ROTATIONAL DUCTED FAN (RDF) PROPULSION SYSTEM

Article:

In accordance with the present invention, an embodiment of a rotational ducted fan motor comprises a monolithic rotational ducted fan rotor, an electric propulsion system, a static aft-shroud comprising electrochemical-energy-storage, and an engagement system. The rotational ducted fan rotor is the portion of a ducted fan motor comprising a propeller, a duct, and a center hub, and having the effect of increasing the pressure difference from upstream to downstream of the propeller. The electric propulsion system comprises permanent magnets affixed to the rotational ducted fan rotor, repelling magnetic coils affixed to the static aft-shroud and electrical power provided by the electrochemical-energy-storage comprised within the aft-shroud.
FIG. 8
FIG. 9
ROTATIONAL DUCTED FAN (RDF) PROPULSION SYSTEM

RELATED APPLICATIONS

[0001] The present application is a continuation application of U.S. patent application Ser. No. 14/095,737, filed Dec. 3, 2013, for ROTATIONAL DUCTED FAN, OR RDF FAN MOTOR, by Devin Glenn Samuelson, included by reference herein and for which benefit of the priority date is hereby claimed.

FIELD OF THE INVENTION

[0002] The present invention relates to an aircraft propulsion system, and more particularly to a novel rotational inlet shroud, and additionally to an energy storage and maintenance system.

BACKGROUND OF THE INVENTION

[0003] For each barrel of crude oil refined, approximately only 4 gallons of jet fuel are realized. Specific to aircraft fuel, there is a limited global supply of the natural resource of carbon based fuels such as oil. In consideration of other hybrid systems or alternative biofuel systems, the problem of supply and dependence on these types of natural resources creates new economic challenges such as increased consumable costs due to competing markets, consumable shortages, or even climate disruptions. Given the current path as the global economy increases the supply and demand of oil creates significant risks for economic stability internationally. This strain stems from an imbalanced use of natural resources and too high of dependence on non-renewable energy sources. The carbon footprint of aircraft is negatively impacting the environment from both an atmospheric output of propulsion exhaust, and the extraction and refinery processes of petroleum or biofuels. A typical 150 passenger aircraft consumes an average of about 100 lbs of carbon based fuel per minute, or otherwise stated, nearly 15 gallons per minute. This realization has set in motion the quest for improved efficiency and technology for the development of electrical propulsion systems which use electrical energy that may be derived and stored from a number of other alternative or renewable methods. In addition to the type of energy resource to use, consideration must be given to the supporting infrastructure that will be necessary to support the operation of such new machines in a commercial transportation industry. Other problems that exist with combustion type systems include design restrictions to accommodate a safe combustible containment structure that facilitates the need for only using static fluid containment systems, thus limiting efficiency to be achieved primarily through focused attention to fluid density, achieved through compressors, entropy, and static nozzle designs historically.

[0004] Other aircraft propulsion systems currently include carbon-fueled combustion methods of propulsion such as combustion jet engines, turbo-fan engines, turbo-prop engines, and liquid or solid rocket fuel systems. Additionally, electric ducted fan motors are used in the model radio controlled airplane industry.

U.S. Patents

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[0044] No other solutions in existence today address the three problems that the rotational ducted fan propulsion motor addresses. The use of a static inlet shroud of traditional gas or electric ducted fan motors does not allow the maximum pressure differentials to be achieved between the inlet and the aft exhaust of the system. Additionally, it is common for traditional gas or electric ducted fan motors and propeller propulsion systems to experience efficiency losses at the outer blade tips which results in axial propulsive thrust losses. The operational costs for current carbon fueled combustive propulsion systems are extravagant, for example, with 150
passenger aircraft consuming nearly 15 gallons per minute of a non-renewable fuel source will have economic consequences to future generations, combustive propulsion systems generate noise that creates weight inefficiencies since noise reduction becomes an integral part of the design, and reverse thrust systems are required.

[0045] Electric ducted fan systems have shortcomings too. Traditional electric ducted fan motors rely on a separate battery source which results in energy losses through wire resistance caused from separating batteries or stored energy some distance away from its point of use. Traditional electric fan motors have a static shroud and a dynamic hub which the aerofoil blades are attached, which contributes to airflow energy losses at the blade tips, similarly to those losses experienced by combustive propulsion systems.

