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TOUCH DOWN AVIATION ANALYSIS

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ABSTRACT

Aims:*Energy harvesting by means of any source of energy become essential for developing countries. Natural and renewable energy could provide clean environment to certain areas like airstrip (Run way)Materials and methods:Mostly energy harvesting is achieved through wind source become seasonal and will have huge uncertainty in power quality. To overcome and to produce power without uncertainty with enhanced power quality, we would like to present a existing concept for a newer area with minimization.* ***Results:****Enormous amount of wind is generated during takeoff and landing of an aircraft .In the aim of conserving the wind energy in those areas we have proposed to use low power, lower size wind turbine on both sides of the runway to require power. Conclusion:The power generation could provide clean energy and an important parameter called touchdown point of an air craft on the runway (air strip).*

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KEY WORDS

Formal verification, static analysi, Android, Inter-App vulnerabilities

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INTRODUCTION

Global Mobile app markets are creating a fundamental model shift in the way software is delivered to the end users.

The increase in demand for power has become more in day to day life. Rising in demand for electricity made the advancement in finding the alternative generation of power resources for the future generations. Energy harvesting system has become more essential for all the developing countries. There are many alternative energy resources like solar, wind and tidal which has become seasonal and during the uncertainties it is much more difficult to generate power with all enhanced power quality.

Electricity use can vary dramatically on short and medium time frames, largely dependent on weather patterns. Energy Demand Management (EDM) which is also known as Demand Side Management (DSM) is an alternative modification made in generating the energy resources during the peak hours. A newer application for DSM can be done in the airport runway system in balancing the intermittent generation from other renewable energy resources when there is a seasonal issue. EDM activities attempt to bring the electricity demand and supply closer to the operational needs for a particular organization and also for the consumers nearby the society.

Reducing energy demand is contrary to energy suppliers, government and private sectors are themselves trending to generate the electricity for the future demands that will increase the efficiency of energy consumption. In this concept the metro airport is making use of an alternative resource in generating electricity for their usage and also to supply power for other residential and commercial sectors which are located nearby. The main aim for this type of alternative resource is to reduce the demand in power and also to use the resources which can be made from easily available physical quantities. The type of generation should also provide a clean environment by not affecting any harm for living creatures.

Utility activities that influence customer use of electricity encompasses the planning, implementation and monitoring if activities designed to encourage consumers to change their electricity usage patterns.

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AEROMACS APPROACH

The existing system uses a normal power supply for the runway power management and more energy is required to make the lighting system effective during night times. The communication with the C- band is at higher rates but the touchdown point is done manually through AeroMACS. There are more difficulties in analyzing the speed of the aircraft between the runways from the point of touchdown. There are chances of angle deviation from touchdown point which leads to overshooting of runways. Improper monitoring of the taxi-ways could lead to accidents and collision of aircraft.

AEROMACS COMMUNICATION

AeroMACS is based on a specificcommercial profile of the Institute of Electrical and Electronics Engineers (IEEE) 802.16standard known as Wireless Worldwide Interoperability for Microwave Access orWiMAX. To help increase the capacity and efficiency of the nation's airports, a secure wide band wirelesscommunications system is proposed for use on the airport surface.

As the communications, navigation, and surveillance (CNS) facilities for air trafficmanagement (ATM) at an airport grow in number and complexity, the need for communications network connectivity and data capacity increases. Over time, CNS infrastructure ages and requires more extensive and expensive monitoring, maintenance, repair or replacement. Airport construction and unexpected equipment outages also require temporary communications alternatives.

RUNWAY POWER GENERATION

Runway power generation is done with the normal distribution generation supply from the substation, feeders and transmission lines. Airport runway airstrips need more energy during the night time lighting for the aircraft landing and takeoff. When more power is consumed then there will be energy demand and crisis for the commercial and residential purposes. There are so many alternative methods for generation of power but those have become seasonal with the weather conditions. More advancement must be made to have a alternative sources of energy.

The communication with the C- band is at higher rates but the touchdown point is done manually through AeroMACS. There are more difficulties in analyzing the speed of the aircraft between the runways from the point of touchdown. There are chances of angle deviation from touchdown point which leads to overshooting of runways. Improper monitoring of the taxi-ways could lead to accidents and collision of aircraft. The runway lighting system is given with normal power supply by which more demand for the energy is needed. There must be some improvement made in this existing system so that there will be lesser number of accidents and to find the optimal solutions for the development of alternative resources.

