Project Batch No.	:	BE / ECE / Sem-7 / Section - B / Batch Group No – R06	
Title of the final year BE project work (VII / VIII)	:	Design and Verification of Flight Data Acquisition system using UVM	
Academic Year		2022-23	
Course Name & Code		Project Work/19EC7ICPR1	
Project Guide (Internal)	:	Dr.Jamuna S	Sign :
Venue of project done	:	Dayananda Sagar College of Engineering	
Project Guide (External)	:		Sign :
Details of External (E/M)	:		
Project section in-charge	:	Dr.Suma M.R	Sign :
Project Coordinator	:	Dr. Abhishek M.B.	Sign :
Field or area of project	:	VLSI	

Nainshree Raj 1DS19EC084	Pallavi G 1DS19EC096	Poornima M 1DS19EC099	Lakshmi S 1DS20EC417

Phone no./email-id student-1 N :Nainshree Raj	:	P	7004324434/9006455090
		E	nainshreeraj@gmail.com
Phone no./email-id student-2 N :Pallavi G	:	P	8123733240
		E	pallavig0310@gmail.com
Phone no./email-id student-3 N :Poornima M	:	P	9632928026
		E	poornimanel2002@gmail.com
Phone no./email-id student-4 N :Lakshmi S	:	P	9591719029
		E	lakshmislakshmi95@gmail.com

Abstract : The final year project work undertaken by us involves the design & Verification of Flight Data Acquisition system using UVM (Universal Verification Methodology). The main aim of our project work is to develop a Flight Data Acquisition system. It generate records of data relating to flight and performance parameters for each flight of the aircraft. The data typically relate to parameters such as air speed, altitude, vertical acceleration, heading, time, etc. The data are utilized in the event of an accident or a near-accident and to assist in maintenance of the aircraft by detecting faulty components or gradual deterioration of a system or component, to assist in reviewing crew performance, and to assist in logistical planning activities such as scheduling and routing.

Introduction : With the rapid development of aviation technology, higher requirements have been put forward for aircraft acquisition system. On the one hand, the number of measurement and control equipment increases, the range of data acquisition expands, and the ability of real-time acquisition, transmission and processing of test and measurement data increases rapidly, which makes the data volume increase exponentially .On the other hand, aviation accidents occur frequently in recent years, and the application of flight data is deepened by all major airlines. The requirements of single aircraft life monitoring, fleet health management, pilot training and assessment are proposed. In this case, the aircraft data acquisition system faces the challenges of increasing the number of flight data to be collected and the rapid growth of data scale.

Problem Statement : The traditional aircraft data acquisition system consists of multiple acquisition boards which have the disadvantages of large volume and slow collection speed, and can no longer meet the existing data collection and processing work. Thus, we define our problem statement as "Design and Verification of Flight Data Acquisition system using UVM".

Objectives : The main objective of our project is to design a system which can give full play to the parallel working ability of FPGA in collecting multi-type and multichannel flight data simultaneously which has the advantages of simple circuit structure, high integration and high universal, which can be used for engine sensor parameter, air frame sensor parameter, flight attitude and other flight data.

Proposed methodology : The system can meet the requirement of multichannel data acquisition for different types of flight data. The collected data include RS422 bus signal, ARINC429 bus signal, discrete signal, analog signal, frequency signal. Our system mainly comprises sensor, a processor which collects the data from the sensors and performs the signal processing.

Proposed block diagram :
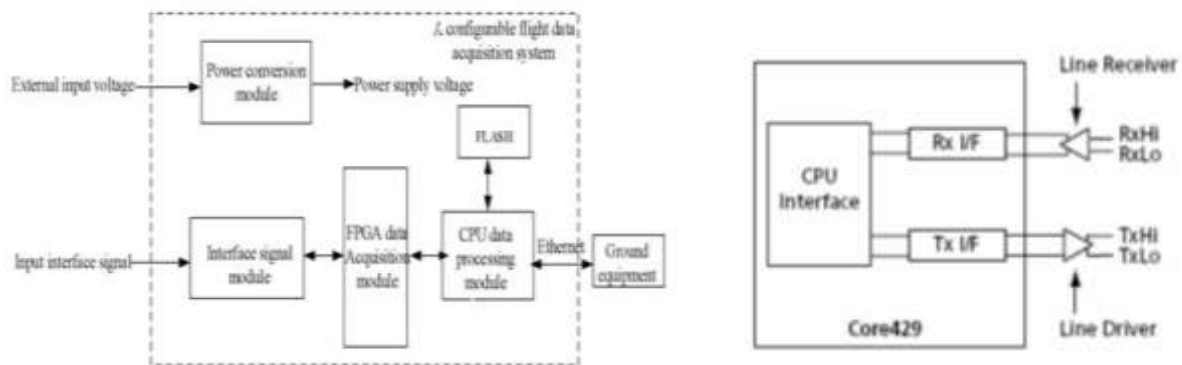
Overview of working : The configurable aircraft data acquisition system mainly collects engine sensor parameters, fuselage sensor parameters, altitude, atmosphere and other flight data. The interface signal module is used to collect and output various flight data, complete signal format and level conversion. The CPU data processing module realizes bus communication control and task scheduling management. The CPU acts as the main device to allocate different address space for peripheral devices such as FPGA. The FPGA data acquisition module realizes the parallel acquisition function of all kinds of flight data by using the parallel operation mode of FPGA.

Tools used : Modelsim,Spartan-6 boards, UVM

Expected Results & Outcome : In view of the ICD configuration requirements of different aircraft flight data, this architecture can complete the acquisition task of multiple types of flight data and store it in real time.

Applications: Modern data acquisition technology uses real-time communication and advanced networks to monitor aircraft all over the world. This allows for flight data to still be relayed to crews and inspectors on the ground in the event of an accident, even if flight data recorders (FDRs) are unrecoverable.

Conclusions : According to the requirement of the flight data acquisition, the system uses the FPGA parallel processing mode to modularized the design of the signal acquisition, and uses the bus control and task scheduling management function of the CPU to initialize the configuration register in the FPGA interface modules, so as to realize the flexible configuration of multiple types of flight data acquisition and storage.

Time-Line : Jul-Aug : Case Study, topic search, finalization, approval from guide
          Sep-Oct: – Starting of the project work, study & implementation of OCR
          Nov-Dec: - Translation into other Language and Test run
          Jan-Feb:-Trail run, debug & project stage review
          Mar-Apr: - Phase reviews
          May-June: - Final submission & project demo in exhibition open day