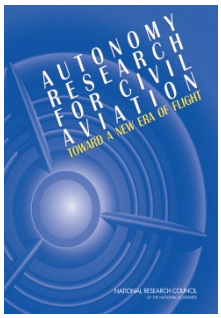
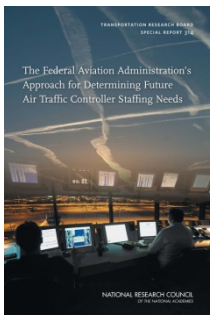
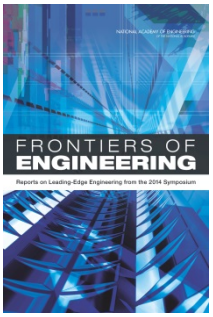
List of selected reports from the National Academies related to the meeting topic: Unmanned Aircraft Systems



AUTONOMY RESEARCH FOR CIVIL AVIATION: TOWARD A NEW ERA OF FLIGHT (DEPS, 2014)
The development and application of increasingly autonomous (IA) systems for civil aviation is proceeding at an accelerating pace, driven by the expectation that such systems will return significant benefits in terms of safety, reliability, efficiency, affordability, and/or previously unattainable mission capabilities. IA systems range from current automatic systems such as autopilots and remotely piloted unmanned aircraft to more highly sophisticated systems that are needed to enable a fully autonomous aircraft that does not require a pilot or human air traffic controllers. These systems, characterized by their ability to perform more complex mission-related tasks with substantially less human intervention for more extended periods of time, sometimes at remote distances, are being envisioned for aircraft and for air traffic management and other ground-based elements of the national airspace system. Civil aviation is on the threshold of potentially revolutionary improvements in aviation capabilities and operations associated with IA systems. These systems, however, face substantial barriers to integration into the national airspace system without degrading its safety or efficiency. The report identifies key barriers and suggests major elements of a national research agenda to address those barriers and help realize the benefits that IA systems can make to crewed aircraft, unmanned aircraft systems, and ground-based elements of the national airspace system.

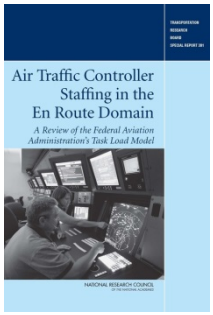


TRANSPORTATION RESEARCH BOARD SPECIAL REPORT 314: THE FEDERAL AVIATION ADMINISTRATION'S APPROACH FOR DETERMINING FUTURE AIR TRAFFIC CONTROLLER STAFFING NEEDS (TRB 2014)
TRB Special Report 314: The Federal Aviation Administration s Approach for Determining Future Air Traffic Controller Staffing Needs examines the methods used by the Federal Aviation Administration (FAA) to estimate how many controllers are needed to staff its air traffic control facilities and its processes for using these estimates to properly distribute controllers across facilities.

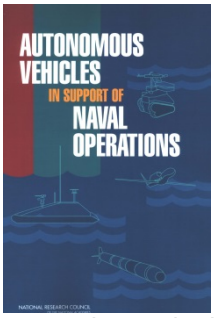


FRONTIERS OF ENGINEERING: REPORTS ON LEADING-EDGE ENGINEERING FROM THE 2010 SYMPOSIUM (NAE 2015)
This volume presents papers on the topics covered at the National Academy of Engineering's 2014 US Frontiers of Engineering Symposium. Every year the symposium brings together 100 outstanding young leaders in engineering to share their cutting-edge research and innovations in selected areas. The 2014 symposium was held September 11-13 at the National Academies Beckman Center in Irvine California. The topics covered at the 2014 symposium were: co-robotics, battery materials, technologies for the heart, and shale gas and oil. The intent of this book is to convey the excitement of this unique meeting and to highlight innovative developments in engineering research and technical work.

TRANSPORTATION RESEARCH BOARD SPECIAL REPORT 301: AIR TRAFFIC CONTROLLER STAFFING IN THE EN ROUTE DOMAIN: A REVIEW OF THE FEDERAL AVIATION ADMINISTRATION'S TASK LOAD MODEL (TRB 2010)

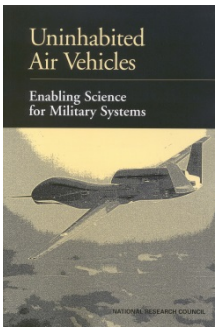


TRB Special Report 301: Air Traffic Controller Staffing in the En Route Domain: A Review of the Federal Aviation Administration's Task Load Model examines the structure, empirical basis, and validation methods of a Federal Aviation Administration model that estimates the time controllers spend performing tasks when handling en route traffic. The model's task load output is being used to inform workforce planning. The committee that developed the report concluded that the model is superior to past models because it takes into account traffic complexity when estimating task load. However, the report recommends that more operational and experimental data on task performance be obtained to establish and validate many key model assumptions, relationships, and parameters.

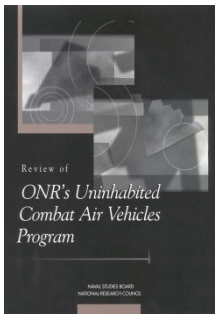


AUTONOMOUS VEHICLES IN SUPPORT OF NAVAL OPERATIONS (DEPS 2005)
Autonomous vehicles (AVs) have been used in military operations for more than 60 years, with torpedoes, cruise missiles, satellites, and target drones being early examples.1 They have also been widely used in the civilian sector--for example, in the disposal of explosives, for work and measurement in radioactive environments, by various offshore industries for both creating and maintaining undersea facilities, for atmospheric and undersea research, and by industry in automated and robotic manufacturing. Recent military experiences with AVs have consistently demonstrated their value in a wide range of missions, and anticipated developments of AVs hold promise for increasingly significant roles in future naval operations. Advances in AV capabilities are enabled (and limited) by progress in the technologies of computing and robotics, navigation, communications and networking, power sources and propulsion, and materials. *Autonomous Vehicles in Support of Naval Operations* is a forward-looking discussion of the naval operational environment and vision for the Navy and Marine Corps and of naval mission needs and potential applications and limitations of AVs. This report considers the potential of AVs for naval operations, operational needs and technology issues, and opportunities for improved operations.

