NATIONAL INSTITUTE FOR AVIATION RESEARCH
WICHITA STATE UNIVERSITY
FY20 LEGISLATIVE UPDATE
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.
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 \textbf{#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 \textbf{#3 NATIONALLY AS AN ADVANCED INDUSTRY HOTSPOT}.

Wichita ranks \textbf{#1 IN PERCENTAGE OF JOBS INVOLVING STEM OCCUPATION}.

Wichita ranks \textbf{#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 institute's 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

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

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

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

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

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

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

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
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

WWW.NIAR.WICHITA.EDU
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.
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*
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

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<th>University</th>
<th>Expenditures</th>
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<tr>
<td>UTAH STATE UNIVERSITY</td>
<td>$118 million</td>
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<td>GEORGIA INSTITUTE OF TECHNOLOGY</td>
<td>$113 million</td>
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<td>UNIVERSITY OF COLORADO BOULDER</td>
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<td>WICHITA STATE UNIVERSITY</td>
<td>$57 million</td>
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<td>MASSACHUSETTS INSTITUTE OF TECHNOLOGY</td>
<td>$37 million</td>
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*Source: National Science Foundation Higher Education Research and development survey 2018*

### INDUSTRY FINANCED AERO R&D

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<tr>
<td>WICHITA STATE UNIVERSITY</td>
<td>$39 million</td>
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<td>GEORGIA INSTITUTE OF TECHNOLOGY</td>
<td>$10 million</td>
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<td>PURDUE</td>
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*Source: National Science Foundation Higher Education Research and development survey 2018*
DOD AWARDS BY FISCAL YEAR

EXPENDITURES BY FISCAL YEAR

Wichita State University