SUMMARY OF THE INVENTION

[0046] In accordance with the present invention, an embodiment of a rotational ducted fan motor comprises a monolithic rotational ducted fan rotor, an electric propulsion system, a static aft-shroud comprising electrochemical-energy-storage, and an engagement system. The rotational ducted fan rotor is the portion of a ducted fan motor comprising a propeller, a duct, and a center hub, and having the effect of increasing the pressure difference from upstream to downstream of the propeller. The electric propulsion system comprises permanent magnets affixed to the rotational ducted fan rotor, repelling magnetic coils affixed to the static aft-shroud and electrical power provided by the electrochemical-energy-storage comprised within the aft-shroud.

[0047] In another advantageous embodiment, an aft-shroud comprises one mounting section that houses electrical controls and has mounting hanger bars for a hook and latch connection and engagement system of the two replaceable electrochemical storage aft-shroud segments, wherein the electrochemical storage segments of the aft-shroud having the effect of heat exchangers and electrical supply systems for the propulsion system.

[0048] It would be advantageous to provide a machine to convert electrical energy to thrust.

[0049] It would also be advantageous to provide an object to create a fluid pressure difference, decreases pressure at the inlet and increases pressure aft of the system.

[0050] It would further be advantageous to provide an object that converts electrical power into mechanical rotational work with magnetic fields.

[0051] It would further be advantageous to provide a machine that utilizes heat energy created from electrochemical activation into enthalpy with laminar fluid flow at the aft-duct exit nozzle.

[0052] It would be an object of the invention to provide a method for reducing the aircraft non-operational down-times with interchangeable rechargeable electrochemical storage duct segments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0053] A complete understanding of the present invention may be obtained by reference to the accompanying drawings, when considered in conjunction with the subsequent, detailed description, in which:

[0054] FIG. 1 is a perspective view of a rotational ducted fan motor;

[0055] FIG. 2 is a front view of a rotational ducted fan motor;

[0056] FIG. 3 is a left view of a rotational ducted fan motor;

[0057] FIG. 4 is a right sectional view of a rotational ducted fan motor;

[0058] FIG. 5 is a perspective view of a method of assembly for the rotational ducted fan motor;

[0059] FIG. 6 is a rear section view of an embodiment of a serviceable aft duct shroud;

[0060] FIG. 7 is a perspective view of an example aircraft and its applicable rotational ducted fan motor installation arrangements;

[0061] FIG. 8 is a plan view of a flow diagram for producing a commercial rotational ducted fan propulsion system; and

[0062] FIG. 9 is a plan view of a rotational ducted fan system with interactions to other associated systems.

[0063] For purposes of clarity and brevity, like elements and components will bear the same designations and numbering throughout the Figures.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0064] FIG. 1 is a perspective view of a rotational ducted fan motor. Referring more particularly to the drawings, embodiments of the disclosure may be described in the context of an aircraft propulsion system. The embodiment shown in FIG. 1 comprises a static non-rotating aft duct 110, and a rotational ducted fan 202. The rotational ducted fan is described as a dynamic rotor that rotates about an axis parallel to its thrust, and is comprised of an outer shroud or duct that is dynamic and rotates orbitally about a center axis that is parallel to its generally cylindrical shape, and concentric to a center hub and an arrangement of a plurality of propeller blades or airfoils axially perpendicular to the axis of rotation. The rotational ducted fan or orbital fan duct is comprised of a cylinder that has a plurality of propeller blades affixed axially at their substantially larger diameter or blade tip to the inner surface of an approximately cylindrically shaped duct. There may be a center hub that enables its outside diameter to be attached to the least significant diameter of a plurality of axially arranged propeller blades to adjoin essentially two rings, an outer and an inner ring by a plurality of blades between these two rings concentrically about a shared axis. At the least significant or smallest diameter, an airfoil entry lip 104 rotates tangentially to incoming fluid flow to create forward lift, while its affixed propeller blades are creating a forward vacuum and aft thrust pressure 106 as they rotate about axis 108.

[0065] FIG. 2 is a front view of a rotational ducted fan motor. Referring to the rotational ducted fan motor, FIG. 2 illustrates the forward component of the system, the rotational ducted fan monolithic rotor. With reference to FIG. 2, the control surfaces are of an aerodynamic nature and designed to create forward lift at 104 and the plurality of 106 as these surfaces both rotate coaxially about the axis 208, while circumferentially creating aft thrust pressure delta.