PROPOSED SYSTEM

The proposed concept Low Power Wind Turbine can installed on both sides of runway to acquire power during aircraft landing and take off.

Generally on run way air crafts movements will be around 400 KMPH. During the movement very great air velocity will occur on runway, the same can be enough to drive small micro wind turbines to produce power.

The proposed concept will have wind turbine, step downtransformer, rectifier unit, ultra capacitor, lighting system and a on line wireless transmitter.

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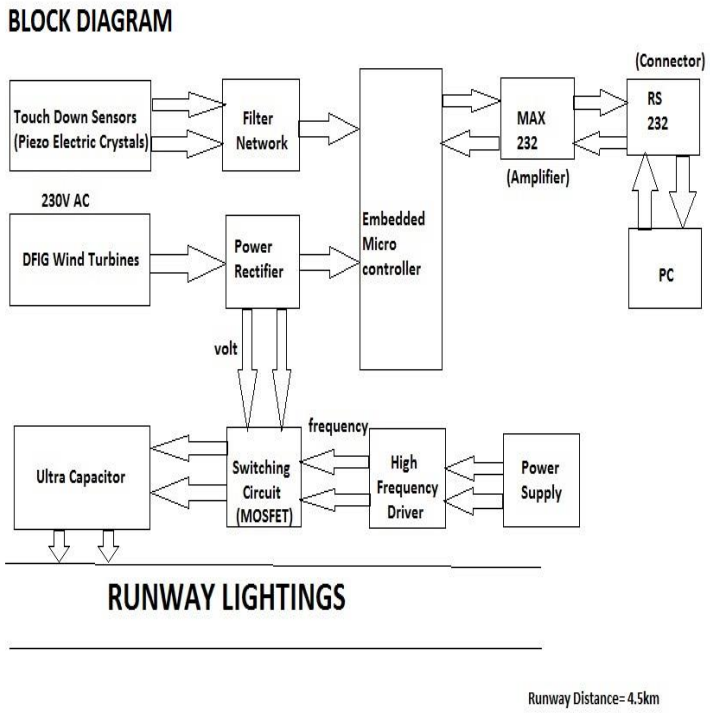

Fig. 1: Block diagram

The LPWT will be a small double fed induction generator (DFIG), which can produce 230v output of AC.

The output of the DFIG can be connected to a step down transformer to reduce voltage and will be fed to a full wave bridge rectifier Ac to Dc conversion.
Output of the rectifier will be applied to ultra capacitor called super capacitor to store and utilize for airport applications like light and signalling.

PIEZO ELECTRIC SENSOR

A piezoelectric sensor is a device that uses the piezoelectric effect, to measure changes in pressure, acceleration, temperature, strain, or force by converting them to an electrical charge. The prefix piezo- is Greek for 'press' or 'squeeze'.

Fig.2: Piezo Electric Sensors

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SIGNAL CONDITIONER

Signal conditioners are essential to improve field-received signals. Signal conditioner job starts from simple amplification to protection. For our circuit input will be 0v to 1000mv and must be amplified to 5volts.Essentially, we need a signal conditioner to amplify the IR detector output.Remove shell voltage and atmospheric pollution.To remove unwanted frequency.

