantly build on that heritage and ensure ongoing upward momentum for our partners.

In the research sector, our experts are providing technical solutions for national civil and defense priorities. We are working to further expand opportunities for our partner academic institutions to leverage the investments that the State of Ohio has made in the Ohio Federal Research Network.

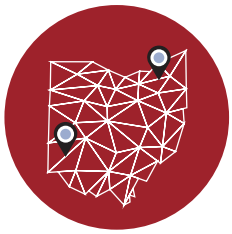
Innovation is prolific at OAI. As more and more of our researchers, partners and students discover ways to translate their findings into enterprising ventures, OAI's economic impact is continuing to grow and bolster development throughout the state. Efforts to drive economic prosperity with technical innovations are strategically concentrated in the northern, center and southern areas of Ohio and are projected to trickle throughout the state.

Since its inception, OAI has excelled at forging partnerships between industry groups, academia and government, but the continued health of our consortia is poised for additional growth as the federal government seeks more public-private partnerships. The health of Ohio's aerospace industry rests on a diverse, educated workforce, and we remain committed to partnerships in STEM education and advancing aviation workforce development.

Aviation and aerospace have inspired generations of Ohioans to dream big. But collaboration is the key to evolving dreams into real innovations that transform the region. By building an innovation infrastructure between industry, academia and the public sector, Ohio will thrive and establish dominance in global aerospace.

Sincerely,

John M. Sankovic, Ph.D., P.E.
President and CEO



OHIO'S DRIVE **FOR DEFENSE**

OAI led Ohio's DRIVE for Defense, which engaged partners from throughout the State of Ohio in a dialogue with key Department of Defense (DoD) decision makers. With special guest Congresswoman Marcy Kaptur and participation from Ohio Congressional Representatives Jim Jordan and Joyce Beatty, this very successful event achieved two primary goals. One goal was to communicate national defense security priorities and needs to Ohio businesses, universities and other organizations that can fulfill those needs. The other goal was to create greater awareness among key DoD decision makers of the full span of capabilities and unique strengths offered by Ohio suppliers of research, technology, goods, services and other programs. Hosted at Sawmill Creek in Sandusky, Ohio, the event attracted more than 200 participants from 145 organizations across the entire state of Ohio and Washington, D.C. area.

Discussion topics included the advantages of doing business with the DoD; Ohio's Innovation Ecosystem and its advantages for fulfilling DoD needs; an overview of NASA Glenn Research Center's Plum Brook Station's unique test facilities; DoD strategic direction and needs; technology acquisition; special sessions on Ohio's advanced energy and medical sectors; and the importance of DoD work across Ohio districts. Attendees also had the opportunity to tour NASA's Plum Brook Station.

Distinguished Department of Defense participants included Chief of Naval Research Rear Admiral David Hahn; James Galvin, Acting Director, Office of Small Business Programs in the Office of the Secretary of Defense; Adele Ratliff, Director, Manufacturing Technology, Office of the Deputy Assistant Secretary of Defense; Dr. Paul Zablocky, Division Director of the Complex Hybrid Warfare Sciences Division within the Expeditionary Maneuver Warfare and Combating Terrorism Science and Technology Department, Office of Naval Research; Col. Brian Magnuson, Director, Marine Corps Expeditionary Energy Office, United States Marine Corps; Jack Blackhurst, Executive Director of the Air Force Research Laboratory; Dr. Jaret Riddick, Director of the Vehicle Technology Directorate, U.S. Army Research Laboratory; Anthony Aldrich, SBIR Program Manager for Special Operations Forces, Acquisition Technology and Logistics, U.S. Special Operations Command. Distinguished industry panelists represented GE Aviation, Parker Aerospace, L3 Space and Sensors, Teledyne Technologies, General Dynamics, Arconic, Isto Biologics, ZIN Technologies, and Frueh Enterprises.

Distinguished panelists and speakers were also drawn from the Ohio Aerospace and Aviation Technology Committee, the Ohio Aerospace and Aviation Council, JobsOhio, TeamNEO, Greater Cleveland Partnership, Kent State University, the Ohio Federal Research Network, Ohio Development Services Agency, Toledo Chamber of Commerce, the Cleveland Clinic, University of Toledo, BioEnterprise, GLX Power Systems, Case Western Reserve University and Technology Management, Inc. – many of whom also provided representatives to the Summit Planning Committee.

Sponsors for the event included FibreTUFF, RBB, Teledyne Turbine Engines, Woolpert, Kent State University, ZIN Technologies, SMART Microsystems, Comrod and OAI.

