AERO PATENT MATRIX

INVENTING THE WORLD

JUNE 2022

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MLR INSTITUTE OF TECHNLOGY

DEPARTMENT OF AERONAUTICAL ENGINEERING

“AERO PATENT MATRIX”

2022

MARRI LAXMAN REDDY
GROUP OF INSTITUTIONS
MLR
Institute of Technology

Institute Vision:

Promote academic excellence, research, Innovation, and entrepreneurial skills to produce graduates with human values and leadership qualities to serve the nation

Institute Mission:

Provide student-centric education and training on cutting-edge technologies to make the students globally competitive and socially responsible citizens.

Create an environment to strengthen the research, innovation and entrepreneurship to solve societal problems.

Vision of the Department:

To be a centre of excellence in Aeronautical engineering with emphasis on Research & Innovation to serve the needs of industry with human values to build strong nation. The department's vision is derived from the institute vision and it vouches to help the institute in fulfilling its vision by becoming a center of excellence in Aeronautical Engineering.

Mission of the Department:

The mission statements are the action statements; the department intends to implement in fulfilling its vision. The key components are quality oriented technical education, multidisciplinary skills and Research & Innovation activities with human values.

M1. Provide quality oriented education, well-grounded in the fundamental principles of Aeronautical Engineering.

M2. Consistently produce top quality Aeronautical engineers with core and multidisciplinary skills, who can become ace leaders and successful entrepreneurs with human values.

M3. Continuously strive for knowledge; undertake Research and Innovation that will contribute to the industrial development of the nation.

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :30/11/2022

(21) Application No.202241068882 A
(43) Publication Date : 09/12/2022

(54) Title of the invention : 2D PLAIN-WOVEN PATTERN KEVLAR COMPOSITE REINFORCED WITH POLYESTER RESIN

(51) International classification :B29L0031300000, B32B0027420000, B29C0043000000, B32B0027060000, A61C0013000000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

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(57) Abstract :
Kevlar composite are widely used in various structural applications including aircraft wing fuselage skin, automobiles and space vehicles due to their lighter in weight and high strength material which can be replace the steel. It has low density and high modulus of para-aramid synthetic fiber. In our proposed invention Kevlar fabric with 2D plain-woven pattern reinforced with polyester resin was fabricated using compression molding process at room temperature. The material cutting process was performed by using waterjet machining to attain accurate shape and size of the composite and also it reduces the manufacturing defects and provides the better bonding properties. In turn structural stability of composite increases with increment in mechanical properties such as tensile strength and flexural strength. 3 Claims & 2 Figures

No. of Pages : 9 No. of Claims : 3

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :12/05/2022

(21) Application No.202241027371 A
(43) Publication Date : 27/05/2022

(54) Title of the invention : AERIAL HOVER BOARD

(51) International classification :B64C0039020000, A63C0017010000, B64C0027200000, A63C0017120000, G06Q0050300000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
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(62) Divisional to Application Number :NA
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(57) Abstract :
An Aerial Hoverboard is a personal mobility vehicle which is intended to fly short range, low altitude flights. This vehicle's design is derived from skateboard design, it helps the rider to hover in the air and travel small distances where usually other means of transport may not help to reach. There are possible advantages based on the application. Aerial Hoverboard is a fascinating vehicle that is convenient to the rider/pilot which makes him/her an ease to fly the vehicle. This vehicle is useful for short distance travel. These vehicles are very useful in terms of search and rescue, sports, short distance travel etc. So, the range of the vehicle depends on the propulsion system which is used to propel the Vehicle. The ducted electric fans are used in the propulsion system of the vehicle. The propulsion system is one of the efficient systems to provide sufficient lift and maneuverability to the vehicle. 4 Claims and 1 Figure

No. of Pages : 8 No. of Claims : 4

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :30/11/2022

(21) Application No.202241068881 A
(43) Publication Date : 09/12/2022

(54) Title of the invention : Composite-based Stitched Foam Sandwich Structure

(51) International classification :B29C0070240000, B32B0003120000, B32B0005060000, B32B0018000000, G01N0003240000
(86) International Application No :PCT// Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA Filing Date :NA
(62) Divisional to Application Number :NA Filing Date :NA

