Design Propulsion Electric Power Generation Systems

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Design Propulsion Electric Power Generation
"BAE Systems' next-generation technology represents a significant investment in our electric ... design results in a flexible system tailored to each vessel's specific power and propulsion ...

BAE Systems to Provide Next-Generation Electric-Hybrid Power and

Propulsion System for Southern Wind Superyacht

Thurso-based battery maker AMTE Power is taking part in a £9.7 million research project to boost charging speeds of electric and hydrogen-powered BMWs.

AMTE takes part in £10m project to supercharge electric BMWs

That's still an important advantage, but hybrid power has turned out to be much more than an efficiency-booster for existing technology. For the evolution beyond diesel, hybrid is an essential tool ...

Hybrid Propulsion Solutions Leading the Way to a Zero-Carbon Future

The hybrid-electric aircraft propulsion ... power management approaches on the basis of feasibility, mass and efficiency. The focus is on voltage synchronisation and adaptation to the load rating. The ...

Voltage synchronisation for hybrid-electric aircraft propulsion systems
A recently published design patent illustrates what may very well be a next-generation Chevy Equinox electric crossover ... wheel drive and all-wheel drive propulsion combinations and can even ...

New GM Design Patent Shows Possible Chevy Equinox Electric
These products, to be developed by a new £9.7 million UK government-backed project, will aim to address existing consumer concerns relating to the charging speeds of today’s electric vehicles. Funding ...

Sprint Power to lead on new UK Government backed project to develop ultra-fast charging systems for EVs
In addition to hybrid-electric propulsion, the company said the generator ... while the 2.5MW electrical generator, motor and power electronics design, make and testing in Trondheim has been supported ...

Generator for future hybrid-electric aircraft arrives at Rolls-Royce
Electric aircraft propulsion ... engine to turn a generator that supplies electricity to a set of electric fan motors. Key to this was the generator for the new 2.5-MW Power Generation System ...

Rolls-Royce puts 2.5-MW generator for future hybrid aircraft to the test
The Pegasus runs a large turboprop

generator, powering two electric tilt-rotors ... a notoriously difficult and expensive design to produce, it offers no propulsion redundancy, and it runs on ...

Pegasus hybrid-electric VTOL promises massive range, no redundancy
and power electronics design in Trondheim. The generator can apply to either hybrid-electric propulsion systems or as part of a “more-electric” system for larger aircraft. Once ground tested ...

Rolls Readies Hybrid Airliner Propulsion Trials
Sky Power customer UAS Global Services of Texas will present at AUVSI XPONENTIAL two new helicopters, which are powered by

different engines from Sky Power.

Sky Power and UAS Global Services present two new helicopters
The design, assembly and testing in Trondheim of the electrical generator, motor and associated power electronics has been supported by the European Union’s Clean Sky 2 programme.

Rolls-Royce marks major step forward in hybrid-electric aircraft propulsion project
The good news is that the unveiling of a Hybrid Powered Flying car with a luxurious feel and aerodynamic design ... a power interruption on the generator, the backup power will provide electricity ...

Vinata Aeromobility All Set to Reveal

Asia's First Hybrid Flying Car
Xplore Inc., a commercial space company providing Space as a Service®, today announced a cooperative Memorandum of Understanding with Accion Systems to provide spacecraft hosting services for the next ...

Xplore Partners with Accion Systems to Test Next Generation TILE Thrusters Aboard LEO Xcraft (XLEO)
The partnership will validate the resiliency of TILE's fault tolerant design ... next generation TILE system flying on XLEO will be the lowest size, weight and power (SWaP) electric propulsion ...

The primary human activities that release carbon dioxide (CO_2) into the atmosphere are the combustion of fossil fuels (coal, natural gas, and oil) to generate electricity, the provision of energy for transportation, and as a consequence of some industrial processes. Although aviation CO_2 emissions only make up approximately 2.0 to 2.5 percent of total global annual CO_2 emissions, research to reduce CO_2 emissions is urgent because (1) such reductions may be legislated even as commercial air travel grows, (2) because it takes new technology a long time to propagate into and through the aviation fleet, and (3) because of the ongoing impact of global CO_2 emissions. Commercial

Aircraft Propulsion and Energy Systems Research develops a national research agenda for reducing CO_2 emissions from commercial aviation. This report focuses on propulsion and energy technologies for reducing carbon emissions from large, commercial aircraftâ€" single-aisle and twin-aisle aircraft that carry 100 or more passengersâ€"because such aircraft account for more than 90 percent of global emissions from commercial aircraft. Moreover, while smaller aircraft also emit CO_2, they make only a minor contribution to global emissions, and many technologies that reduce CO_2 emissions for large aircraft also apply to smaller aircraft. As commercial aviation continues to grow in terms of revenue-passenger miles and cargo ton miles, CO_2 emissions are expected to increase. To reduce the contribution of aviation to climate change, it is essential to improve the effectiveness of ongoing efforts to reduce emissions and initiate research into new approaches.