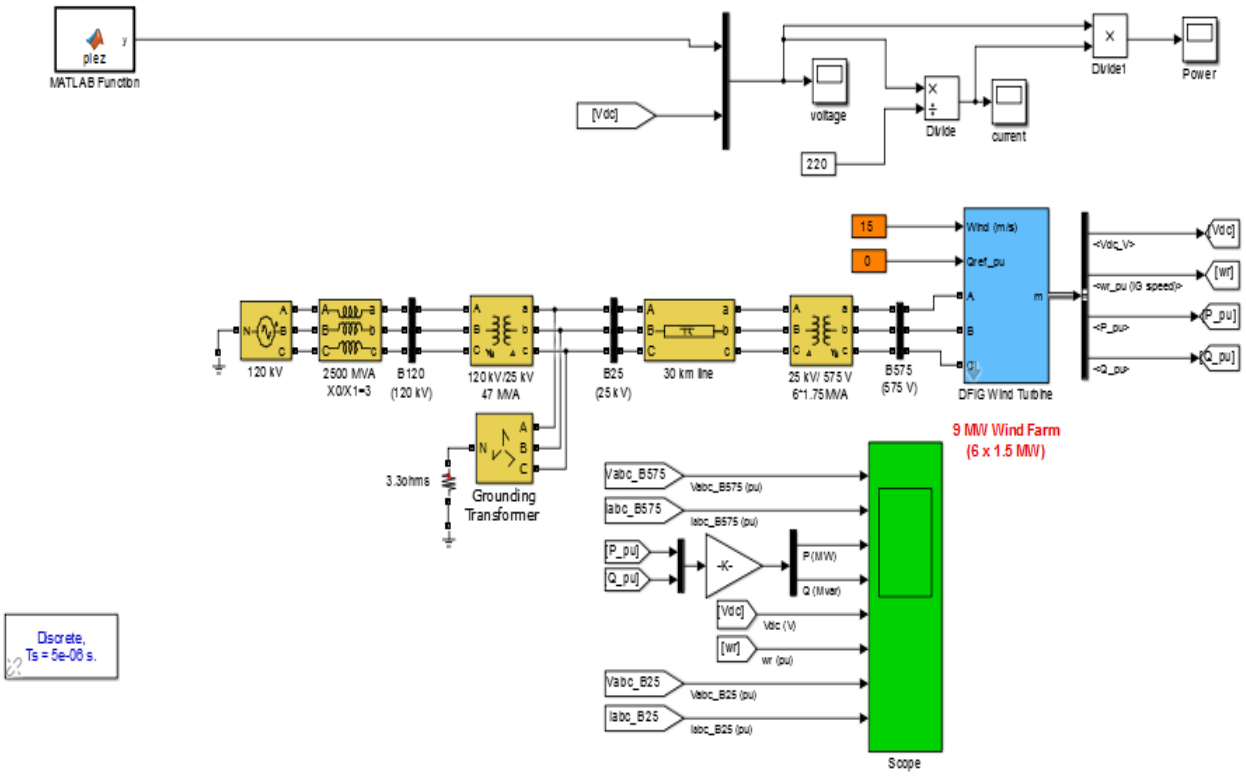

Fig.3: The circuit

voltage and current of interconnect link B575

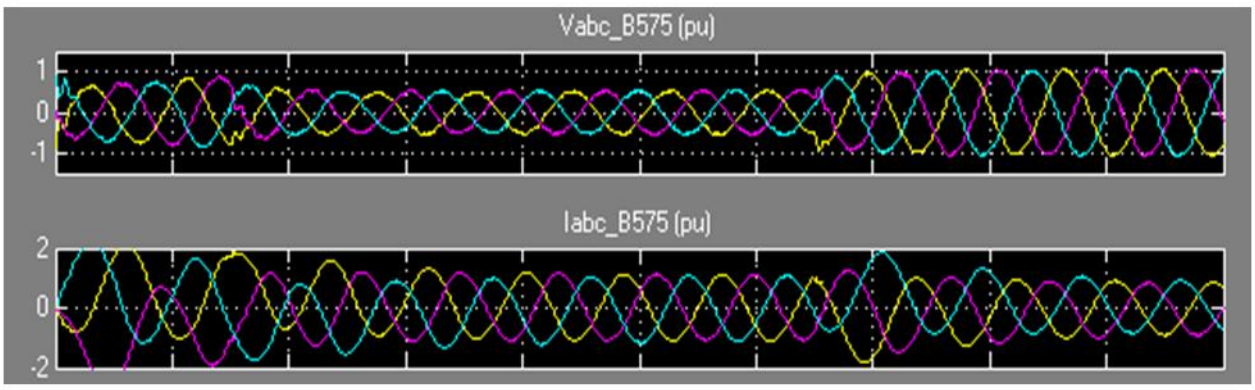

Fig.4: voltage and current of interconnect link B25

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EMBEDDED MICROCONTROLLER

To perform the various operations and conversions required to switch, control and monitor the devices a processor is needed.
Industrial advantages in power electronics like built in ADC, RAM, ROM, ports, USART, DAC.This leads to lesser space occupation by the circuit and also the speed of embedded controllers are more compared to other processors.
The embedded controller selected for this project is PIC16F877A due to its various features.
The PIC 16F877A has five serial ports namely A, B, C, D and E. It has five parallel ports namely:
PSP (Parallel Slave Port 8 bit wide)
SSP (Serial Synchronous Port)
MSP (Master Serial Synchronous Port)
I^2C (Inter Integrated Circuit)
SPI (Serial Peripheral Interface)
12 bit 10 channel PSP (Parallel Slave Port) -12 bit accuracy
Sleep mode processor
Built in temperature sensor
Built in RAM and EPROM

RESULTS

DFIG wind turbine is supplied with the input wind (m/s) which makes the turbine rotate.Another parameter is piezo MATLAB function where the piezo crystals are based on the pressure and impact which is coded according to the automation of touchdown point. The turbine voltages generated in the piezo effect are combined in the channel. The total voltage and power from both turbine and piezo effect can be separately viewed in the scope output.

