



# NIAR®

**NATIONAL INSTITUTE FOR AVIATION RESEARCH**

WICHITA STATE UNIVERSITY

**FY20 LEGISLATIVE UPDATE**



WICHITA STATE  
UNIVERSITY

# NATIONAL INSTITUTE FOR AVIATION RESEARCH

WHERE TEST PLANS BECOME RESULTS

WICHITA, KANSAS

LOCATION

\$120 MILLION

YEARLY R&D

850

EMPLOYEES

1.3 MILLION

SQUARE FEET

6 WICHITA AREA

LOCATIONS

1986

ESTABLISHED

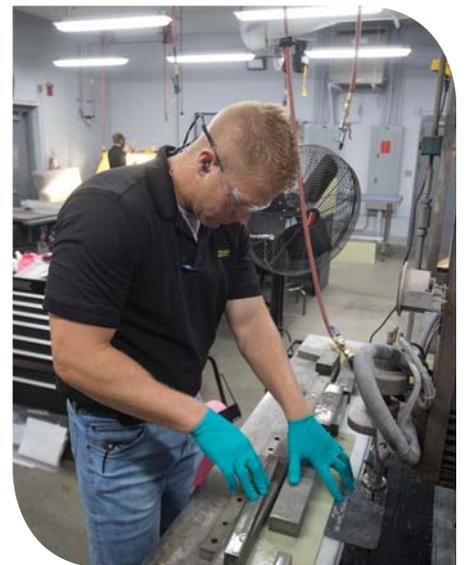
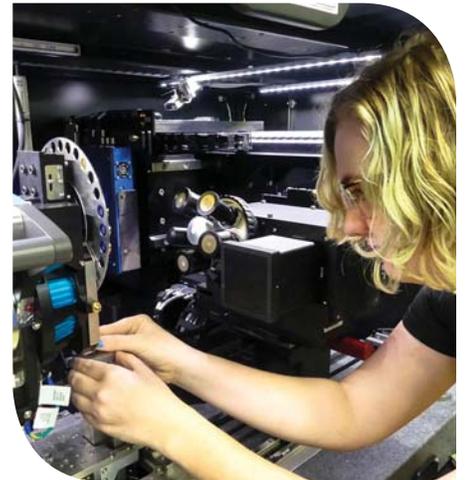
The National Institute for Aviation Research (NIAR) at Wichita State University provides research, testing, certification and training for aviation and manufacturing technologies.

Established in 1985, NIAR has a \$120 million annual budget; a staff of 850; and 1.3 million square feet of laboratory and office space in six locations across the city of Wichita, the Air Capital of the World.

[WWW.NIAR.WICHITA.EDU](http://WWW.NIAR.WICHITA.EDU)

# AREAS OF EXPERTISE

ADDITIVE MANUFACTURING  
ADVANCED COATINGS  
ADVANCED MANUFACTURING  
AERODYNAMICS  
BALLISTIC AND IMPACT DYNAMICS  
COMPOSITES AND ADVANCED MATERIALS  
CRASH DYNAMICS  
ENGINEERING DESIGN AND MODIFICATION  
ENVIRONMENTAL AND ELECTROMAGNETIC TESTING  
FLIGHT SIMULATION  
FULL-SCALE STRUCTURAL TESTING  
NONDESTRUCTIVE TESTING  
SUSTAINABILITY  
REVERSE ENGINEERING  
ROBOTICS AND AUTOMATION  
VIRTUAL ENGINEERING  
EXTENDED REALITY



# LOCATION

**NIAR'S LOCATION IS IDEAL CONSIDERING WICHITA'S STRONG MANUFACTURING AND AEROSPACE WORKFORCE.**

Wichita ranks **#1 IN MANUFACTURING JOBS** as a percentage of all jobs.

South Central Kansas is the most manufacturing - specialized region in the United States with 17.7 percent of regional jobs in manufacturing, more than half of which are engaged in making some of the world's most sophisticated aircraft.

Wichita has the highest concentration of aerospace manufacturing employment in the nation.

Wichita is ranked **#3 NATIONALLY AS AN ADVANCED INDUSTRY HOTSPOT**.

Wichita ranks **#1 IN PERCENTAGE OF JOBS INVOLVING STEM OCCUPATION**.