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(57) Abstract :
Sandwich composites and laminate composite structures are widely preferred for various engineering applications due to its high strength to weigh ratio. The delamination is a serious problem encountered in both sandwich and laminate structure. In our invention interlocking stitching between the face sheet and core material is proposed to avoid delamination and to increase the interlaminar shear strength. The stich angle is varied and the optimized angle is proposed to attain wide variant of mechanical properties without changing the material for the structure. 4 Claims & 2 Figures

No. of Pages : 8 No. of Claims : 4

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :12/05/2022

(21) Application No.202241027369 A
(43) Publication Date : 27/05/2022

(54) Title of the invention : AUTOMATIC PLANT WEED IDENTIFIER

(51) International classification :G01N0021840000, G06F0016245500, A01M0021040000, A01B0079000000, G06K0009000000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
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(57) Abstract :
Agriculture is an ancient profession and owing to current day scenario, there is a demand for equipment which would help the farmers in early detection of unwanted plants in the field. This would help in obtaining better yield. The proposed equipment “Plant Weed Identifier” is meant for identifying the type of plant through image processing, classification using inbuilt data set along with analyzing the exact location of the plant in the field. The mobile sensory platform with mounted arm fitted with camera helps capturing the images and these images are transferred to the processing unit where the type of plant is identified. This product will offer better advantage over manual identification as well. 4 Claims & 1 Figure

No. of Pages : 7 No. of Claims : 4

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :12/05/2022

(21) Application No.202241027366 A
(43) Publication Date : 27/05/2022

(54) Title of the invention : CORRUGATED NOZZLE TO ENHANCE THE NOISE SUPPRESSION IN RAMJET POWERED HELICOPTER

(51) International classification :F02K0007100000, F02K0001460000, F02K0001380000, F02K0001360000, G06F0030200000
(86) International Application No :PCT// Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA Filing Date :NA
(62) Divisional to Application Number :NA Filing Date :NA

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(57) Abstract :
The proposed invention mainly concentrates on the suppression of noise at the exit of the nozzle of the Ramjet powered tip jet helicopters. For a ramjet operating at a subsonic-flight Mach number, exhaust flow is accelerated through a converging nozzle. The new concept was introduced in the convergent nozzle of the tip jet helicopter to reduce the noise emission. We introduced hard wall corrugations at the exit of the convergent nozzle. Because of hard wall corrugation the mixing rate with the atmospheric air get increases as well as relative jet velocity also reduces to optimize the thrust performance. The analyses were carried out with various parameters in the nozzle. This results in significant reduction of noise, with a small amount of thrust loss. ANSYS- Fluent software was used to analyze the nozzle with the hard-wall corrugations. Thus this invention results are investigated to implement hard wall corrugation at the exit of the nozzle design to obtain minimum noise with minimum thrust loss. 3 Claims & 2 Figures

No. of Pages : 8 No. of Claims : 3

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :12/05/2022

(21) Application No.202241027373 A
(43) Publication Date : 27/05/2022

(54) Title of the invention : HUMAN DIRECTED MULTI ROCKET LAUNCHER

(51) International classification :A63H0027140000, F41F0003045000, F41F0003040000, F41F0007000000, A63H0027000000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

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(57) Abstract :
It is very important to save lives and property at the time of a military operation. Since hand launched RPGs and their usage are a great risk to the ground operator and more over instant engagement of a flying target is not possible with a hand or a muscle launch RPGs, the proposed innovation helps overcome the above-mentioned threats and helps in safe guarding and monitoring the area of interested in an effective and efficient manner by the deployment of the human directed multi rocket launcher. More important benefit of deploying this multi rocket launcher is that it is operatable at all weather conditions and provides stability advantage at the time of rocket launch. 7 claims & 2 Figures

No. of Pages : 9 No. of Claims : 7

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :15/12/2020

(21) Application No.202041055121 A
(43) Publication Date : 17/06/2022

(54) Title of the invention : Magnesium Matrix Reinforced with Zirconium, Garnet and Graphite for Improved Bulk Hardness