[0066] FIG. 3 is a left view of a rotational ducted fan motor. Referring to the drawing embodiment of FIG. 3, the advantageous embodiment of the rotational ducted fan inlet lip 308 creates a fluidic accelerator for bypass with a drag component airfoil convexly situated generally outside the rotational duct 104. The dynamic rotor 202 and static shroud 110 are independent of each other, whereby they are separated by a mag-
ngetic force field gap 302. Pursuant to the repulsion of the magnetic fields, FIG. 4 provides details of the novel energy conversion machine.

[0067] FIG. 4 is a right sectional view of a rotational ducted fan motor. Referring to FIG. 4, comprising an aft static duct 110, an orbiting rotational ducted fan rotor 202, and various arrangements of neodymium permanent magnets 406 and 414, and various arrangements of magnetic coils 410 and 412 that work as a system to create kinetic energy from magnetic fields. Further, FIG. 4 shows the electrochemical current storage cell cavity 418 as comprised in the static aft duct.

[0068] FIG. 5 is a perspective view of a method of assembly for the rotational ducted fan motor. More particularly, FIG. 5 shows the assembly of how a rotational ducted fan rotor 202 is housed by its static aft shroud or duct housing. In another embodiment 502, the static aft shroud or duct is segmented into at least two parts, whereby one of the segments mounts to an aircraft 514 and 508, and comprises a hinge, such as is shown in example element 512, that allows servicing or removal of at least one other static aft shroud or duct housing segment 504.

[0069] FIG. 6 is a rear section view of an embodiment of a serviceable aft shroud or aft duct. Referring to FIG. 6, the two rear aft shroud duct segments shown are in an embodiment section 606 with an integrated crook hook 612 that assembles onto a hinge hanger 512. This method of design embodiment allows for servicing by lifting the panels to an open or removable position, and enables the release of the magnetically suspended rotational ducted fan rotor 202 for removal or replacement as shown in FIG. 5.

[0070] FIG. 7 is a perspective view of an example aircraft and its applicable rotational ducted fan motor installation arrangements. In an embodiment shown, an aircraft refers to any aerial form of cargo transportation whereby there is a fuselage or hull 710. In the embodiment example shown in FIG. 7, a fixed wing aircraft 702 receives propulsion rotational ducted fan (RDF) motors 102 mounted to fixed wings 708, or to fuselage 710. In another embodiment, a vertical take-off aircraft will also benefit from the advantageous electrical thrust energy to propel the vehicle.

[0071] FIG. 8 is a plan view of a flow diagram for producing a commercial rotational ducted fan propulsion system. Referring to FIG. 8, the seven steps of the process necessary to producing the rotational ducted fan propulsion system and implementing it into service, beginning with the design phase 804 whereby Electrijet Flight Systems holds the design authority and design rights for use of the rotational ducted fan rotor in conjunction with an aft duct assembly 102 or any rotational monolithic shrouded propeller with inserted permanent magnets and electrical coils for use in creating resistant magnetic fields to create tangential rotational energy. All materials are procured or manufactured within the production authority of Electrijet Flight Systems 806 and 808 respectively. Systems integration of the rotational ducted fan propulsion system 810 comprises input from airframe manufacturers or retrofit companies, and whereby Electrijet Flight Systems customizes design and application to create required thrust, weight, size, mounting, requirements for said users. Federal Aviation Authority application for Title 14 CFR requirements may be conformed to and certified to support commercial use of the said rotational ducted fan motor for aircraft propulsion 812. While there is a constant need for rapid travel for longer ranges, some flight paths require intermittent stopping points for servicing. The in-service capabilities of an embodiment of a rotational ducted fan motor lends itself to the removal and replacement of the rotational ducted fan motor 110 and its static aft duct 310 segments 606 to enable cool-down periods for permanent magnets and magnetic coils as well as replacement of static duct segments which are fully electrically charged with stored current in the electrochemical storage cavity 418. This advantageous embodiment provides for easy maintenance access for servicing and periodic reviews, maintenance manuals, operating manuals, service bulletins, airworthiness advisories, and RF disturbance protections 816.

[0072] FIG. 9 is a view plan of a rotational ducted fan system with interactions to other associated systems. Referring to FIG. 9, the three primary systems comprising the rotational ducted fan propulsion system are shown 902. Comprising the embodiment of 902, a rotational ducted fan rotor 304 comprised of a composite inlet lip, thrust propeller 106, and permanent magnets 406 and 414. An aft shroud housing duct 110 comprised of composite may also wrap an aluminum core housing of an electrochemical current storage and transfer device enables use of a regenerative magnetic speed clutch shaft supported on a laminar airfoil blade that is affixed in an advantageous embodiment that enables a rigid connection to exactly one segment of the aft shroud 508. The magnetic coils 412 and 410 receive their systems energy from the electrochemical storage and dispersion of 418, and are replaceable in the embodiment 606. The controls for the release of the energy to the coils is governed by an electrical distribution system 906.