Wichita ranks **#3 AMONG METROS FOR HIGHEST CONCENTRATION OF ENGINEERS** per 1,000 employees (22.4/1,000)



# NIAR CENTERS

NIAR also runs several centers and initiatives that are strategically aligned with the institutes capabilities and mission including:

## NATIONAL CENTER FOR ADVANCED MATERIALS PERFORMANCE (NCAMP)

The National Center for Advanced Materials Performance (NCAMP) is designed to provide the nation's commercial and military aviation industry with a center for the validation and quality assurance of composites and advanced materials. Both the FAA and EASA accept composites specification and design values developed using the NCAMP process. NCAMP works with the FAA, DoD and industry partners to qualify material systems and populate a shared materials database that can be viewed publicly.

[WWW.NIAR.WICHITA.EDU/NCAMP](http://WWW.NIAR.WICHITA.EDU/NCAMP)



## COMPOSITES MATERIALS HANDBOOK-17 (CMH-17)

The CMH-17 organization, administered by Wichita State University, provides information and guidance necessary to design and fabricate end items from composite materials. Its primary purpose is the standardization of engineering data development methodologies related to testing, data reduction, and data reporting of property data for current and emerging composite materials.

[WWW.CMH17.ORG](http://WWW.CMH17.ORG)



## FAA CENTER OF EXCELLENCE FOR COMPOSITES AND ADVANCED MATERIALS (CECAM)

CECAM is an FAA-sponsored consortium of universities competent in advanced materials research. CECAM is led by Wichita State University, which interacts directly with the FAA to support its advanced materials safety programs.

[WWW.NIAR.WICHITA.EDU/CECAM](http://WWW.NIAR.WICHITA.EDU/CECAM)



## FAA CENTER OF EXCELLENCE FOR UAS RESEARCH

Wichita State University is a member of the Federal Aviation Administration Center of Excellence for Unmanned Aircraft Systems, which was awarded by the U.S. Department of Transportation in Washington in May 2015.

[WWW.ASSUREUAS.ORG](http://WWW.ASSUREUAS.ORG)



## KANSAS AVIATION RESEARCH AND TECHNOLOGY GROWTH INITIATIVE (KART)

KART funds are provided to WSU-NIAR by the Kansas Department of Commerce and the Kansas Legislature with the goal of strengthening a variety of aircraft industry technologies and marketing them to other areas outside the State of Kansas and the United States. The funding supports research initiatives that benefit multiple aviation and manufacturing stakeholders in an effort to support the retention and growth of more than 30,400 direct aerospace jobs and 118,894 indirect jobs as a result of the aerospace industry with an average wage of \$67,440, a total direct payroll of \$2.3 billion and an indirect payroll of \$5.2 billion. KART retains and grows the aviation cluster in Kansas and helps Kansas aviation companies remain competitive.



## 3D EXPERIENCE CENTER

The 3DEXPERIENCE® Center, a partnership with Dassault Systèmes, involves an interconnected community of top researchers, corporations and laboratories to accelerate innovation. The 3DEXPERIENCE Center enables organizations to engage in advanced product development and the manufacturing of next-generation materials and technologies including additive manufacturing, multi-robotic advanced manufacturing, reverse engineering and inspection, and virtual reality and immersive technologies.

[WWW.NIAR.WICHITA.EDU/3DEXPERIENCE](http://WWW.NIAR.WICHITA.EDU/3DEXPERIENCE)



## AIRCRAFT STRUCTURAL TEST AND EVALUATION CENTER (ASTEC)

NIAR's Aircraft Structural Test and Evaluation Center (ASTEC) encompasses 130,000 square feet (39,000 square meters). The facility features include a 30x70-foot hangar door, a clear span of 265 feet (80 meters) and ceiling height of 48 feet (14 meters). The facility is currently home to the institute's Full-Scale Structural Test Lab, Mechanical Test Lab and Ballistics Lab.

[WWW.NIAR.WICHITA.EDU/ASTEC](http://WWW.NIAR.WICHITA.EDU/ASTEC)



## ADVANCED TECHNOLOGY LABORATORY FOR AEROSPACE SYSTEMS (ATLAS)

The Advanced Technologies Lab for Aerospace Systems – is a multi-disciplinary manufacturing environment and engineering education program to prepare engineers and educators for the Factory of the Future and to aid the current workforce in seamlessly adapting to advancements in the workplace.

[WWW.NIAR.WICHITA.EDU/ATLAS](http://WWW.NIAR.WICHITA.EDU/ATLAS)



## FIREPOINT AT WICHITA STATE

FirePoint partners with the United States Army to accelerate the delivery of innovative capabilities to the warfighter. FirePoint creates a collaborative and networked environment of national scope to investigate, collaborate and produce courses of action to solve technology and equipment challenges identified by the Army. As FirePoint's principal partner, the Army's Combat Capabilities Development Command Aviation and Missile Center (CCDC AvMC).

