Landing Aerodynamics and Adequate Power Plant Using LPWT for Airport Lighting Scheme

D. Santhosh Kumar, R.Sanjutha, S. Subashini, K.H. Sowmmya, V.P. Subhashree

Abstract: Renewable energy source are more crucial for our country because renewable energy produce endless power supply. In this project we use input as wind energy. The wind which is produced in the aircraft while takeoff and launching the plane. The aircraft which produce high pressure while takeoff and launching. Using the wind turbine which is placed near the airport which produce power. The turbines start rotating with the help of high pressure air it produced from the aircrafts. The LPWT which can be used on the both sides of the airport where it need some energy to rotate. While dealing with wind energy we are connected with the surface wind. The aircraft which travels nearly around 400 nautical miles per hour. During the aircraft launching or take off which produce high rotates the turbines which produce energy. During this process a proposed controller is used to display the landing and takeoff process in the monitor . The power which produced from the turbines is used for lighting in the airport.

Keywords: GPWS, Piezoelectric Pads, LPWT.

I. INTRODUCTION

The demand for power is more increasing in this generation. Nowadays harvesting energy by various methods is more essential in our developing countries. By various alternating methods energy can produced such as solar, tidal and wind but it is difficult to produce to generate. Power Quality is a main disadvantage in producing power in all different methods. To overcome these problems the concept of producing electricity in the airport is founded. In our project we turbines are used to produce electricity .Turbines are fixed with wings. The aircraft which produce high velocity which is used for rotating the turbines. By this process turbines start rotating which produce electricity it is used for lights inside the airport. In alternating production methods it causes many disadvantages in production and in the distribution process. But in our concept production and distribution of electricity which takes place in the same place which it reduces the loss of energy. By using the piezoelectric pads the position of the air craft can be watched in the system. This system has long-term reliability and at efficient cost.

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II. RUNWAY EXCURSION

A runway excursion which occurs during the take off and launching process of the aircraft. Approximately 25% of incidents and accidents in air transport, and 96% of all runway accidents. The excursion may be national and international it has three types. One is departing the aircraft fails to become airborne or successfully reject the takeoff before reaching the end of the designated runway. Second one is landing aircraft is unable to stop before the end of the designated runway is reached. Third one is an aircraft taking off or rejecting take-off or landing departs the side other designated runway. An aircraft depart from or lands on a runway other than that designated or a taxiway either of which may obstructed and/or shorter and /or narrow then the intended runway. In exception cases, the landing case may involve the use of the wrong airport. A departing aircraft fails to get airborne before end of the runway due to inappropriate aircraft handling technique or aircraft weight exceeds maximum for prevailing condition or craft malfunction engine failure.

III. TOUCHDOWN METHODS

HIDEC

Highly Integrated Digital Electronics Control (HIDEC) is used to improve aircraft performance. The STNRG011 combines a double-ended UC resonant half-bridge controller and a multi-mode power-factor correction(PFC) controller, managed by digital core running best in class control algorithms. Non-volatile memory is also provided on chip, for storing application specific parameter. The STNRGOLL's digital control and used programmability helps engineers optimize efficiency and performance throughout the load range and load top maximize efficiency. A 2-pin UART/I^2C port enable a host system to monitor and manage the power supply.

- Additional integrated features include LLC & PFC gate drives, high-voltage (800 V) startup circuitary, and line sensing to further simplify design, increase reliability & ruggedness, and reduce solution size and BOM.

- There is also an x-capacitor discharge circuit that compliance with the new IEC 62368-1 safety standard for audio –visual and ICT equipment, which is taking over from 60950 and 60065 standards in the US and EU.
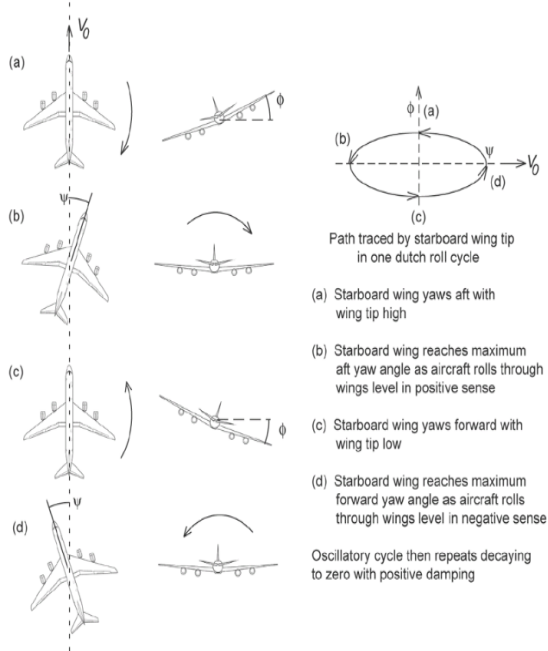
PCA-Propulsion Controlled Aircraft

This Propulsion Controlled Aircraft (PCA) was developed and tested at NASA Dryden commercial and military aircraft.