[0073] Since other modifications and changes varied to fit particular operating requirements and environments will be apparent to those skilled in the art, the invention is not considered limited to the example chosen for purposes of disclosure, and covers all changes and modifications which do not constitute departures from the true spirit and scope of this invention.

[0074] Having thus described the invention, what is desired is to be protected by Letters Patent is presented in the subsequently appended claims.

What is claimed is:
1. A rotational ducted fan (RDF) propulsion system for converting stored electrical energy into aircraft thrust propulsion, comprising:
   means for generally providing propulsion thrust to power aircraft;
   means for providing an accelerated fluid flow across inlet control surface to decrease fluid pressure, accelerate fluid, and decrease upstream fluid pressure, creating lift;
   means for creating thrust by converting rotational potential energy into linear thrust, creating a pressure difference of the fluid upstream of the propeller to the fluid downstream of the propeller, rigidly connected to said means for providing an accelerated fluid flow across inlet control surface to decrease fluid pressure, accelerate fluid, and decrease upstream fluid pressure, creating lift;
   means for providing an aerodynamic control surface for low velocity fluid flow, with varying cord lengths of exterior aerodynamic design, comprising of housing core to store electrochemical energy, and providing the rigid static bearing housing that contains magnetic levitation coils;
   means for converting rotational potential energy into thrust energy by accelerating intake fluids such as air across its dynamic intake control surface, creating a low pressure
region that results in forward lift, rigidly connected to said means for creating thrust by converting rotational potential energy into linear thrust, creating a pressure difference of the fluid upstream of the propeller to the fluid downstream of the propeller, and rigidly connected to said means for providing an accelerated fluid flow across inlet control surface to decrease fluid pressure, accelerate fluid, and decrease upstream fluid pressure, creating lift;

means for providing a repelling thrust bearing to enable 304 to levitate, and to have frictionless bearing rotation;

means for providing a controlled drag surface of external static airfoil of propulsion motor, functionally constructed to said means for providing an aerodynamic control surface for low velocity fluid flow, with varying cord lengths of exterior aerodynamic design, comprising of housing core to store electrochemical energy, and providing the rigid static bearing housing that contains magnetic levitation coils;

means for providing magnetic thrust levitation between the rotational ducted fan rotor and the static aft shroud;

means for providing an opposing magnetic force whereby the axial rotation of the rotational ducted fan is generated, circumferentially embedded to said means for providing an aerodynamic control surface for low velocity fluid flow, with varying cord lengths of exterior aerodynamic design, comprising of housing core to store electrochemical energy, and providing the rigid static bearing housing that contains magnetic levitation coils;

means for converting electrical energy into magnetic field energy, insertably coupled to said means for providing an aerodynamic control surface for low velocity fluid flow, with varying cord lengths of exterior aerodynamic design, comprising of housing core to store electrochemical energy, and providing the rigid static bearing housing that contains magnetic levitation coils;

means for providing a magnetic field that acts against the 410 pulsor coil creating a levitating frictionless bearing;

means for providing a magnetic force field for the regenerative power clutch;

means for providing for electrochemical storage of electrical power, stoichiometrically housed to said means for providing an aerodynamic control surface for low velocity fluid flow, with varying cord lengths of exterior aerodynamic design, comprising of housing core to store electrochemical energy, and providing the rigid static bearing housing that contains magnetic levitation coils;

means for providing a method for servicing the electric coils and battery shroud segments, actively delineated to said means for generally providing propulsion thrust to power aircraft;

means for providing for the storage of electrochemical energy, converting electrical energy to magnetic fields, and contributing to the directionally laminar thrust of downstream fluid pressure;

means for provide an adjoining mounting structure that couples the top aft duct shroud 512 to an aircraft wing or aircraft fuselage to provide propulsion power for the aircraft;

means for providing a solid hinge for hanging exactly two shroud segments, replaceably connected to said means for providing for the storage of electrochemical energy, converting electrical energy to magnetic fields, and contributing to the directionally laminar thrust of downstream fluid pressure;