[FIREPOINT.INFO](http://FIREPOINT.INFO)



# RECENT U.S. DEPARTMENT OF DEFENSE PROGRAMS

WSU-NIAR is supporting multiple units of all major Department of Defense agencies with research and testing projects totaling more than \$60 million.

MQ-9 Reaper Airframe Static Testing, Air Force

MQ-9 Reaper Airframe Durability and Damage Tolerance Testing, Air Force

MQ-4 Triton Airframe Durability and Damage Tolerance Testing, Navy

KC-135 Structural Teardown Data Management Visualization, Air Force

F-35 Teardown, Air Force, Navy, Marine Corps

FirePoint joint R&D projects: technology development and transition, U.S. Army AMRDEC

Multi-university/agency research partnerships to develop techniques to enhance advanced material characterization and structural certification aided by high-fidelity damage modeling and efficient protocols for substantiation of advanced composite structures - AFRL, ONR, NAVAIR, DURIP, SBIR/ STTR

UH-60L Black Hawk Digital Twin, Army AMC

B-1B Lancer Digital Twin, Air Force

Skyborg Prototyping, Experimentation and Autonomy Development, Air Force

Emerging Materials for High-Speed Missile Applications, DoD

Modeling for Affordable, Sustainable Composites (MASC) research program, Air Force Research Laboratory



# 2020 HIGHLIGHTS

## FEBRUARY

Wichita State licenses wind turbine protection technology developed by NIAR researcher Billy Martin



## MARCH

FAA awards CECAM \$8.2 million to nine new projects and provide additional funding for nine existing projects.

## APRIL

NIAR uses 3D printing resources to assist the Ad Astra Coalition manufacture PPE for COVID-19 relief efforts

FirePoint hosts the first C3 Challenge, selecting teams to design next-generation drone systems in partnership with the U.S. Army's Combat Capabilities Development Command and Aviation & Missile Center.



## MAY

Air Forces' B1-B and Army's UH-60L Black Hawk arrive at NIAR ASTEC for long-term digital twin research programs



## JULY

Martin Defense Group (formerly Navatek) announces plans to establish office at WSU

## SEPTEMBER

Deloitte and Wichita State University join forces to launch new Smart Factory

Engineering Design & Modification Lab announces new partnerships and Boeing 777 conversion program.

Advanced Virtual Engineering and Testing Center renamed Jerry Moran Center in tribute to Kansas Sen. Jerry Moran's focus on Kansans, the advancement of our nation's defense and the future learning research.



## OCTOBER

NIAR teams take home gold and bronze awards in the Air Force's inaugural Advanced Manufacturing Olympics

USAF adds WSU-NIAR to elite list of Skyborg program vendors

Army awards \$13.5 million for high-speed missile materials research

WSU opens Molecular Diagnostics Lab to provide COVID testing, with strong support from NIAR Robotics & Automation Lab



## NOVEMBER

ATLAS receives \$13.7 million from the U.S. Air Force for advanced composites research