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 â€œgeneration-after-nextâ€ 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 â€œleapfrogâ€ 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).

Leadership in gas turbine technologies

is of continuing importance as the value of gas turbine production is projected to grow substantially by 2030 and beyond. Power generation, aviation, and the oil and gas industries rely on advanced technologies for gas turbines. Market trends including world demographics, energy security and resilience, decarbonization, and customer profiles are rapidly changing and influencing the future of these industries and gas turbine technologies. Technology trends that define the technological environment in which gas turbine research and development will take place are also changing - including inexpensive, large scale computational capabilities, highly autonomous systems, additive manufacturing, and cybersecurity. It is important to evaluate how these changes influence the gas turbine industry and how to manage these changes moving forward. Advanced Technologies for Gas Turbines identifies high-priority opportunities for improving and creating advanced technologies that can be introduced into the design and manufacture of gas turbines to enhance their performance. The goals of this report are to assess the 2030 gas turbine global landscape via analysis of global leadership, market trends, and technology trends that impact gas turbine applications, develop a prioritization process, define high-priority research goals, identify high-priority research areas and topics to achieve the specified goals, and direct future research. Findings and recommendations from this report are important in guiding research within the gas turbine industry and advancing electrical power generation, commercial and military aviation, and oil and gas production.

Various combinations of commercially available technologies could greatly reduce fuel consumption in passenger cars, sport-utility vehicles, minivans, and other light-duty vehicles without compromising vehicle performance or safety. Assessment of Technologies for Improving Light Duty Vehicle Fuel Economy estimates the potential fuel savings and costs to consumers of available technology combinations for three types of engines: spark-ignition gasoline, compression-ignition diesel, and hybrid. According to its estimates, adopting the full combination of improved technologies in medium and large cars and pickup trucks with spark-ignition engines could reduce fuel consumption by 29 percent at an additional cost of $2,200 to the consumer. Replacing spark-ignition engines with diesel engines and components would yield fuel savings of about 37 percent at an added cost of approximately $5,900 per vehicle, and replacing spark-ignition engines with hybrid engines and components would reduce fuel consumption by 43 percent at an increase of $6,000 per vehicle. The book focuses on fuel consumption--the amount of fuel consumed in a given driving distance--because energy savings are directly related to the amount of fuel used. In contrast, fuel economy measures how far a vehicle will travel with a gallon of fuel. Because fuel consumption data indicate money saved on fuel purchases and reductions in carbon dioxide emissions, the book finds that vehicle stickers should provide consumers with fuel consumption data in addition to fuel economy information.

The advantages of space nuclear fission power systems can be summarized as: compact size; low to moderate mass; long operating lifetimes; the ability to operate in extremely hostile environments; operation independent of the distance from the Sun or of the orientation to the Sun; and high system reliability and autonomy. In fact, as power requirements approach the tens of kilowatts and megawatts, fission nuclear energy appears to be the only realistic power option. The building blocks for space nuclear fission electric power systems include the reactor as the heat source, power generation equipment to convert the thermal energy to electrical power, waste heat rejection radiators and shielding to protect the spacecraft payload. The power generation equipment can take the form of either static electrical conversion elements that have no moving parts (e.g., thermoelectric or thermionic) or dynamic conversion components (e.g., the Rankine, Brayton or Stirling cycle). The U.S. has only demonstrated in space, or even in full systems in a simulated ground environment, uranium-zirconium-hydride reactor power plants. These power plants were designed for a limited lifetime of one year and the mass of scaled up power plants would probably be unacceptable to meet future mission needs. Extensive development was performed on the liquid-metal cooled

SP-100 power systems and components were well on their way to being tested in a relevant environment. A generic flight system design was completed for a seven year operating lifetime power plant, but not built or tested. The former USSR made extensive use of space reactors as a power source for radar ocean reconnaissance satellites. They launched some 31 missions using reactors with thermoelectric power conversion systems and two with thermionic converters. Current activities are centered on Fission Surface Power for lunar applications. Activities are concentrating on demonstrating component readiness. This book will discuss the components that make up a nuclear fission power system, the principal requirements and safety issues, various development programs, status of developments, and development issues.

