Radiation Pulse Analyzer

Software Design Document

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PHYS 434

November 11, 2015

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# Introduction

## Purpose

This software design document describes the architecture and system design of and radiation pulse analyzer.

## Scope

This software aims to analyze indirect effects of ionizing radiation using a detector exposed to a source of ionizing radiation. The design of this software intends to use a modular user interface to allow the user to analyze multiple detectors. Based on the detector specific response to radiation, this program will plot radiation intensity (rad/sec) over time to describe a pulse of gamma radiation. Alternatively this program will take an input lower intensity radiation and determine the total dose (rad) over a given period of time. Definitions and Acronyms

RDS: Radiation Detector Setup

LINAC: linear accelerator

NG: Neutron Generator

LV: LabView 2012 32-bit

# System Overview

The primary use for this program would be in conjunction with radiation test devices to determine radiation effects on electronic parts. The test environment for this program will utilize a 10 MeV electron linear accelerator and a 14 MeV Neutron Generator. The LINAC is a pulsed machine that produces pulses of radiation on the order of 100 µs while the NG is a machine that produces CW neutron radiation.

# System Architecture

## Architectural Design

The modularity of this program will implement a case selection to switch between a neutron detector and a photon detector. Each detector will allow specific parameters to be entered in order to analyze the radiation data. This program will also allow the user to select between a radiation pulse analysis (pulse graph) or a total dose analysis (total rads).

## Design Rationale

The detector information will be specific to each individual detector as energy response, response time, and physical detection mechanisms will vary. Many other factors would need to be taken into account in order to determine the dose to a test part. This program design is to demonstrate proof of concept rather than a replacement for radiation dose calculation methodologies.

# Human Interface Design

## Overview of User Interface

Describe the functionality of the system from the user’s perspective. Explain how the user will be able to use your system to complete all the expected features and the feedback information that will be displayed for the user.

## Screen Images