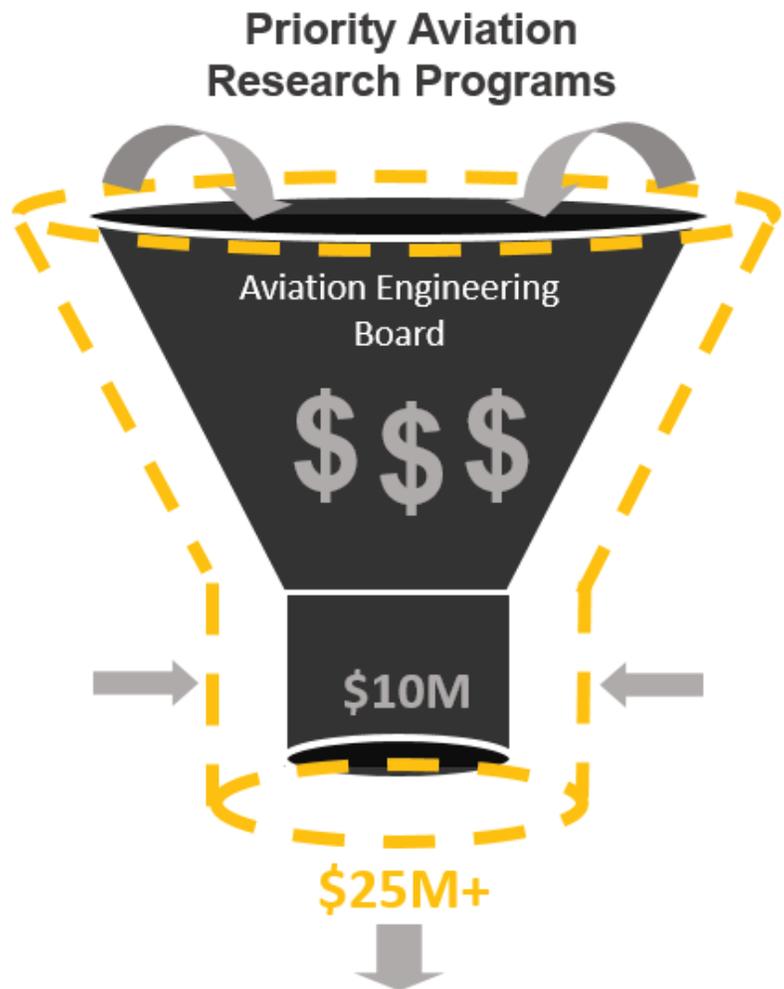


# KART RESEARCH PROGRAM OVERVIEW

The Kansas Aviation Research & Technology Growth Initiative uses funds provided by the Department of Commerce and the Kansas Legislature with the goal of strengthening a variety of aircraft industry technologies and marketing them to other areas outside the State of Kansas and the United States. This funding used in this program supports the retention and growth of over 30,400 direct aerospace jobs and 118,894 indirect jobs as a result of the aerospace industry with an average wage of \$67,440, a total direct payroll of \$2.3 billion and an indirect payroll of \$5.2 billion. The Kansas Aviation Research & Technology Growth Initiative helps retain and grow the aviation cluster in Kansas and help Kansas aviation companies remain competitive throughout the 21st century.

## RESEARCH PROGRAM OVERVIEW

- Program been in place since 2003
- The protocol used by the program is for the **industry** to supply high priority research programs to increase KS competitiveness in the global market.
- These programs are then down selected by the **industry** to fit within the available budget.
- Programs are continually reviewed every two weeks by **industry** points of contact to ensure deliverables are being achieved.



# KANSAS AVIATION INDUSTRY

WHY THIS IS SO IMPORTANT TO US

## KANSAS CONTRIBUTIONS



**30,700** direct aerospace jobs and **113,590** indirect jobs as a result of the aerospace industry with an average wage of \$70,381