(51) International classification	:C22C0032000000, C22C0001100000, C22C0001050000, B22D0019140000, C22C0047080000
(31) Priority Document No	:NA
(32) Priority Date	:NA
(33) Name of priority country	:NA
(86) International Application No Filing Date	:PCT// :01/01/1900
(87) International Publication No	: NA
(61) Patent of Addition to Application Number Filing Date	:NA :NA
(62) Divisional to Application Number Filing Date	:NA :NA

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(57) Abstract :
Magnesium based metal matrix composites are widely used in the structures of aerospace, marine, and automobile sectors for its low density, lightweight, better mechanical properties and resistance to corrosion. Magnesium based metal matrix composites are incorporated attractive attributes of ceramics to the substrate material. In our invention magnesium matrix is reinforced with Zirconium, Garnet and Graphite particulates. The reinforcement particles are blended with magnesium using stir casting process to ensure uniform distribution of particulates across the matrix. The microstructure of the prepared composites were analyzed and hardness across the bulk is reported. The results revealed that the hardness of composites were increased with the addition of garnet and graphite reinforcement particles in magnesium metal matrix composites. Optimized parameters aid in uniform distribution of particulate reinforcement within the metal matrix pool. Bonding at the metal matrix-reinforcement interface was excellent for all compositions of reinforcements. Agglomeration of garnet particle was observed to be minimal at 0.3 wt%, and increases with higher percentage. Porosity of the composites decreased with the increase in weight percentage of reinforcements. The composite reinforced with 0.9wt% of garnet and graphite exhibited increased hardness of 70.2 HV0.1 compared to 41 HV0.1 hardness exhibited by composite reinforced with 0.3wt% of reinforcements.

No. of Pages : 11 No. of Claims : 6

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :21/12/2021

(21) Application No.202141059725 A
(43) Publication Date : 04/02/2022

(54) Title of the invention : METHOD TO DETECT SOIL MOISTURE USING UAV

(51) International classification :A01G0025160000, A01G0027000000, B64C0039020000, G01N0033240000, A01G0007000000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

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(57) Abstract :
The moisture of the soil plays an essential role in the irrigation field as well as in gardens for plants. As nutrients in the soil provide the food to the plants for their growth. Supplying water to the plants is also essential to change the temperature of the plants. The temperature of the plant can be changed with water using the method like transpiration. Extreme soil moisture levels can guide to anaerobic situations that can encourage the plant's growth as well as soil pathogens. The aerial testing of moisture content is required to get the water content in the soil. This is made possible with the invention of VTOL uav with moisture sensor. In this invention the sensor is attached to the onboard equipment of the UAV and it is dropped into the soil when it hovers at a given altitude. The sensor detects the water content in the soil and it will be sent to the farmer to take necessary action to protect the crop from damage due to insufficient water. 3 claims & 1 Figure

No. of Pages : 6 No. of Claims : 3

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :21/12/2021

(21) Application No.202141059722 A
(43) Publication Date : 04/02/2022

(54) Title of the invention : METHOD TO RESCUE CHILD FROM BOREWELL

(51) International classification :A61N0001040000, H04W0052240000, A62B0099000000, A62C0027000000, A61B0017160000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

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(57) Abstract :
In our invention, retracting pulley drive mechanism was proposed to rescue victim from bore well within a short period of time. The proposed invention is easily operable, mechanical arrangements are used to lift victim from the bore-well. A high resolution camera is used to visualize the victim state throughout the operation and an expandable base plate is provided to give additional support while lifting the victim. 4 claims & 1 Figure

No. of Pages : 6 No. of Claims : 4

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :21/12/2021

(21) Application No.202141059724 A
(43) Publication Date : 04/02/2022

(54) Title of the invention : METHOD TO USE SURVEY DRONES FOR AGRICULTURAL LAND

(51) International classification :B64C0039020000, G06N0020000000, A01B0079000000, G06Q0050020000, A01C0021000000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
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(57) Abstract :
Around the globe precision agriculture has experienced unprecedented growth. The usage of drones in the agricultural flied and horticulture are revolutionizing agriculture. The implementation of various sensors and digital imaging capabilities in drones will lead to the precision agriculture. The purpose of the invention is to optimize agricultural process by doing survey with the help of drones. The usage of drones in survey helps to reduce the time and effort. In one flight, huge amount of data will be collected from the sky, in the form of digital aerial images. 3 claims & 3 Figures