UNINHABITED AIR VEHICLES: ENABLING SCIENCE FOR MILITARY SYSTEMS (DEPS, 2000)



U.S. Air Force (USAF) planners have envisioned that uninhabited air vehicles (UAVs), working in concert with inhabited vehicles, will become an integral part of the future force structure. Current plans are based on the premise that UAVs have the potential to augment, or even replace, inhabited aircraft in a variety of missions. However, UAV technologies must be better understood before they will be accepted as an alternative to inhabited aircraft on the battlefield. The U.S. Air Force Office of Scientific Research (AFOSR) requested that the National Research Council, through the National Materials Advisory Board and the Aeronautics and Space Engineering Board, identify long-term research opportunities for supporting the development of technologies for UAVs. The objectives of the study were to identify technological developments that would improve the performance and reliability of generation-after-next UAVs at lower cost and to recommend areas of fundamental research in materials, structures, and aeronautical technologies. The study focused on innovations in technology that would leapfrog current technology development and would be ready for scaling-up in the post-2010 time frame (i.e., ready for use on aircraft by 2025).



REVIEW OF ONR'S UNINHABITED COMBAT AIR VEHICLES PROGRAM (DEPS 2000)
Joint Vision 20101 addresses the need for achieving military dominance through the application of new operational concepts. For the Department of the Navy, future operational concepts will hinge on a continuance of forward yet unobtrusive presence and the capability to influence events ashore as required. This capability will be enabled by the development and insertion into the forces of new technologies for providing command, control, and surveillance; battlespace dominance; power projection; and force sustainment. For example, unmanned aerial vehicles (UAVs) have recently proven to be valuable operational platforms for providing tactical intelligence by surveillance of the battlefield. To support naval force objectives, the Office of Naval Research (ONR) has established a research program within the Strike Technology Division (Code 351) of the Naval Expeditionary Warfare Science and Technology Department aimed at expanding the operational capabilities of UAVs to include not only surveillance and reconnaissance, but strike and logistics missions as well. This new class of autonomous vehicles, known as uninhabited combat air vehicles (UCAVs), is foreseen as being intelligent, recoverable, and highly maneuverable in support of future naval operations. *Review of ONR'S Uninhabited Combat Air Vehicles Program* evaluates ONR's UCAV technology activities, including its vision documents and its science and technology roadmap (in areas of vehicle dynamics, communications, sensors, and autonomous agents) against criteria that would be selected by the committee, such as the relevance for meeting future naval priorities, the cost and time scale for its utilization, duplication of effort, and scientific and technical quality.

TRANSPORTATION RESEARCH BOARD SPECIAL REPORT 250: AIR TRAFFIC CONTROL FACILITIES: IMPROVING METHODS TO DETERMINE STAFFING REQUIREMENTS (TRB 1997)
TRB Special Report 250 - Air Traffic Control Facilities: Improving Methods to Determine Staffing Requirements reviews the methodologies by which Federal Aviation Administration (FAA) estimates and applies its staffing standards, examines the feasibility and cost of modifying agency staffing standards and developing alternative approaches for application to individual facilities, and recommends an improvement strategy. The appropriate level of staffing for air traffic control (ATC) has long been controversial. As a service of the Federal Aviation Administration (FAA), ATC is almost exclusively staffed by federal employees. Following the controller strike of 1981, which resulted in the firing of two-thirds of controllers, congressional concerns about staffing were focused primarily on the overall size and rebuilding of the workforce. During the 1990s, however, congressional concerns shifted to questions about whether staffing levels are appropriate at the agency s highest traffic locations. FAA has long had difficulty staffing its ATC centers, terminal radar approach control facilities, and other terminal facilities in metropolitan areas such as New York, Chicago, and Los Angeles. In addition to being the most demanding locations because of the volume and types of traffic that must be handled, they are among the areas with the highest cost of living. Concerns about stressful working conditions and the amount of overtime required of workers at these locations have been raised regularly by the controllers union and sometimes by members of Congress. In the aftermath of the controllers strike, FAA developed analytical models for estimating the number of specialists required to control traffic safely. The application of these models to particular locations became a source of controversy between FAA and the controllers union. The committee formed to examine whether these models were sufficiently accurate for estimating staffing levels at specific locations determined that they could not be relied upon for this purpose. The models provide a useful starting point, but the staffing estimates they produce need to be adjusted on the basis of both local conditions and the norms that exist across FAA s workplaces. The committee recommended a process that FAA could follow to make these adjustments.

ABOUT THE GOVERNMENT-UNIVERSITY-INDUSTRY RESEARCH ROUNDTABLE (GUIRR)

GUIRR's formal mission is to convene senior-most representatives from government, universities, and industry to define and explore critical issues related to the national and global science and technology agenda that are of shared interest; to frame the next critical question stemming from current debate and analysis; and to incubate activities of on-going value to the stakeholders. The forum isdesigned to facilitate candid dialogue among participants, to foster self-implementing activities, and, where appropriate, to carry awareness of consequences to the wider public.

The reports listed do not include all National Academies' reports on topics related to unmanned aircraft systems. To find more on this topic or browse other National Academies reports go to: www.nationalacademies.org.