Direct payroll of **\$2.3 billion** and indirect payroll of **\$5.2 billion**



Each aviation job generates an additional **3.7** jobs

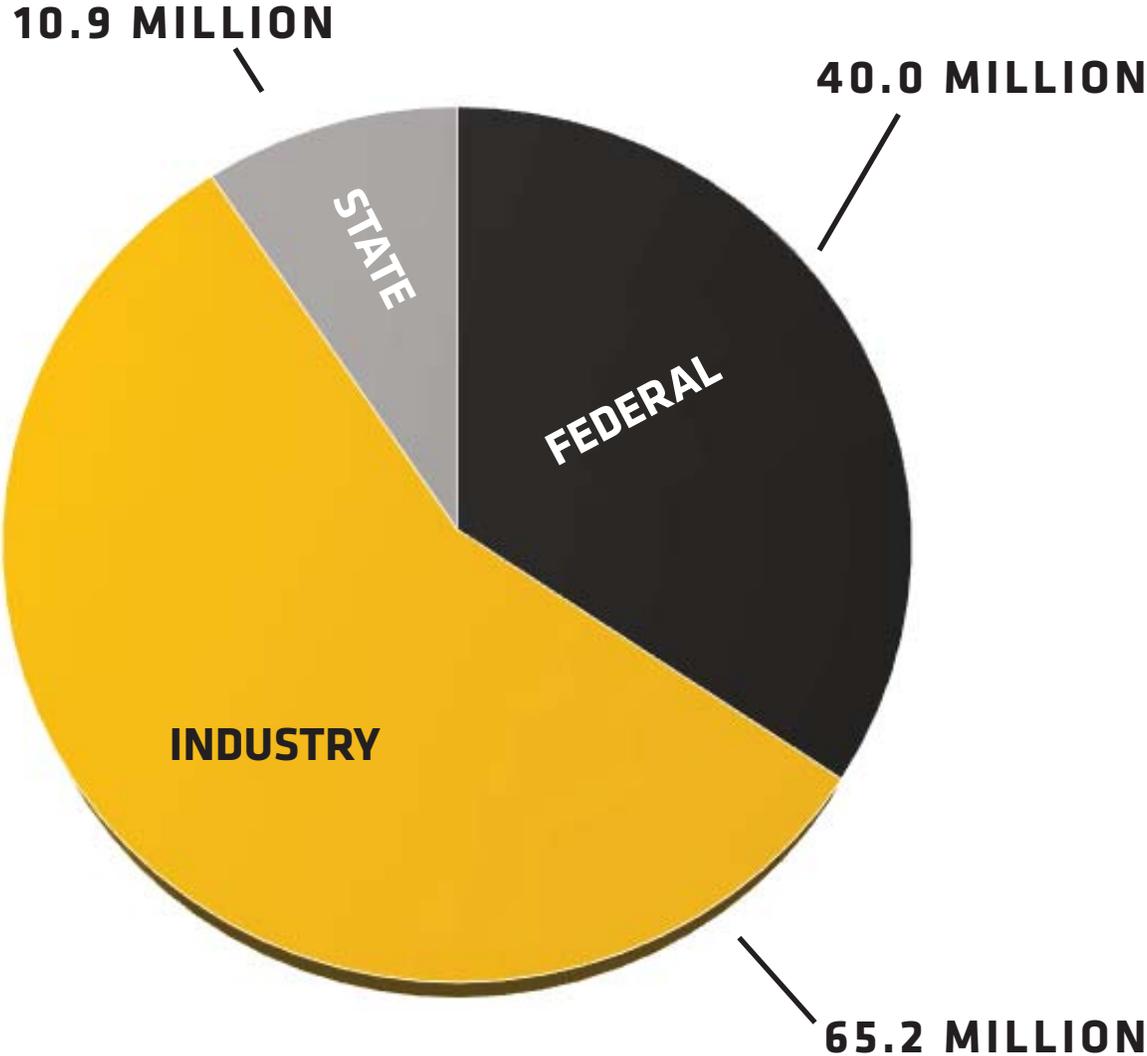


Kansas Aerospace Products & Parts accounted for **21.5%** of all exports for Kansas

Support of the Kansas Aviation and Research Growth Initiative (KART), provides a 10:1 return on investment for aviation R&D awards at Wichita State University. The State's \$10 million investment translated to \$115 million in awards from industry and government entities such as the DoD, FAA and NASA.

# IMPACT OF KART

*\*as reported to the NSF Higher Education Research & Development Survey*



**10:1**  
RETURN ON INVESTMENT

WSU is the **No. 1 university** in the country for industry-funded aeronautical research and development (R&D).

The rankings were released by the **National Science Foundation**.

R&D is an important part of driving innovation with a university and leads to more educational and job opportunities for students, and helps drive the economy.

## AERO R&D EXPENDITURES

<b>118</b> MILLION	<b>UTAH STATE UNIVERSITY</b>
<b>113</b> MILLION	<b>GEORGIA INSTITUTE OF TECHNOLOGY</b>
<b>110</b> MILLION	<b>UNIVERSITY OF COLORADO BOULDER</b>
<b>57</b> MILLION	<b>WICHITA STATE UNIVERSITY</b>
<b>37</b> MILLION	<b>MASSACHUSETTS INSTITUTE OF TECHNOLOGY</b>

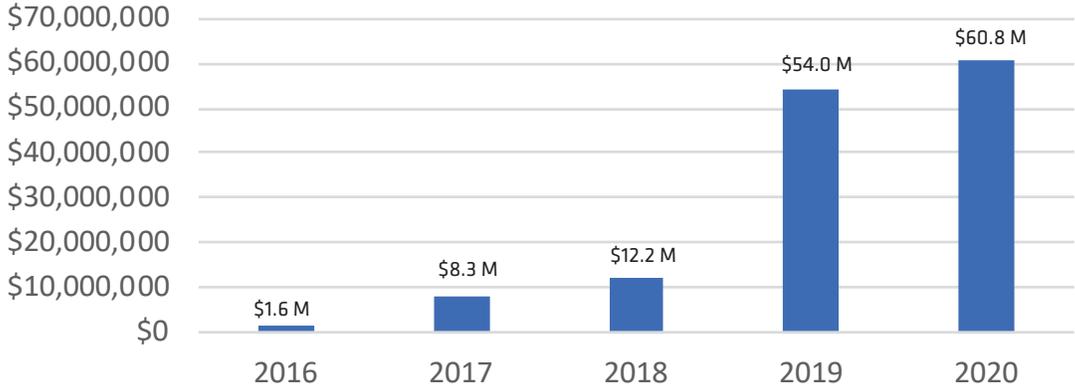
Source: National Science Foundation Higher Education Research and development survey 2018