means for providing interface mount that completes the containment of the fluid-flow, provides aircraft mounting embodiment, provides hanger hinges or connections for removable shroud segments, substantially connected to said means for providing a solid hinge for hanging exactly two shroud segments, substantially connected to said means for providing an adjoining mounting structure that couples the top aft duct shroud 512 to an aircraft wing or aircraft fuselage to provide propulsion power for the aircraft, and alternately constructed to said means for providing an aerodynamic control surface for low velocity fluid flow, with varying cord lengths of exterior aerodynamic design, comprising of housing core to store electrochemical energy, and providing the rigid static bearing housing that contains magnetic levitation coils;

means for providing a hanger clasp arrangement to allow for installation and segment removal of the aft shroud electrical storage segments from the aft shroud aircraft mount; and

means for providing the subsystems that comprise the rotational ducted fan propulsion system, operationally encompassing to said means for providing a method for servicing the electric coils and battery shroud segments.

2. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for generally providing propulsion thrust to power aircraft comprises an assembly of rotational ducted fan rotor and shroud, made of nonferrous materials, aerodynamic for airflow bi-pass 102 rotational ducted fan motor.

3. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing an accelerated fluid flow across inlet control surface to decrease fluid pressure, accelerate fluid, and decrease upstream fluid pressure, creating lift comprises a dynamic airfoil, composite material, fluid accelerating control surface, convex control surface 104 rotational ducted fan inlet surface.

4. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for creating thrust by converting rotational potential energy into linear thrust, creating a pressure difference of the fluid upstream of the propeller to the fluid downstream of the propeller comprises an airfoil with varying pitch cord lengths, made of composite material, lightweight and strong, affixed to inlet control surface of duct, a plurality of blades, airfoil forward lift control surfaces 106 rotor propeller blades.

5. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing an aerodynamic control surface for low velocity fluid flow, with varying cord lengths of exterior aerodynamic design, comprising of housing core to store electrochemical energy, and providing the rigid static bearing housing that contains magnetic levitation coils comprises an aerodynamic exterior shape, smooth surfaces, alumina silica and composite construction, adiabatic design considerations, varying cord lengths for aerodynamic exterior to induce drag and increase pressure aft of system, at least a partially hollow core, solid and structurally rigid supporting magnetic repulsive field bearings 110 static aft shroud.

6. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for converting rotational potential energy into thrust energy by accelerating
intake fluids such as air across its dynamic intake control surface, creating a low pressure region that results in forward lift comprises an aero-foil inlet 202 rotational ducted fan rotor inlet.

7. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing a repelling thrust bearing to enable 304 to levitate, and to have frictionless bearing rotation comprises a gap between rotational ducted fan rotor and static aft shroud, frictionless 302 thrust magnetic field gap.

8. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing a controlled drag surface of external static airfoil of propulsion motor comprises a convex exterior, generally round, without voids or uncontrolled wind-breaks 312 static aft shroud airfoil.

9. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing magnetic thrust levitation between the rotational ducted fan rotor and the static aft shroud comprises a plurality of neodymium magnets, arranged circumferentially around axis 208 406 permanent thrust magnet.

10. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing an opposing magnetic force whereby the axial rotation of the rotational ducted fan is generated comprises a plurality of magnetic coils 410 levitation magnetic coil.

11. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for converting electrical energy into magnetic field energy comprises an electrical coil 412 magnetic thrust field control coil.

12. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing a magnetic field that acts against the 410 pulsor coil creating a levitating frictionless bearing comprises a plurality of neodymium magnets 414 permanent levitation bearing magnet.

13. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing a magnetic force field for the regenerative power clutch comprises a neodymium permanent magnets 416 regenerative clutch permanent magnet.

14. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing for electrochemical storage of electrical power comprises an alumina silicate shell, battery chemistry 418 electrochemical conversion chamber.

15. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing a method for servicing the electric coils and battery shroud segments comprises a removable rotational ducted rotor, removable shroud batteries, fixed top shroud mount, permanent hanger hinges 502 systemic servicing detail.

16. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing for the storage of electrochemical energy, converting electrical energy to magnetic fields, and contributing to the directionally laminar thrust of downstream fluid pressure comprises a removable, convex outer exterior, comprising a number of magnetic coils 504 static aft shroud electrochemical storage segment, having electrochemical storage cavity.

17. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing an adjoining mounting structure that couples the top aft duct shroud 512 to an aircraft wing or aircraft fuselage to provide propulsion power for the aircraft comprises a 508 aircraft mount, having aerodynamic exterior shape.

18. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing a solid hinge for hanging exactly two shroud segments comprises a solid high strength bar, affixed to 508 mount segment 512 aft shroud segment hinge rack.

19. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing interface mount that completes the containment of the fluid flow, provides aircraft mounting embodiment, provides hanger hinges or connections for removable shroud segments comprises a 514 upper aft shroud duct segment.

20. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing a hanger clasp arrangement to allow for installation and segment removal of the aft shroud electrical storage segments from the aft shroud aircraft mount comprises a cavity containing electrochemical materials for storing electrical current in its core, comprising a composite hook on the exterior of the shroud shell 606 aft serviceable shroud segment.

21. The rotational ducted fan (rdf) propulsion system in accordance with claim 1, wherein said means for providing the subsystems that comprise the rotational ducted fan propulsion system comprises a 902 rdf propulsion system.

22. A rotational ducted fan (rdf) propulsion system for converting stored electrical energy into aircraft thrust propulsion, comprising:

an assembly of rotational ducted fan rotor and shroud, made of nonferrous materials, aerodynamic for airflow bi-pass 102 rotational ducted fan motor, for generally providing propulsion thrust to power aircraft;

a dynamic airfoil, composite material, fluid accelerating control surface, convex control surface 104 rotational ducted fan inlet surface, for providing an accelerated fluid flow across inlet control surface to decrease fluid pressure, accelerate fluid, and decrease upstream fluid pressure, creating lift;

an airfoil with varying pitch cord lengths, made of composite material, lightweight and strong, affixed to inlet control surface of duct, a plurality of blades, airfoil forward lift control surfaces 106 rotor propeller blades, for creating thrust by converting rotational potential energy into linear thrust, creating a pressure difference of the fluid upstream of the propeller to the fluid downstream of the propeller, rigidly connected to said 104 rotational ducted fan inlet surface;

an aerodynamic exterior shape, smooth surfaces, alumina silica and composite construction, adiabatic design considerations, varying cord lengths for aerodynamic exterior to induce drag and increase pressure aft of system, at least a partially hollow core, solid and structurally rigid supporting magnetic repulsive field bearings 110 static aft shroud, for providing an aerodynamic control surface for low velocity fluid flow, with varying cord lengths of exterior aerodynamic design, comprising of housing core to store electrochemical energy, and providing the rigid static bearing housing that contains magnetic levitation coils;

an aero-foil inlet 202 rotational ducted fan rotor inlet, for converting rotational potential energy into thrust energy by accelerating intake fluids such as air across its dynamic intake control surface, creating a low pressure region that results in forward lift, rigidly connected to
said 106 rotor propeller blades, and rigidly connected to said 104 rotational ducted fan inlet surface; a gap between rotational ducted fan rotor and static aft shroud, frictionless 302 thrust magnetic field gap, for providing a repelling thrust bearing to enable 304 to levitate, and to have frictionless bearing rotation; a convex exterior, generally round, without voids or uncontrolled wind-breaks 312 static aft shroud airfoil, for providing a controlled drag surface of external static airfoil of propulsion motor, functionally constructed to said 110 static aft shroud; a plurality of neodymium magnets, arranged circumferentially around axis 208 406 permanent thrust magnet, for providing magnetic thrust levitation between the rotational ducted fan rotor and the static aft shroud; a plurality of magnetic coils 410 levitation magnetic coil, for providing an opposing magnetic force whereby the axial rotation of the rotational ducted fan is generated, circumferentially embedded to said 110 static aft shroud; an electrical coil 412 magnetic thrust field control coil, for converting electrical energy into magnetic field energy, insertably coupled to said 110 static aft shroud; a plurality of neodymium magnets 414 permanent levitation bearing magnet, for providing a magnetic field that acts against the 410 pulser coil creating a levitating frictionless bearing; a neodymium permanent magnets 416 regenerative clutch permanent magnet, for providing a magnetic force field for the regenerative power clutch; an alumina silica shell, battery chemistry 418 electrochemical conversion chamber, for providing for electrochemical storage of electrical power, stoichiometrically housed to said 110 static aft shroud; a removable rotational ducted rotor, removable shroud batteries, fixed top shroud mount, permanent hanger hinges 502 systemic servicing detail, for providing a method for servicing the electric coils and battery shroud segments, actively delineated to said 102 rotational ducted fan motor; a removable, convex outer exterior, comprising a number of magnetic coils 504 static aft shroud electrochemical storage segment, having electrochemical storage cavity, for providing for the storage of electrochemical energy, converting electrical energy to magnetic fields, and contributing to the directionally laminar thrust of downstream fluid pressure; a 508 aircraft mount, having aerodynamic exterior shape, for providing an adjoining mounting structure that couples the top aft duct shroud 512 to an aircraft wing or aircraft fuselage to provide propulsion power for the aircraft; a solid high strength bar, affixed to 508 mount segment 512 aft shroud segment hinge rack, for providing a solid hinge for hanging exactly two shroud segments, replaceably connected to said 504 static aft shroud electrochemical storage segment; a 514 upper aft shroud duct segment, for providing interface mount that completes the containment of the fluid-flow, provides aircraft mounting embodiment, provides hanger hinges or connections for removable shroud segments, substantially connected to said 512 aft shroud segment hinge rack, substantially connected to said 508 aircraft mount, and alternately constructed to said 110 static aft shroud; a cavity containing electrochemical materials for storing electrical current in its core, comprising a composite hook on the exterior of the shroud shell 606 aft serviceable shroud segment, for providing a hanger clasp arrangement to allow for installation and segment removal of the aft shroud electrical storage segments from the aft shroud aircraft mount; and a 502 rdf propulsion system, for providing the subsystems that comprise the rotational ducted fan propulsion system, operationally encompassing to said 502 systemic servicing detail.