A component in the America's Energy Future study, Electricity from Renewable Resources examines the technical potential for electric power generation with alternative sources such as wind, solar-photovoltaic, geothermal, solar-thermal, hydroelectric, and other renewable sources. The book focuses on those renewable sources that show the most promise for initial commercial deployment within 10 years and will lead to a substantial impact on the U.S. energy system. A quantitative characterization of technologies, this book lays out expectations of costs, performance, and impacts, as well as barriers and research and development needs. In addition to a principal focus on renewable energy technologies for power generation, the book addresses the challenges of incorporating such technologies into the power grid, as well as potential improvements in the national electricity grid that could enable better and more extensive utilization of wind, solar-thermal, solar photovoltaics, and other renewable technologies.

High power nuclear electric propulsion systems have the capability to enable many next-generation space exploration applications. To date, use of electric primary propulsion in flight systems has been limited to low-power, solar electric missions. There is a need for a large-scale research and development effort to field systems capable of meeting the demands of future high-power electric propulsion missions, especially missions utilizing nuclear power plants to power electric propulsion systems. In formulating such an effort, it is first important to identify the likely requirements around which such a system might be designed. These requirements can be effectively cast in terms of required thruster lifetime, thrust, specific impulse, output power, and power plant specific power. Projected requirements can be derived based on the mass characteristics of space-borne nuclear power plants, and the optimized trajectories of spacecraft missions enabled by the use of megawatt-level nuclear electric power systems. Detailed mass modeling of space-based Rankine cycle nuclear power plants is conducted to evaluate the achievable specific power of these systems. Based on the figures for specific power so obtained, mission modeling is next conducted using the Mission Analysis Low-Thrust Optimization software package. Optimized thrust, specific impulse and lifetime figures are derived for several missions of interest. A survey of available electric propulsion thrusters is conducted and thruster configurations presenting the lowest developmental risks in migrating to high thruster output power are identified. Design evolutions are presented for three thrusters that would enhance or enable operation at the megawatt level. First, evaluation of projected lifetime for dual-stage gridded ion thrusters is conducted using the CEX2D simulation tool to evaluate the utility of multi-stage gridded ion engines in obtaining the required thruster lifetime for operation at high specific impulse. Next, to evaluate the utility of Hall thrusters operating at high propellant mass flow rate, a numerical thruster model is developed that incorporates the effects of the neutral fluid in predicting thruster performance. Using this code, numerical simulations are conducted to investigate the effects of variations in propellant mass flow rate, magnetic field topology, and thruster channel geometry on achievable performance. Finally, the effects of variations in the channel contour of magnetoplasmadynamic thrusters on performance and efficiency are evaluated using the MACH2 software package. Incremental variations in thruster channel contour are implemented, and the effects of these variations on the performance onset condition, and electrode current distributions are observed. Conclusions regarding the utility of each of these three design evolutions in developing thrusters for multi-megawatt electric propulsion systems are discussed. Contributions stemming from this research include, first, the establishment of an appropriate requirements space for the design of advanced highpower electric power and propulsion systems. This design space is comprised of projected requirements for power plant specific power, derived from power plant mass modeling, and thruster output power, specific impulse and lifetime derived from mission modeling. Additionally, this work provides evaluation, using state-of-the-art simulation suites, of several electric thruster design evolutions of potential utility in developing electric propulsion systems designed to operate at the megawatt level.

The only book that covers fundamental shipboard design and verification concepts from individual devices to the system level Shipboard electrical system design and development requirements are fundamentally different from utility-based power generation and distribution requirements. Electrical engineers who are engaged in shipbuilding must understand various design elements to build both safe and energy-efficient power distribution systems. This book covers all the relevant technologies and regulations for building shipboard power systems, which include commercial ships, naval ships, offshore floating platforms, and offshore support vessels. In recent years, offshore floating platforms have been frequently discussed in exploring deep-water resources such as oil, gas, and wind energy. This book presents step-by-step shipboard electrical system design and verification fundamentals and provides information on individual electrical devices and practical design examples, along with ample illustrations to back them. In addition, Shipboard Power Systems Design and Verification Fundamentals: Presents real-world examples and supporting drawings for shipboard electrical system design Includes comprehensive coverage of domestic and international rules and regulations (e.g. IEEE 45, IEEE 1580) Covers advanced devices such as VFD (Variable Frequency Drive) in detail This book is an important read for all electrical system engineers working for shipbuilders and shipbuilding subcontractors, as well as for power engineers in general.