

## **PRELIMINARY DESIGN REVIEW (PDR)**

**Due: December 2, 2022**

At the conclusion of the preliminary design phase, the system has been defined down to the subsystem and major element level. Before proceeding into the critical design phase where the rest of the design takes form, programs pause to document and review where they are. The mechanism for this is the preliminary design review (PDR). Successful completion of the preliminary design phase is indicated if the decision maker receiving the information grants permission to proceed into the critical design phase. To receive that permission, it is up to the design team to convince the decision maker that the design will satisfy the requirements. Because the PDR is a formal event, attire will be [business professional](#) (suits). Dress uniforms are also acceptable and encouraged. The content of the PDR briefing shall be as follows:

- Introduction and System Overview
  - PDR agenda
  - Design team
    - Provide a graphic depiction of the design team organization
  - Purpose
    - Why the design team is developing this solution
  - Objectives
    - What the system is expected to accomplish
  - Benefits
    - Supported with realistic theory, facts, and data
  - Concept of operations
    - Graphical depiction
- System Description
  - Definition
    - Describe the overall system configuration
  - Requirements
    - State the requirements and discuss their origin
  - Trade studies
    - Document the process that led to your system configuration
  - Integration
    - Describe how your system interfaces with other systems or support equipment
    - Show integrations (mechanical, electrical, data, etc.) in a block diagram
  - Governing equations
    - Introduce equations needed for system analysis, define variables, and explain how the equations are used
  - Analysis/results
    - Explain what system-level analysis was done, why it was done, and what assumptions were made in enough detail that your work can be reproduced
    - Discuss the important results
  - System summary (see example below)
    - Summarize the system configuration

- Include a table of the requirements, the performance your design will achieve based on your analysis, and if your design satisfies that requirement
- Subsystem X (repeat for each subsystem)
  - Definition
    - Describe the subsystem's role in achieving the mission objectives
  - Requirements
    - State the requirements and discuss their origin
  - Trade Studies
    - Document the process that led to your subsystem configuration
  - Integration
    - Describe how the subsystem interfaces and is compatible with other subsystems
    - Show integrations (mechanical, electrical, data, etc.) in a block diagram
  - Governing equations
    - Introduce equations needed for subsystem analysis
    - Define variables and explain how the equations are used
  - Analysis/results
    - Explain what analysis was done, why it was done, and what assumptions were made in enough detail that your work can be reproduced
    - Discuss the important results
  - Subsystem summary (see example below)
    - Summarize the subsystem configuration
    - Include a table of the requirements, the performance your design will achieve based on your analysis, and if your design satisfies that requirement
- Conclusion
  - Summarize your design
  - Discuss how your design satisfies the requirements and constraints
  - Discuss how your design achieves the objectives
  - Summarize the schedule and budget for the remainder of the project
  - Review risks that must be addressed as you enter into the critical design phase
  - Acknowledge students, staff/faculty, or anyone else that supported you this semester

Example System/Subsystem Summary Table:

| Requirement |            |                   | Analysis Value | MOC | Meets Requirement |
|-------------|------------|-------------------|----------------|-----|-------------------|
| Number      | Title      | Value             |                |     |                   |
| 1.1         | Total Mass | $\leq 10$ kg      | 10.45 kg       |     | No                |
| 1.2         | Endurance  | $\geq 20$ minutes | 27 minutes     |     | Yes               |