- OAI's Icing Research team members Dr. Paul Tsao and Dr. Tadas Bartkus examined fundamental physical mechanisms of jet engine icing and physical aspects of ice erosion. New modeling software developed by Dr. Bartkus, Thermodynamically Coupled Air-Droplet Icing Wind Tunnel Model (TADICE), was added to the NASA Software Library for U.S. use.
- Mr. Darrell Gaydosh established a unique testing facility to measure mechanical properties of shape memory alloys (SMA's) using a method that eliminates the need for liquid nitrogen and greatly simplifies low temperature testing. The facility has been used to evaluate low temperature SMA torque tubes for use in an actuator in vortex generators scheduled to fly on the Boeing Eco-Demonstrator aircraft in 2019.
- OAI executed multiple projects under its Versatile, Affordable Advanced Turbine Engine III contract with the Air Force Research Laboratory. Projects involved coordinating partnerships to address significant technology challenges in design, analysis, instrumentation, controls, additive repair and digital thread/digital twin for turbine engines.
- Under an AFRL contract, OAI's Engineered Surfaces, Materials and Coatings for Drag Reduction program advanced its unique approach to the fabrication of riblets to reduce drag.
- OAI's multiple consortia continued to advance research in jet engine noise, additive manufacturing, distributed engine controls, propulsion instrumentation and replacement of halon in aircraft fire suppression systems.

In fiscal 2018, OAI's Research, Innovation, Technology and Education (RITE) Team, led by Executive Vice President Ann Heyward, grew revenue by more than 15.5% compared to FY17.

15.5%

OSGC GRADUATE SOARS AS FOUNDER AND **CEO OF OHIO DRONE COMPANY**

OSGC graduate Rob Charvat with Senator John H. Glenn Jr. (2012 NASA Future Forum)

Rob Charvat is celebrating 10 years in Ohio's aerospace industry, supporting organizations such as GE Aviation, Sierra Lobo, Ohio Drone and NASA Glenn. Charvat is a 2012 Ohio Space Grant Consortium (OSGC) Master's Graduate in Aerospace Engineering from the University of Cincinnati, where he focused in Unmanned Aerial Systems. He was the student lead for the OSGC funded SIERRA Project, which explored drone use for wildfire management and was featured on the Discovery channel for its groundbreaking work. Rob also received a scholarship and internship support from the OSGC.

Today, Charvat is the CEO of the Ohio Drone Company (LLC), which was founded in the lobby of the Ohio Aerospace Institute (OAI) in 2017 when two OSGC graduates reunited to create a company that could support Ohio's unique drone needs. "The Ohio Drone Company deploying drones to both commercial and emergency response partners is a direct result of the tremendous support from the OSGC, and its commitment to advancing aerospace technology and commercialization efforts here in Ohio," Charvat said.

Taking the technology from college laboratories to the award-winning HCDC Business Center and the #StartupCincy ecosystem, Charvat has made tremendous progress in scaling operations. The Ohio Drone Company now has activities in Dayton, Cleveland, Cincinnati, Toledo and Akron. Outside of the emergency response market, they have also been recognized for supporting the Cleveland National Airshow, Electrical Utility Robotics and a series of inspection technology patents. The Ohio Drone Company is most famous for capturing video footage of the NASA 2017 Eclipse that was viewed by more than 40 million people. "The applications for the drone technology are limitless, and we are proud to see our technology making a difference from California to Maryland, as well here at home," Charvat said.

The Ohio Drone Company partnered with Tytek Medical Group to develop emergency response drones for local, state and federal partners. The company is currently on its second drone production run, which features an Ohio Built ISO 9001 Certified FAA Flight Compliant Fire Response Drone.

Reflecting on how OSGC has impacted him and his community, Charvat said, "One of my favorite moments is when I was corrected that the company didn't have seven, but ten Ohio graduates receiving financial compensation through OSGC. True evidence that as Ohio had given so much to us, and now we are now giving back to it as well."

Rob also volunteers at the OSGC Annual Student Research Symposium by chairing a STEM (Science, Technology, Engineering and Mathematics) panel of OSGC alumni who share their experiences with current scholarship and fellowship awardees.

Ohio Drone LLC and Community Celebrating 3 Days of Safe Flights (2017 Cleveland Air Show)

OSGC

AWARDED:

78	3	15
UNDERGRADUATE SCHOLARSHIPS	GRADUATE FELLOWSHIPS	SUMMER INTERNSHIPS

OSGC HAS IMPACTED MORE THAN 1,460 STUDENTS TO DATE.