## INDUSTRY FINANCED AERO R&D

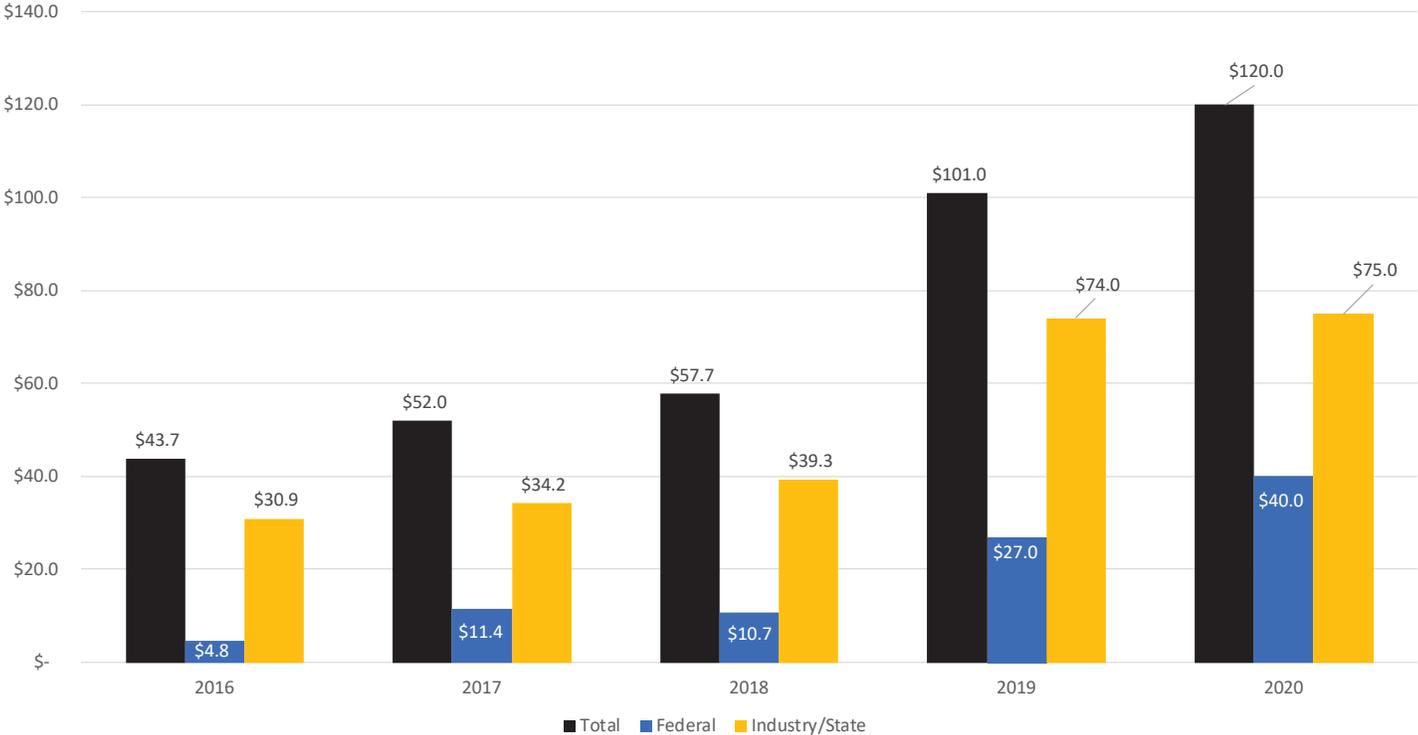
<b>39</b> MILLION	<b>WICHITA STATE UNIVERSITY</b>
<b>10</b> MILLION	<b>GEORGIA INSTITUTE OF TECHNOLOGY</b>
<b>7</b> MILLION	<b>UNIVERSITY OF NOTRE DAME</b>
<b>5</b> MILLION	<b>MASSACHUSETTS INSTITUTE OF TECHNOLOGY</b>
<b>3</b> MILLION	<b>PURDUE</b>

Source: National Science Foundation Higher Education Research and development survey 2018

# DOD AWARDS BY FISCAL YEAR



# EXPENDITURES BY FISCAL YEAR





## KEEP IN TOUCH

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