23. A rotational ducted fan (rdf) propulsion system for converting stored electrical energy into aircraft thrust propulsion, comprising: an assembly of rotational ducted fan rotor and shroud, made of nonferrous materials, aerodynamic for airflow bi-pass 102 rotational ducted fan motor, for generally providing propulsion thrust to power aircraft; a dynamic airfoil, composite material, fluid accelerating control surface, convex control surface 104 rotational ducted fan inlet surface, for providing an accelerated fluid flow across inlet control surface to decrease fluid pressure, accelerate fluid, and decrease upstream fluid pressure, creating lift; an airfoil with varying pitch cord lengths, made of composite material, lightweight and strong, affixed to inlet control surface of duct, a plurality of blades, airfoil forward lift control surfaces 106 rotor propeller blades, for creating thrust by converting rotational potential energy into linear thrust, creating a pressure difference of the fluid upstream of the propeller to the fluid downstream of the propeller, rigidly connected to said 104 rotational ducted fan inlet surface; a composite or generally non-ferrous alloys, affixed to rotor propeller blade root inclusive of both leading and trailing edge, cylindrical, axis of rotation is parallel to cylindricity 108 center hub, for providing a monolithic connection for all propeller blades, and comprising permanent magnets to create magnetic field for coupling with regenerative power clutch, rigidly connected to said 106 rotor propeller blades; an aerodynamic exterior shape, smooth surfaces, alumina silica and composite construction, adiabatic design considerations, varying cord lengths for aerodynamic exterior to induce drag and increase pressure aft of system, at least a partially hollow core, solid and structurally rigid supporting magnetic repulsive field bearings 110 static aft shroud, for providing an aerodynamic control surface for low velocity fluid flow, with varying cord lengths of exterior aerodynamic design, comprising of housing core to store electrochemical energy, and providing the rigid static bearing housing that contains magnetic levitation coils; an aero-foil inlet 202 rotational ducted fan rotor inlet, for converting rotational potential energy into thrust energy by accelerating intake fluids such as air across its dynamic intake control surface, creating a low pressure region that results in forward lift, rigidly connected to said 106 rotor propeller blades, and rigidly connected to said 104 rotational ducted fan inlet surface; a gap between rotational ducted fan rotor and static aft shroud, frictionless 302 thrust magnetic field gap, for providing a repelling thrust bearing to enable 304 to levitate, and to have frictionless bearing rotation;
a concave surface of airfoil 304 rotational ducted fan rotor, for providing a concave airfoil surface to create drag for the forward thrust, rigidly connected to said 202 rotational ducted fan rotor inlet, rotationally connected to said 110 static aft shroud, and magnetically housed to said 102 rotational ducted fan motor;
a textured surface, smooth, without disruptions, made of composite material, lightweight and rigid 308 rotational leading edge, for providing a forward control surface comprised at the leading edge of the rotational ducted fan rotor 202 at its forward most edge, and acting as a fluidic gate that creates an orbital low pressure surface causing forward (upstream) lift, rigidly connected to said 202 rotational ducted fan rotor inlet, and rigidly connected to said 104 rotational ducted fan inlet surface;
a smooth surface, parallel inner control surface to axis of rotation 208.310 aft shroud exit surface, for contributing to laminar flow of exit fluid pressure with no eddy current disruptions;
a convex exterior, generally round, without voids or uncontrolled wind-breaks 312 static aft shroud airfoil, for providing a controlled drag surface of external static air-foil of propulsion motor, functionally constructed to said 110 static aft shroud;
a solid, composite 402 static duct bi-directional thrust bearing, structure, for provide a strong and light weight structure to mount magnetic coils and connectors, structurally constructed to said 110 static aft shroud;