No. of Pages : 8 No. of Claims : 3

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :12/05/2022

(21) Application No.202241027368 A
(43) Publication Date : 27/05/2022

(54) Title of the invention : MORPHING WING USING GEAR-ROD MECHANISM

(51) International classification :B64C0003480000, B64C0003380000, G06F0030150000, B64D0017020000, B64C0003540000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
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(57) Abstract :
The morphing technology integrated into an aircraft wing concerns an automated shape adaptation to reach the best aerodynamic efficiency at given flying condition. Morphing designs include sliding, inflating, and rotating based on shape change mechanisms. Basically, the morphing takes place in any section of aircraft nose, fuselage, tail etc. Morphing wing is a flexible and span-extendable wing, which can be used to generate different lift and drag forces in various flight conditions. And also, we can alter its wing span ratio, wing aerofoil, camber ratio, wing reference area and different angle of attack can be obtained in different parts of wing. The main objective of this project is to increase the aircraft performance at different phases of aircraft without usage of any controlling surfaces. Usage of CATIA software to get the analysis of aerodynamic forces, flows over wing, stress distribution at STP conditions, thermal distributions, weight or load acting on wing, the analysis gives the performance of morphing wing which is used elastic, flexible material in which the deflections are take place. Materials used in this project are very light weight and flexible which can get the deflection of the aerofoil or a wing without any surface controls. 3 Claims & 1 Figure

No. of Pages : 7 No. of Claims : 3

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :12/05/2022

(21) Application No.202241027372 A
(43) Publication Date : 27/05/2022

(54) Title of the invention : RAMIE-FLAX HYBRID FIBER COMPOSITE

(51) International classification :C08J0005060000, C04B0035626000, C08J0005240000, B29L0031300000, D06M0014360000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

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(57) Abstract :
Composite materials are widely used in aerospace and automobile domains due to its excellent high strength to wait ratio. In our invention, Ramie and flax combination is proposed as reinforcement which is having excellent load withstanding capacity even after wetting. The optimized ratio of ramie and flax is found in our invention and its strength is proved exceptional when compare to other existing natural fiber combination. The proposed composite material may be used to fabricate machine parts, internal combustion engine components, railway coaches, flywheels, process industries, sports Leisure equipment and marine structures, Biomedical equipment. 3 claims & 1 Figure

No. of Pages : 8 No. of Claims : 3

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :11/12/2021

(21) Application No.202141057703 A
(43) Publication Date : 28/01/2022

(54) Title of the invention : RC AGROBOT

(51) International classification	:A01M0007000000, B64D0001180000, A01M0021040000, A01M0009000000, A01N0065120000
(86) International Application No Filing Date	:PCT// :01/01/1900
(87) International Publication No	: NA
(61) Patent of Addition to Application Number Filing Date	:NA :NA
(62) Divisional to Application Number Filing Date	:NA :NA

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(57) Abstract :
Pesticide spraying is one of the most important steps to achieve healthy crops. In India, most of the commercial farmers use chemical fertilizers and pesticides. Unfortunately, most of them avoid safety precautions and safety aids while apply to their fields. The proposed invention is aimed to overcome this with minimum training to the farmers. The invention pertains to the design and development of remotely controlled Agricultural vehicle called as Agrobot which can be used for pesticide spraying crops like Chilly, Eggplant, and Tomato etc. In this, the Agrobot will replace human effort of carrying pesticide and spraying it to the crops and is operated from a distant place with in the field. 5 Claims & 2 Figures

No. of Pages : 6 No. of Claims : 5

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :21/05/2022

(21) Application No.202241029320 A
(43) Publication Date : 17/06/2022

(54) Title of the invention : ROCKET PAYLOAD FAIRING

(51) International classification :B64G0001640000, B64G0001000000, F42B0015360000, B64G0005000000, B64G0001520000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