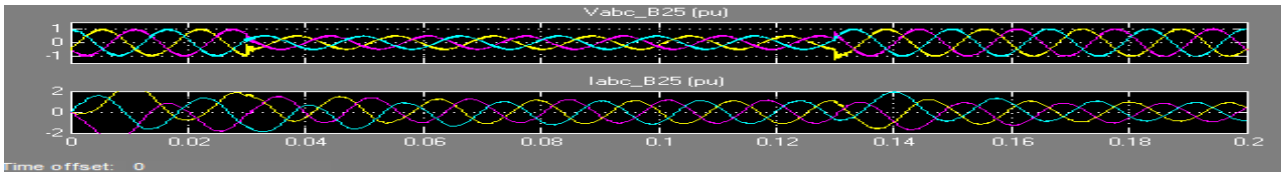

Fig.5: Voltage and speed of DFIG

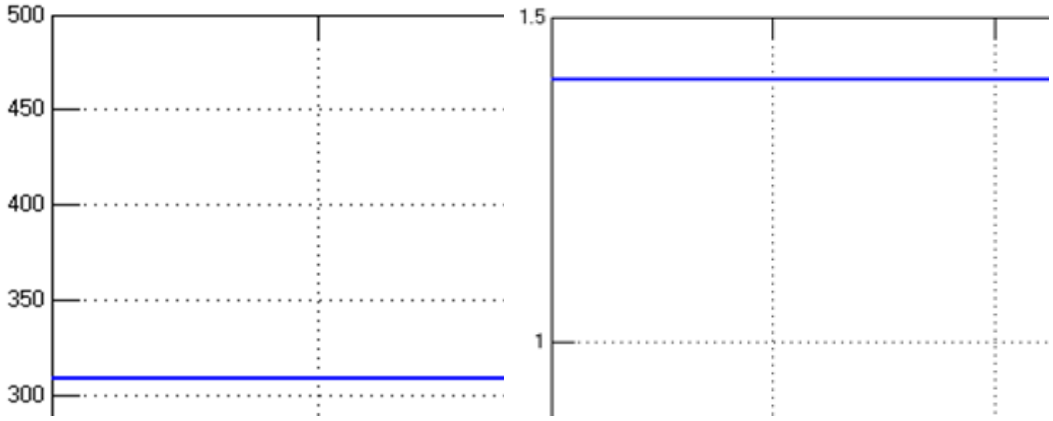

Fig.6: Generated Voltage Generated Current

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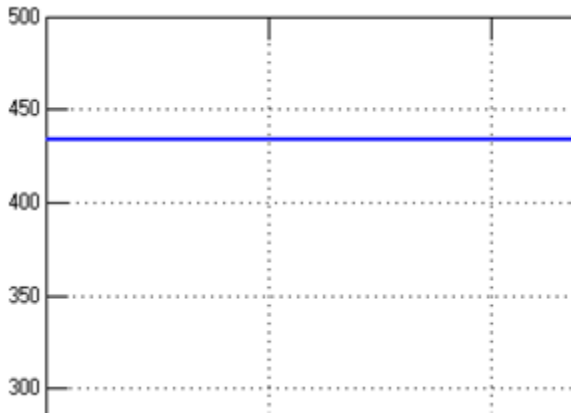

Fig.7: Generated Power

Hencelarge amount of power can be generated from the runway which can be utilized for taxi-ways and the excess power generated can be connected to the feeder of transmission lines for onward use in commercial/ residential purpose.

CONCLUSION

This project could have a complete solution for the existing system with the improved efficiency and automation for the social and safety welfare of the country. It uses touchdown sensors to automate the aircraft landing and power is generated with the pressure and impact from the vibration during landing.The implementation of this system could report analyzing the speed of the aircraft from the point of touchdown which is automated.

CONFLICT OF INTEREST

The authors declare no conflict of interests.

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None

FINANCIAL DISCLOSURE

The authors report no financial interests or potential conflicts of interest.

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