

## RAW DATA MONITOR

In brief summarization my project's goal is to decode raw data coming in from various sources, and, using this decoded data, determine the presence and severity of errors in the data transmission. Upon the program's detection of an error, there will be a warning/alert procedure, the nature of which depends on the job description of the individual user. The sources of incoming data include radar sources from Wallops Island, radar sources from other states, satellite data transmissions, and a few others. The input data is packed so as to save time, money, and space. I've just recently decided to do the actual coding within my Raw Data Monitor application, as opposed to having the decoded data be as input to the application. There are a number of reasons for doing this, the most important being the transportability among different locations embraced by Goddard Space Flight Center.

I have obtained the formats of the incoming Minimum Delay Data Format (MDDF), launch Trajectory Acquisitions System (LTAS), ASCII Time-of-Year (TOY), and Program Time (PT) data formats. I'd like to get some more sample data to test out the final version, though, as it is a sensitive project where human lives may be at stake. The MDDF format is concerned with the azimuth, elevation, and range coordinates of the rocket, while the LTAS format is concerned with the vector representation and its decomposition into x, y, z components, for both the position and the velocity of the vehicle. I understand the semantics of the most vital bit patterns within each of the above data formats, and have no known access to the meaning of some of the more 'obscure' bit patterns. Because the Front End Processor will receive 10 data frames per second (2400 BAUD), the time bit patterns within the TOY/PT data formats store the hour, minute, second, and tenths of seconds. The time data formats represent both the time of day and the time into the launch since liftoff.

I am in the process of designing and gathering the final requirements on the output of the Raw Data Monitor. Information that must be included such as the radar source ID, manual or auto-track mode, the sync and toggle status, have been taken into account; the concern at the moment is a well laid out graphical user interface for displaying the important data. I am considering using Visual C++ Version 5.0 to implement the code for this application. Visual C++ conveniently offers Microsoft Foundation Classes and the AppWizard feature. Perhaps the menu bar in the main window could have a listing of the different incoming data sources (RADAR1 RADAR2 RADAR3 ..... RADAR n). Then the users could click on which source is relevant to them for their own purposes. The various windows should have the usual scroll bars, static labels, and edit boxes so that any change to a value, either by strict card reading or user intervention, will instantaneously update the important output. Instantaneous is one of the most important adjectives used to describe the purpose of this project. If the RADAC reads in data on the wrong frames or is off sync by a tenth of a second, the future of the expedition becomes very uncertain at the least. I also need to investigate the various possibilities for a warning system to alert the users of inaccurate and/or out of sync data transmission. There will be at least two levels of warning, yellow being enough to cause doubts, and the red being enough to cause further definitive, perhaps preventative action. Of course, the exact lines between no warning, yellow alert, and red alert have to be documented. The reason for the warnings will be output to the user as well. And I'm still trying to get Visual C++ ver. 5.0 to beep and not 'click'. There are various algorithms used to detect the quality of the data, depending on the meaning of the data. In addition to the validity of toggle and synchronization, there is the first differences test useful for velocity accuracy, etc. The bit patterns arriving must also conform to the acceptable domain of the meaning of the patterns.

I am of course open to suggestion from the RADAC team, my advisor, and my committee for other items of interest to be included in the project.