OAI BOLSTERS ECONOMIC DEVELOPMENT THROUGHOUT **THE STATE AND MIDWEST**

Through supporting enterprising projects and forging strategic partnerships, OAI has expanded its economic impact significantly in FY18. The developments have brought opportunities to the State of Ohio as well as to communities and businesses throughout the Midwest.

The Economic Development Administration awarded a $1.5M cooperative agreement to OAI and its partner, Milwaukee Development Corporation, to develop a new approach to capitalizing on Federal laboratories as catalysts for economic growth in distressed communities. The project will support job creation by directly connecting businesses with expertise, technologies for commercialization, and spin-in needs of Federal laboratories. The model will be able to be scaled and replicated in other regions, creating new revenue streams statewide. EDA's funding was generously matched by the State of Ohio, Cuyahoga County, the Cleveland Foundation, the Gund Foundation and the in-kind contributions of 11 additional partners. A comprehensive cluster analysis of Northeast Ohio was completed and will guide pilot project activities in 2019.

OAI also won a Federal and State Technology (FAST) partnership grant from the U.S. Small Business Administration. Representing the State of Ohio, OAI is one of just 24 recipients nationwide. OAI will use the grant to connect minority, woman and veteran-owned businesses with federal funding opportunities in aerospace and allied sectors through the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs.

As part of the State of Ohio's Entrepreneurial Signature Program, OAI partnered with Jumpstart, Inc. to help emerging businesses develop successful SBIR proposals. Jumpstart and OAI emphasize inclusion to ensure the broadest possible access to this source of capital for innovative products and services. Through its partnership with Jumpstart, OAI received its second grant to participate in the Business Growth Collaborative (BCG). Funded by the Cleveland Foundation, the BCG is a targeted effort to specifically engage entrepreneurs and potential entrepreneurs in the City of Cleveland.

OAI continued to help build the Aerozone Alliance, a place-based economic development initiative of many local organizations and communities. The mission of the Alliance is to create a 15.5 mile innovation district to attract smart jobs and innovative companies that can capitalize on the presence of the unique assets of the NASA Glenn Research Center and Cleveland Hopkins International Airport.

- Partnering with JobsOhio and Ohio's Development Services Agency, OAI coordinated delegations at the 2018 Farnborough International Air Show in the UK and the Airtec International Supply Fair in Munich. OAI also participated with a booth and presentation at the 2018 Turbine Engine Technology Symposium in Dayton.
- OAI played a large role in coordinating Ohio Aerospace Day, an advocacy collaboration between the Ohio Aerospace and Aviation Council and the Ohio Aerospace and Aviation Technology Committee, to build awareness among state legislators of the importance of aerospace to Ohio's economy.
- OAI hosted 10 summer faculty at NASA GRC and 9 students under our contract with Paragon TEC, Inc.
- OAI supported the 2018 Buckeye Regional FIRST Robotics Competition by serving as fiscal agent, involving more than 1,500 high school students in an intensive, hands-on design and build experience. The competition has demonstrated impact on scholastic achievement and STEM career choice.
- Dr. Andrew Gyekenyesi co-chaired the SPIE conference, "Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, and Civil Infrastructure and Transportation XII," in Denver March 5-8, 2018.

OHIO AEROSPACE INSTITUTE

RESEARCH ACHIEVEMENTS INCLUDED:

SERVICE ON 2 DISSERTATION COMMITTEES

> MORE THAN 40 TECHNICIAL, CONFERENCE AND JOURNAL PUBLICATIONS

17 TECHNICAL LEADERSHIP ROLES

14 BOOK CHAPTERS AND EDITORSHIPS

9 TECHNICAL SOCIETY SPECIAL AWARDS AND INTERNATIONAL HONORS

5 NEW TECHNOLOGY DISCLOSURES

2 UTILITY PATENT APPLICATIONS

1 NEW PROVISIONAL PATENT APPLICATION

OSGC scholars presented their research at OAI for the 26th Annual Student Research Symposium

TESTIMONIAL

"As an information technology provider that works frequently with organizations in the aviation and aerospace industries, we joined OAI to help fortify and expand our industry knowledge and expertise, forge new business relationships, and network with other members. On all fronts, OAI has delivered in ways that have been beneficial to our business.

OAI welcomed us with open arms and they have helped us navigate the aerospace community. They met with us to truly get to get know our company capabilities and culture, and they always keep us top of mind as they come across opportunities they may see in the industry. We've leveraged OAI as a trusted advisor as we've been awarded government contracts with the NASA Glenn Research Center and the NASA Safety Center. They are a resource we know we can lean on if we ever need assistance understanding government contract policies or initiatives in the aerospace industry.

