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10/15/2022

Homework 3

Rocket Launch Syste (RLS)
1 Functional Requirements

1.1: Power Off Mode

Inputs: CU power switch flipped (new concept)

1.1.1: While powered off, the RLS system shall accept no input if either of the following occurs:

> 1.1.1.a: The enable button on the Launch Pad Unit (LPU) is pressed
>
> 1.1.1.b: The test button on the LPU is pressed
>
> 1.1.1.c: The ready button on the Control Unit (CU) is pressed
>
> 1.1.1.d: The launch button on the CU is pressed

1.1.2: When powered off, the RLS system shall turn on (initial mode) if the power switch on the CU is flipped (new concept)

Outputs: None

1.2: Initial Mode

Input: None

1.2.1: While in idle mode, the RLS system shall accept no input if either of the following occurs:

> 1.2.1.a: The enable button on the Launch Pad Unit (LPU) is pressed
>
> 1.2.1.b: The ready button on the Control Unit (CU) is pressed
>
> 1.2.1.c: The launch button on the CU is pressed

Outputs: None

1.3: Test Mode

Inputs: LPU test button pressed

1.3.1: When in idle mode and the test button on the LPU is pressed, the RLS system shall send a low current through the wires connecting the LPU to the rocket and turn the LPU's green light on (test mode) if and only if:

> 1.3.1.a: The battery is charged
>
> 1.3.1.b: The circuit through the igniter is closed

1.3.2: If either of the following is true, the RLS system shall not turn the LPU's green light on

> 1.3.2.a: The battery is not charged
>
> 1.3.2.b: The circuit through the igniter is open

1.3.3: While in test mode, the RLS system shall leave the LPU's green light turned on

1.3.4: While in test mode, the RLS system shall accept no input if either of the following occurs:

    1.3.4.a: The test button on the LPU is pressed

    1.3.4.b: The ready button on the CU is pressed

    1.3.4.c: The launch button on the CU is pressed

Outputs: LPU green light

1.4: Enable Mode

Inputs: LPU enable button pressed

1.4.1: When in test mode and the enable button on the LPU is pressed, the RLS system shall turn the LPU's red light on (enable mode)

1.4.2: While in enable mode, the RLS system shall leave the LPU's red light turned on

1.4.3: While in enable mode, the RLS system shall accept no input if either of the following occurs

    1.4.3.a: The test button on the LPU is pressed

    1.4.3.b: The enable button on the LPU is pressed

    1.4.3.c: The launch button on the CU is pressed

Outputs: LPU red light

1.5: Ready Mode

Inputs: CU ready button pressed

1.5.1: When in enable mode and the ready button on the CU is pressed, the RLS system shall turn the CU's red light on (ready mode) if and only if

    1.5.1.a: The LPU acknowledges the ready command by outputting a loud low-pitched tone (new concept)

1.5.2: If the LPU does not output a low-pitched tone (command not acknowledged), the RLS system shall not turn the CU's red light on

1.5.3: While in ready mode, the RLS system shall leave the CU's red light turned on

1.5.4: While in ready mode, the RLS system shall accept no input if either of the following occurs:

    1.5.4.a: The test button on the LPU is pressed

    1.5.4.b: The enable button on the LPU is pressed

    1.5.4.c: The ready button on the CU is pressed

Outputs: CU red light, LPU low-pitched tone

1.6: Launch Mode

Inputs: CU launch button pressed

1.6.1: When in ready mode and the launch button on the CU is pressed, the RLS system shall turn the CU's green light on (launch mode) if and only if:

1.6.1.a: The LPU acknowledges the launch command by outputting a loud high-pitched tone (new concept)

1.6.2: If the LPU does not output a high-pitched tone (command not acknowledged), the RLS system shall not turn the CU's green light on

1.6.3: When in launch mode, the RLS system shall do the following in order:

1.6.3.a: Send a low current through the wires connecting the LPU to the rocket

1.6.3.b: Close the circuit on the LPU

1.6.3.c: Launch the rocket

Outputs: CU green light, LPU high-pitched tone, launched rocket

1.7: Power On Mode:

Inputs: CU power switch flipped

1.7.1: If at any point the power switch on the CU is flipped when the RLS system is on, the entire system shall turn off and the launch will be aborted

Outputs: None