Aircraft population system generally consists of aircraft engine to generate thrust, such as propeller or a propulsive hozzle. An aircraft propulsion system must achieve two things. The thrust from the propulsion system must balance the drag of the airplane when the aircraft is cruising.
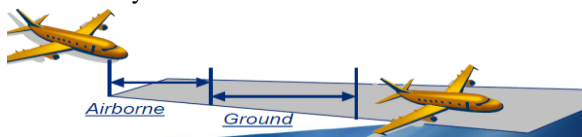
Dutch Roll Method

The dutch roll occurrence is a moment of yawing motion which can be caused by any number of factors. As swept-wing aircraft yaws. The left wing becomes less swept than the right wing in reference to the relative wind.

IV. PROTECT

Protect-Propulsive Technique for Emergency Control)

This scheme is implement for the future aircraft design for replacing the flight control system. In controllable situation the above concept is used with PCA. When the aircraft is reached near the touchdown point then the information is passed to the pilot which helps them to land the aircraft safely.
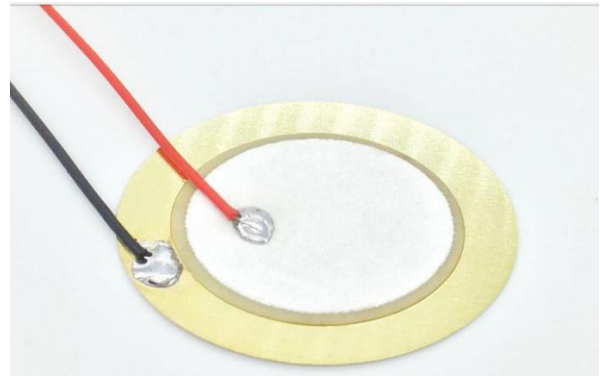

PROTECT Touchdown

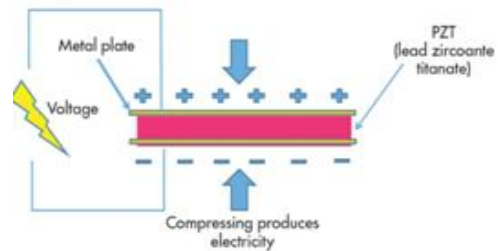### V. GPWS (GROUND PROXIMIOTY WARNUNG SYSTEM)

GPWS is a system designed to alert pilots if their aircraft is in immediate danger of flying into the ground or an obstacle. The system monitors an aircraft's height above ground as determined by a radar altimeter\. A computer then keeps track of these readings calculates trends, and will warn the flight crew with visual and audio messages. GPWS can only gather data from directly below the aircraft, it must predict future terrain features.
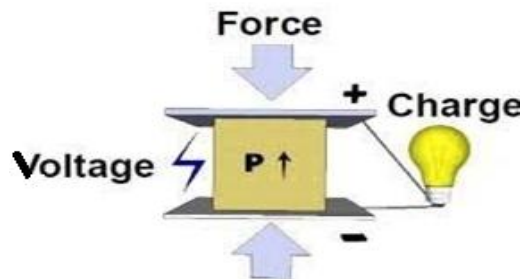
VI. PIEZOELECTRIC SENSORS

In our concept we are using piezoelectric pads for sensing the changes in the device. Sensor is used in the piezoelectric pads. They are versatile tods for the measurement of various process. They are used for quality assurance, process control and for research and development in many industries. It is insensitive to electromagnetic fields and radiation , enabling measurements under harsh condition

Piezoelectric Pads

Piezoelectric effect

Electrical Representation of Piezoelectric effect

Applications

- It is used in various applications such as in medical, aerospace and used in tilt sensor.

- It is used in diffused applications for micro-robotics and course-changing bullets.
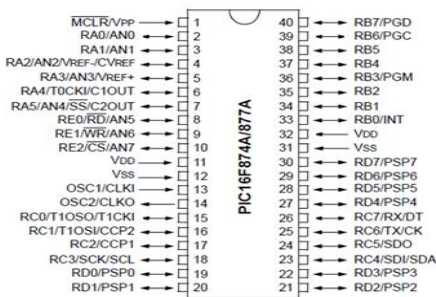- It is also used developing internal combustion engine

VII. WIND TURBINE

A wind turbine which converts wind energy into electrical energy. Vertical and horizontal wind turbines are manufactured in large numbers. Battery used in boats or caravans or traffic signals were using small turbines. If we are using large turbines which produce power for domestic uses. If large numbers of turbines were in same place it is known as wind form. Wind energy are more increasing production of electricity nowadays.