The information and opportunities for participation at various OAI aerospace and aviation events has been consistently valuable to us, helping us stay up-to-date on what's going on in the industry and connect with other members throughout the state of Ohio. Having the ability to use their facilities and resources for V2 events also comes in handy. Across the board, our OAI membership has been useful and rewarding—enabling us to build on the successes our company has experienced in aviation and aerospace. We look forward to continuing this partnership and growing our relationship with OAI in the future."

- V2 Technology

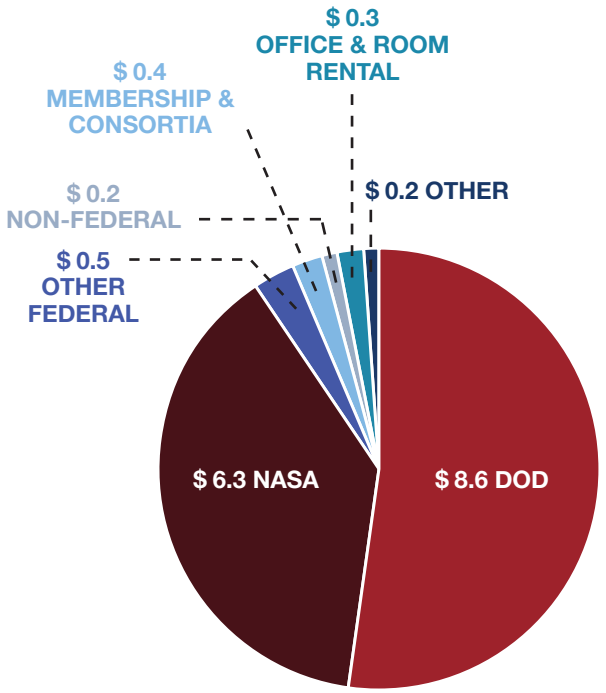
In fiscal 2018, OAI's Operations Team, led by Vice President John Cotman, supported the 15% program growth with negligible expense growth.

FINANCIAL 20 REPORT 18

STATEMENT OF ACTIVITIES (AUDITED)

	2018 Program	2018 Support	2018 Total	2017 Total
REVENUES				
Contracts and Grants	$ 15,459,422	$ -	$ 15,459,422	$ 13,465,013
Consortia	252,091	-	252,091	239,361
Membership and Foundation	143,785	-	143,785	88,199
Building Rental	-	288,562	288,562	282,859
Registration fees	88,165	-	88,165	45,494
Interest and other	66,263	22,582	88,845	207,880
Total revenues	16,009,726	311,144	16,320,870	14,328,806
EXPENSES				
Salaries and benefits	5,942,073	1,539,041	7,481,114	7,577,544
Research subcontracts	4,292,454	-	4,292,454	3,756,811
Student and faculty support	2,213,301	-	2,213,301	1,390,857
Administrative and professional services	579,444	275,642	855,086	681,036
Supplies/equipment/maintenance/depreciation	55,175	373,427	428,602	367,959
Building operations	3,868	447,357	451,225	397,131
Travel/seminars/meetings	291,474	52,294	343,768	280,998
Total expenses	13,377,789	2,687,761	16,065,550	14,452,336
SURPLUS/DEFICIT	$ 2,631,937	$ (2,376,617)	$ 255,320	$ (123,530)

REVENUE SOURCES
DOLLARS IN MILLIONS



STATEMENT OF FINANCIAL POSITION

	2018	2017
ASSETS		
CURRENT ASSETS		
Cash and investments	$ 1,506,444	$ 661,959
Funds held for others	9,462	4,376
Net receivables and deposits	2,977,693	2,087,639
Total current assets	4,493,599	2,753,974
NET PROPERTY AND EQUIPMENT - AT COST	5,411,793	5,624,531
	$ 9,905,392	$ 8,378,505
LIABILITIES AND NET ASSETS		
CURRENT LIABILITIES		
Accounts payable and accrued expenses	$ 2,067,986	$ 1,357,605
Funds held for others	9,462	4,376
Deferred revenue	1,914,204	1,358,104
Total current liabilities	3,991,652	2,720,085
NET ASSETS		
Unrestricted:		
Operating	$501,947	$33,889
Net investment in equipment/improvements	916,353	943,712
	1,418,300	977,601
Temporarily restricted - net building investment	4,495,440	4,680,819
Total Net Assets	5,913,740	5,658,420
	$ 9,905,392	$ 8,378,505

FY2019
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OAI BOARD CHAIRMAN

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