Individual Assignment 5: Requirements Decomposition and Tracing

Start Assignment

- Due Monday by 11:59pm
- Points 10
- Submitting a file upload

Overview and Objectives

In this assignment, you will be constructing a requirements documentation for avionics instrument software.

This assignment is designed for you to show your skills on the following Learning Objectives:

1 Applying the process behind working with requirements
2 Organizing the process behind breaking down large scale projects into requirements

Note: This assignment uses a new software called ReqView. You can use ReqView free online at **https://www.reqview.com/apps/desktop/ReqViewDesktop.html (https://www.reqview.com/apps/desktop/ReqViewDesktop.html)** . If you have not used ReqView before, please take some time to familiarize yourself with it. You can find their quick start video tutorials here: **https://www.reqview.com/doc/quick-start/ (https://www.reqview.com/doc/quick-start/)** . You won't need all the videos there, but across them they will cover everything you need for this assignment.

Background and Context

In this assignment, you will be working with requirements for a Primary Flight Display (PFD). A PFD is an avionics instrument in a cockpit with key information and is often situated directly in front of the pilot.

Here is an example from **Rockwell Collins (http://rockwellcollins.com)** of a PFD.

In this example:

- Airspeed tape is on the left (current airspeed is 172 knots)
- Pitch dashed lines are in the center with heading above the compass (current heading in 066)
- Altitude tape is on the right (current altitude is 8800 feet)

For simplicity, we'll say this system has three subsystems or components:

- User Interface – displays data to the end user.
- Data Layer – receives, filters, aggregates, stores, and provides clean data.
- Network Component – receives raw data from sensors (e.g., airspeed, heading)

The components are arranged in a layered architecture. Each layer interfaces only with adjacent layer(s).

User Interface
Data Layer
Network Component

Procedure

Construct snippets of a requirements document in ReqView as outlined below:

Part 1: Flow-Down Requirements

Step 1: Entering the following headings and requirements into ReqView. Note that ReqView keeps a unique ID internally for each entry, so we won't add one manually.

- SYS: Primary Flight Display (PFD)
  - REQ: The PFD shall provide an indication of the aircraft's current airspeed.
  - REQ: The PFD shall log the aircraft's current heading every 500 milliseconds.
- SUBSYS: Network Component
- SUBSYS: Data Layer
- SUBSYS: User Interface

Step 2: For each requirement under PFD

1. Determine which subsystems will be involved with implementing the requirement. Remember:
   A. the function of each component, and
   B. how it interacts with other components in the layered architecture
2. Write a requirement (beginning with REQ:) nested below each of the subsystems involved with implementing the requirement
3. Make a trace (link) from the associated PFD requirement to each of these subsystem requirements.
   A. **https://www.reqview.com/doc/requirements-traceability-links/ (https://www.reqview.com/doc/requirements-traceability-links/)**

Part 2: Refinement Requirements

Step 1: Under the Data Layer section, add the following requirements and placeholders:

- REQ: The Data Layer shall provide the aircraft's current altitude as a filtered integral value.
  - REQ: <range requirement>
  - REQ: <filtering requirement>
- REQ: The Data Layer shall provide a boolean value indicating whether the aircraft's current pitch is excessive based on a user-configurable threshold.
  - REQ: <filtering requirement>

Step 2: For each higher-level requirement, fill in the placeholder lower-level requirements with appropriate details as follows:

1. For altitude, indicate the range of values that could be provided and their corresponding units (don't worry, you won't be graded on the fine details of aviation, just do a web search about how high

aircraft usually fly).

2. For both altitude and pitch, determine a requirement which simply states the data filtering to be used. The following types of filtering are common, and you will likely be aware of them and where they are used:
   - **Moving Average** – used to provide a more continuous change in values rather than following the jagged edges between individual raw data points from sensors.
   - **Hysteresis** – uses past values, range bands, and/or trending direction calculations to avoid frequent switching/flip-flopping, especially when raw values lie close to some threshold.

Hint: Moving averages ensure a feed of relatively smooth data. Hysteresis ensures that a single indication doesn't continuously flash on and off when values are near a threshold (think of how a thermostat might determine to turn an AC unit on or off at a specified threshold).

Submission Criteria

For this assignment you should submit **both**:

- the **.reqw** file from ReqView (Select-> Save)
- A Screenshot of all your requirements in ReqView

A5_ReqsDecompTracing.docx (https://canvas.asu.edu/courses/195388/files/89610224?wrap=1)

Requirement Decomposition and Tracing				
Criteria	**Ratings**			**Pts**
Flow-down Requirements Follows all instruction for the flow-down requirements	**5 pts** **Full Marks**	**2.5 pts** **Half Marks** Some but not all steps completed.	**0 pts** **No Marks**	5 pts
Refinement Requirements Follows all instruction for the refinement requirements	**5 pts** **Full Marks**	**2.5 pts** **Half Marks** Some but not all steps completed.	**0 pts** **No Marks**	5 pts
				Total Points: 10