Wind Turbine
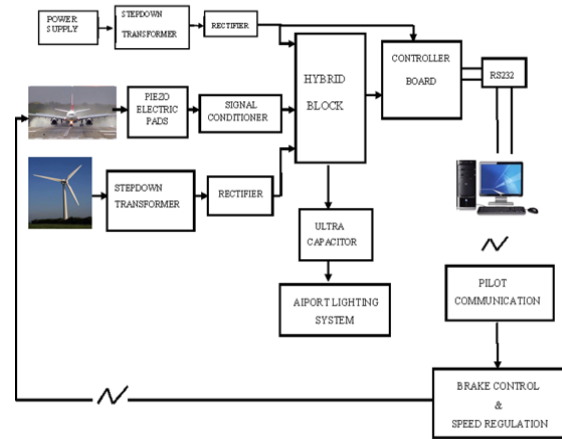
VIII. MICROCONTROLLER:

This powerful (200 nanosecond instruction execution)yet easy to program(only 35 single word instruction)CMOS FLASH-based 8-bit microcontroller packs microchip's powerful PIC architecture into an 40 package and is upward compatible with the PIC16C5X,PIC12XXX and PIC16C7X devices. The PIC16F877A features 256 bytes of EEPROM data memory, self programming, an ICD, 2 comparator, 8 channels of 10-bit analog-digital converter, 2capture/compare/PWM functions, the synchronous serial peripheral interface or the 2-wire inter-integrated circuit bus and a universal asynchronous receiver transmitter(USART).
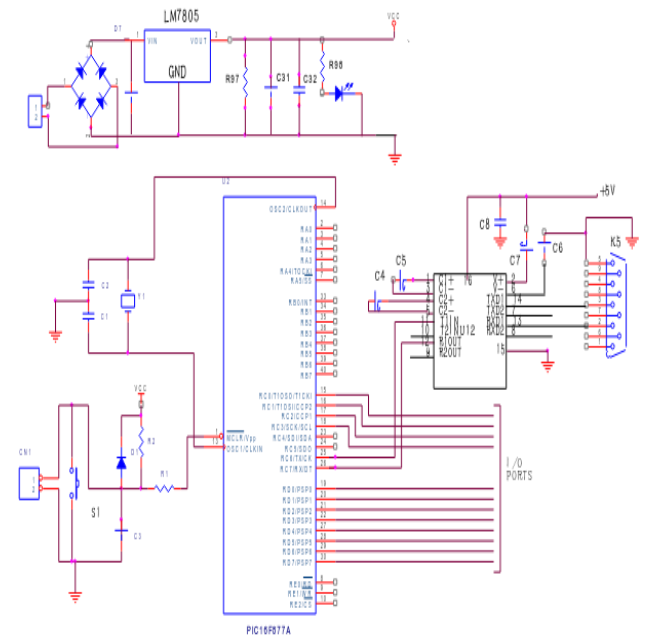

Pin Diagram of PIC16F877

IX. BLOCK DIAGRAM FOR AIRPORT LIGHTING SCHEME

While the aircraft landing and lift off, if we can installed the LPET on both sides of ramp to get or a mass power. If we need the aircraft will be in balance around 400 nautical miles per hour. While shifting the very great air velocity will occur on ramp and at the same time it will be enough to drive small micro wind turbines to carry out or arrive power.

This power is also generated for the ramp and also it will be used in the taxiway or other purpose. While we say the another concept, during landing plane this is the first point for the aircraft to ouch the ramp and also it will be very difficult to achieve the ramp because it can't be communicating between the pilot and supervising or otherwise it is not automatic process which leads to some angle deviation from that point. If it is incorrect supervising it will leads to destruction aircraft on the ramp. While we using the EMC it will be covered all the future needs of ATC and ATM.

X. CIRCUIT DIAGRAM

Front end

Visual basic

Visual basic is a programming environment from Microsoft in which a programmer uses a graphical user interface. Visual basic was derived from BASIC and enables rapid application development of graphical user interface application , access to databases using RDO or ADO creation of active X controls and objects. BASIC is a high level programming languages who design emphasize ease of use.

Back End

Embedded C:

Embedded c is an extension to c programming language that provides support for developing efficient programs for embedded devices. Embedded c is used for micro controlled based applications. Embedded c has to use with the limited resources such as RAM, ROM, I/Os on an embedded processor. Embedded c requires compliers to create file to be downloaded to the micro controllers/ microprocessor where its needs to run. Embedded c contains functions, structures and macros which are could use to access different functionalities of the micro controller.

Hardware model of the proposed system

Output of the proposed system

XI.   CONCLUSION

The concept can be appraise and thoroughly analyzed with the given software. The main idea of the project to possess renewable energy source with efficient cost. In this project, we are using energy as a renewable resources, the source is used to provide to supply the electricity in runway. This alternative source of power generation can be used for all other commercial purpose in the airport for generating power. This project has a great solution for power. The non-renewable resources, providing large amount of electricity with less cost, improved efficiency, automation for the social welfare of the country and the environment.

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