

# Checklist for CubeSat Development Project

Developing a CubeSat is a complex project that involves several stages, from initial concept to launch and operation. Below is a comprehensive checklist to guide you through the CubeSat development process:

## **Pre-Phase A: Concept and Mission Definition**

### **1. Mission Concept**

- Define mission objectives.
- Conduct a preliminary feasibility study.
- Identify potential payloads and instruments.

### **2. Stakeholder Engagement**

- Identify stakeholders and define their roles.
- Secure initial funding and partnerships.

## **Phase A: Concept and Technology Development**

### **1. Preliminary Requirements**

- Define high-level mission requirements.
- Develop preliminary design concepts.
- Perform initial risk assessment.

### **2. Project Planning**

- Create a project management plan.
- Define project milestones and timelines.
- Establish a preliminary budget.

### **3. System Engineering**

- Develop a preliminary system architecture.
- Identify key technologies and components.
- Conduct trade studies.

## **Phase B: Preliminary Design**

### **1. Detailed Requirements**

- Develop detailed mission requirements.
- Define subsystem requirements.

## 2. Preliminary Design Review (PDR)

- Conduct subsystem-level designs.
- Perform simulations and modeling.
- Develop interface control documents.

## 3. Risk Management

- Update risk assessment.
- Develop mitigation strategies.

### **Phase C: Detailed Design**

#### 1. Detailed Design Development

- Complete detailed subsystem designs.
- Develop detailed schematics and layouts.

#### 2. Critical Design Review (CDR)

- Conduct subsystem and system-level reviews.
- Finalize design and interface documents.

#### 3. Prototyping and Testing

- Build engineering models or prototypes.
- Conduct subsystem and system-level tests.

### **Phase D: System Assembly, Integration, and Test (AI&T)**

#### 1. Manufacturing and Assembly

- Manufacture flight hardware.
- Assemble subsystems into the flight model.

#### 2. Integration and Testing

- Integrate all subsystems.
- Conduct system-level testing (thermal, vibration, EMI/EMC).

#### 3. Environmental Testing

- Perform environmental tests (thermal vacuum, shock, etc.).
- Verify system performance under expected mission conditions.

### **Phase E: Deployment and Operations**

## 1. **Launch Preparation**

- Secure launch vehicle and launch services.
- Conduct pre-launch reviews (Flight Readiness Review, Launch Readiness Review).

## 2. **Launch**

- Prepare and transport CubeSat to the launch site.
- Perform pre-launch tests and integration with the launch vehicle.
- Execute the launch.

## 3. **Early Operations**

- Establish communication with the CubeSat.
- Perform initial checkout and calibration.

## 4. **Nominal Operations**

- Conduct planned mission operations.
- Collect and analyze mission data.

### **Phase F: End of Mission and Decommissioning**

#### 1. **End of Mission Procedures**

- Execute end-of-mission commands.
- Safely decommission the satellite.

#### 2. **Data Analysis and Reporting**

- Analyze mission data.
- Publish results and findings.

#### 3. **Lessons Learned**

- Conduct a post-mission review.
- Document lessons learned and best practices.

### **Documentation and Reviews**

#### 1. **Documentation**

- Maintain detailed documentation throughout all phases.
- Ensure traceability of requirements, designs, and changes.

## 2. **Reviews**

- Schedule and conduct regular design and program reviews.
- Include stakeholders in critical reviews.

### **Compliance and Safety**

#### 1. **Regulatory Compliance**

- Ensure compliance with regulatory bodies (FCC, ITU, etc.).
- Obtain necessary licenses and permissions.

#### 2. **Safety Measures**

- Implement safety protocols during testing and integration.
- Ensure safe handling of hazardous materials.

### **Risk Management**

#### 1. **Continuous Risk Assessment**

- Continuously identify and assess risks.
- Update risk management plans and mitigation strategies.

Following this checklist will help ensure a structured and thorough approach to CubeSat development, increasing the likelihood of mission success.