



A Pilot Study on Aeronautics

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Innovation in all disciplines is necessary and particularly advancement in aerospace design and engineering is essential to overcome many real time challenges. Basically innovating novel technologies in any fields is to move our society forward. Recently, much more significant interest has been carried out in conducting fundamental, cutting-edge research into new aircraft technologies, as well as systems-level research into the integration of new operations concepts and technologies by employing new techniques and novel algorithms in solving many real world problems especially in the field of aeronautics. It is well known that, aeronautics is the science or art deals with the study / investigation, design, and manufacturing of airflight-capable machines, and the techniques of operating aircraft and rocketry within the atmospheric level. It is pertinent to pin point out that aeronautical science is a branch of dynamics called aerodynamics, which deals with the motion of air and the way that it interacts with objects in motion, such as an aircraft. Aviation, Aeronautical science and Aeronautical engineering are the three, major branches of aeronautics. Aviation means heavier-than-air flight, but nowadays it includes flying in balloons and airships, Aeronautical science discusses about the practical theory of aeronautics and aviation, including operations, navigation, air safety and human factors. Aeronautical engineering covers the design and construction of aircraft, including how they are powered, how they are employed effectively and how they are controlled for safe operation. Aeronautical engineering is the study of how things fly in the Earth's atmosphere and the application of that knowledge to design and build aircraft and missiles etc. Aeronautical engineering includes an extremely wide range of fields, including the research and development, testing, assembly, and maintenance of aircraft and missiles and their parts. Moreover it includes the effect that aircraft have on the surrounding environment, the potential dangers of specific aircraft, and their fuel and systems efficiency. Aeronautical engineering emphasize on flight within the Earth's atmosphere, while astronautical engineering focuses on the research of space flight and the design of spacecraft and satellites. This includes research on best launching spacecraft and the effects the surrounding environment has on them, as well as developing suitable systems to control spacecraft and designing materials that can withstand space flight. However, a major part plays in case of aeronautical engineering is aerodynamics, (the science of passage through the air) which deals with the motion of air and the way that it interacts with objects in motion, such as an aircraft. The study of aerodynamics falls widely into three fields such as incompressible flow occurs where the air simply moves to avoid objects, typically at subsonic speeds below that of sound, compressible flow occurs where shock waves appear at points where the air becomes compressed, typically at speeds above and transonic flow occurs in the intermediate speed range around, where the airflow over an object may be locally subsonic at one point and locally supersonic at another.

In case of aeronautics, it is necessary that the end user must know the basic concepts of mathematics and fundamentals of engineering theory in order to have the ability of conducting the designing, manufacturing, maintenance and repairing aircraft and engine. In specific higher mathematics, engineering mechanics, fluid mechanics, engineering thermodynamics, mechanical principles and design, design of aircraft, aero engine, design of aircraft controlling system, the basic and application of finite mega, aeronautical manufacturing technology are the primary concerns. But, on the other hand, the secondary disciplines are advanced connectivity technology, high efficiency NC machining technology in aeronautical industries, precision forming technology for aeronautical components, reliability test and evaluation technology for welding structure, welding equipment and quality control and preparation technology of metal based composite materials. Progressive works are still being carried out to solve the challenges that still exist in air transportation system such as air traffic congestion, safety and environmental impacts. Solutions to these problems really need innovative technical concepts, and dedicated research and development which include enabling fuel-efficient flight planning, and reduce aircraft fuel consumption, emissions and noise. For instance, aeronautics integrated service routers (ISR) video image processing design exploits high end digital signal processing hardware and algorithms, broad range of real time automatic image processing features, which enables any end user of still and video images to increase its ISR productivity dramatically. Aeronautics ISR video image processing capabilities can be easily integrated to any existing image source for real time and offline processing. Some of the aeronautics image processing features includes motion detection, video footprint using geographical registration on reference image, digital stabilizer, zoom and rotation, mosaicking, ISR video image compression, real time annotation on image (i.e. high resolution and update rate) and real time ISR video enhancements such as spatial filters, contrast, brightness etc.,

Some of the best recent innovations in aerospace engineering include the Pilotless Cargo Chopper, Red Bull Stratos Pressure Suite, NASA Gravity Recovery and Interior Lab, Boeing PhantomEye, Nano Quadroto Robots, Solazyme Solajet, Asteroid Anchors, Long Endurance Multi-Intelligence Vehicle, NASA PhoneSat, Mars Curiosity Sky Crane etc. With the largest direct impacts on the lives, advancements in aeronautics are the key to make flight more affordable and efficient. These advancements decrease pollutants and make flight faster, quieter, and safer for all. Research work on everything from biomedical science and space exploration to software simulation and satellites are carried out to attain its maximum efficiency. In near future, by providing a comprehensive experience and up to date information on technological developments in aeronautical engineering leads to latest innovations in diversified areas such as aeroacoustics, aircraft design, fluid dynamics, advanced materials / composites, aerodynamics, avionics, aircraft systems, aircraft structures, risk & reliability, noise control, aircraft propulsion, reliable energy propulsion, heat transfer flight mechanics, computational aerodynamics and helicopter aerodynamics etc.