a plurality of neodymium magnets, arranged circumferentially around axis 208.406 permanent thrust magnet, for providing magnetic thrust levitation between the rotational ducted fan rotor and the static aft shroud, circumferentially fastened to said 304 rotational ducted fan rotor;
a plurality of magnetic coils 410 levitation magnetic coil, for providing an opposing magnetic force whereby the axial rotation of the rotational ducted fan is generated, circumferentially embedded to said 110 static aft shroud;
an electrical coil 412 magnetic thrust field control coil, for converting electrical energy into magnetic field energy, insertably coupled to said 110 static aft shroud;
a plurality of neodymium magnets 414 permanent levitation bearing magnet, for providing a magnetic field that acts against the 410 pulsar coil creating a levitating frictionless bearing, rigidly embedded to said 304 rotational ducted fan rotor;
a neodymium permanent magnets 416 regenerative clutch permanent magnet, for providing a magnetic force field for the regenerative power clutch, rigidly embedded to said 108 center hub;
an alumina silica shell, battery chemistry 418 electrochemical conversion chamber, for providing for electrochemical storage of electrical power, stoichiometrically housed to said 110 static aft shroud;
a removable rotational ducted rotor, removable shroud batteries, fixed top shroud mount, permanent hanger hinges
502 systemic servicing detail, for providing a method for servicing the electric coils and battery shroud segments, actively delineated to said 102 rotational ducted fan motor;
a removable, convex outer exterior, comprising a number of magnetic coils 504 static aft shroud electrochemical storage segment, having electrochemical storage cavity, for providing for the storage of electrochemical energy, converting electrical energy to magnetic fields, and contributing to the directionally laminar thrust of downstream fluid pressure;
a 508 aircraft mount, having aerodynamic exterior shape, for providing an adjoining mounting structure that couples the top aft duct shroud 512 to an aircraft wing or aircraft fuselage to provide propulsion power for the aircraft;
a solid high strength bar, affixed to 508 mount segment 512 aft shroud segment hinge rack, for providing a solid hinge for hanging exactly two shroud segments, replaceably connected to said 504 static aft shroud electrochemical storage segment;
a 514 upper aft shroud duct segment, for providing interface mount that completes the containment of the fluid flow, provides aircraft mounting embodiment, provides hanger hinges or connections for removable shroud segments, substantially connected to said 512 aft shroud segment hinge rack, substantially connected to said 508 aircraft mount, and alternately constructed to said 110 static aft shroud;
a cavity containing electrochemical materials for storing electrical current in its core, comprising a composite hook on the exterior of the shroud shell 606 aft serviceable shroud segment, for providing a hanger clasp arrangement to allow for installation and segment removal of the aft shroud electrical storage segments from the aft shroud aircraft mount;
a 612 aft shroud mounting hooks, for provided for connecting serviceable shroud segments to upper shroud segment enabling serviceable motion and removal, rigidly connected to said 606 aft serviceable shroud segment, and removable connected to said 512 aft shroud segment hinge rack;
a 702 rotational ducted fan propulsion systems application drawing, for providing an example for a variety of propulsion mounting locations on aircraft;
a 710 fuselage, for providing for cargo, persons, or equipment occupation;
a 902 rdf propulsion system, for providing the subsystems that comprise the rotational ducted fan propulsion system, operationally encompassing to said 502 systemic servicing detail; and
a 906 iterative current control module (iccm), for providing the electro-magnetic field cycle on-off switching between coils, actively encompassing to said 902 RDF Propulsion System, electrically connected to said 412 magnetic thrust field control coil, and electrically connected to said 410 levitation magnetic coil.

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