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(57) Abstract :
The launch vehicles are failed majorly due to fairing separation issues. As the vehicle approaches supersonic speed, it is subjected to a distinct of loads and forces, which might cause the fairings to separate. Even after the completion of rocket's first stages, if the fairings are nor open, the launch vehicle's heart, the satellite will be destroyed. The main goal of this innovation is to ensure that the fairing does not damage the payload, as well as to improve the safety and to prevent launching failures. In our invention, the fairings are divided into three different clamshells (segments) to avoid failure conditions. 3 Claims & 3 Figures

No. of Pages : 11 No. of Claims : 3

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :12/05/2022

(21) Application No.202241027367 A
(43) Publication Date : 27/05/2022

(54) Title of the invention : ROVER FOR CROP HEALTH MONITORING

(51) International classification :G06K0009000000, A01B0079000000, A01G0025160000, G01N0033240000, A01M0021040000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
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(62) Divisional to Application Number :NA
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(57) Abstract :
The main objective of the rover is to collect the data related to soil demography in the form of pictures. These pictures can be used to develop algorithms for estimating amount of deposits in the soil. These deposits can be related to the nutrient content in the soil, metal deposits, microbial content, moisture content etc., This data can be further processed to identify the type of crops that can be grown in the field for better yielding. The weed plucker is very useful in eliminating growth of unwanted plants eg. Weeds, which would affect the crop health. 5 claims & 1 Figure

No. of Pages : 7 No. of Claims : 5

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :11/12/2021

(21) Application No.202141057689 A
(43) Publication Date : 04/02/2022

(54) Title of the invention : SPECIMEN HOLDER FOR WIRE CUT ELECTRICAL DISCHARGE MACHINE

(51) International classification :G01N0001320000, B23H0007020000, B23H0007260000, B23H0001000000, B23H0011000000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
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(57) Abstract :
Wire cutting electric Discharge machine is one of the finest, accurate method of machining. The machine contains one specimen holder and tool holder, and other energy and mechanical devices to support the EDM process. In this machine it is observed that flat surface plates are being used as specimen holder, where the focus of invention is considered. In order to increase the grip for cylindrical surface featured specimen an idea of using cylindrical jaws is introduced. Here the contact surface between the specimen and specimen holder increased compared to flat surface specimen holder while using the curved surface featured specimens are used. The grip between cylindrical jaws and curved surfaced specimen is also increasing. Ultimately the vibrations that generates while performing machining operation does not effect in the accuracy of machining process. 3 claims & 3 Figures

No. of Pages : 8 No. of Claims : 3

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :12/05/2022

(21) Application No.202241027374 A
(43) Publication Date : 27/05/2022

(54) Title of the invention : UNCONVENTIONAL WING MECHANISM TO ENHANCE OPTIMUM THICKNESS TO CHORD RATIO

(51) International classification :B64C0003480000, B64C0003440000, B64C0003140000, B64C0003380000, B64C0039100000
(86) International Application No :PCT// Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA Filing Date :NA
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(57) Abstract :
Morphing wings change their exterior form radically to respond to a dynamic quest environment. The leading-edge radius advances as the airfoil thickness increases, providing the leading-edge smoother and permitting the laminar air to resist full swing separation at larger angles of attack. Flaps mostly on the leading and trailing edges of the wing are employed to enhance the lift coefficient as well as the camber of the wing. A morphing mechanism would simultaneously achieve leading and trailing edge deflection and airfoil thickness deflection. The morphing wing theory could be used to develop performance characteristics such as maximum speed, fuel consumption, agility, payload capacity, range, durability, and overall stability are among the criteria to address. This morphing wing is a completely new mechanism idea that focuses solely on the mechanism approach rather than the materials. The key goal of this research is to increase aircraft performance without the use of any high lift devices during various phases of flight. ANSYS workbench software is used to analyze aerodynamic forces, static analysis operations, and other wing-related issues. To sum up, we will provide a strategy that will advance the field of Morphing wing study in the future. 5 Claims and 2 Figures

No. of Pages : 9 No. of Claims : 5