# CubeSat Configurator Report

## Introduction

The following report was created using the CubeSat Configurator KBE Application developed by Gargi Sunil Pantoji and Nicolas Oidtmann for the Master Course *AE4204 Knowledge Based Engineering (2023/24 Q3)* at Delft University of Technology.

This report was generated on <date\_generated> by <author>.

## User Input

### **Mission Level Inputs:**

|  |  |  |
| --- | --- | --- |
| Input Parameter | Value | Unit |
| Mission Lifetime | <mission\_lifetime> | Months |
| Required Ground Sampling Distance | <required\_GSD> | m |
| Number of Images per day | <im\_per\_day> | - |
| Orbit Type | <orbit\_type> | - |
| Custom Inclination | <custom\_incl> | degrees |
| Ground Station Selection | <gs\_list> | - |
| Required pointing accuracy | <req\_point\_acc> | degrees |

### Ground Station Selection

### **CubeSat Design Weights**

|  |  |  |
| --- | --- | --- |
| Input Parameter | Value | Unit |
| Mass Design Weight | <mass\_factor> | - |
| Power Design Weight | <power\_factor> | - |
| Cost Design Weight | <cost\_factor> | - |

### **Instrument Specification**

|  |  |  |
| --- | --- | --- |
| Input Parameter | Value | Unit |
| Minimum Operating Temperature | <ins\_min\_temp> | °C |
| Maximum Operating Temperature | <ins\_max\_temp> | °C |
| Focal Length | <focal\_length> | mm |
| Sensor Pixel Size | <pixel\_size> | µm |
| Average Power Consumption | <ins\_power> | W |
| Instrument Mass | <ins\_mass> | g |
| Instrument Height | <ins\_height> | mm |
| Instrument Cost | <ins\_cost> | USD |
| Image Pixel Resolution | <resolution> | - |
| Image Bit Depth | <bit\_depth> | - |

## **Application Output**

### Orbit Design

|  |  |  |
| --- | --- | --- |
| Output Parameter | Value | Unit |
| Altitude | <orb\_alt> | km |
| Semi-Major Axis | <orb\_a> | m |
| Eccentricity | <orb\_e> | - |
| Inclination | <orb\_i> | degree |
| RAAN | <orb\_raan> | degree |
| Argument of Periapsis | <orb\_aop> | degree |
| True Anomaly | <orb\_ta> | degree |
| Orbital Period | <orb\_period> | s |
| Average Eclipse Time per Orbit | <ecl\_time\_orb> | s |
| Average Eclipse Time per Day | <ecl\_time\_day> | s |
| Average Communication Window per Orbit | <comm\_per\_orb> | s |
| Average Communication Window per Day | <comm\_per\_day> | s |
| Shortest Communication Window | <comm\_short> | s |
| Longest Communication Window | <comm\_long> | s |
| Number of Contacts per Day | <c\_per\_day> | - |

Mass Budget

|  |  |
| --- | --- |
| Subsystem | Mass (g) |
| Payload | <pl\_mass> |
| ADCS | <adcs\_mass> |
| OBC | <obc\_mass> |
| Structure | <str\_mass> |
| Thermal | <thm\_mass> |
| Communication | <comm\_mass> |
| Power | <power\_mass> |
| 20 % System Margin | <margin\_mass> |
| Total Mass | <total\_mass> |

### Power Budget

|  |  |
| --- | --- |
| Subsystem | Power (W) |
| Payload | <pl\_power> |
| ADCS (10% duty cycle) | <adcs\_power> |
| OBC | <obc\_power> |
| Structure | <str\_power> |
| Thermal (orbit average) | <thm\_power> |
| Communication (orbit average) | <comm\_power> |
| Power | <power\_power> |
| 20 % System Margin | <margin\_power> |
| Average Power | <total\_power> |
| Peak Power | <peak\_power> |

### Cost Budget

|  |  |
| --- | --- |
| Subsystem | US Dollar |
| Payload | <pl\_cost> |
| ADCS | <adcs\_cost> |
| OBC | <obc\_cost> |
| Structure | <str\_cost> |
| Thermal | <thm\_cost> |
| Communication | <comm\_cost> |
| Power | <power\_cost> |
| 20 % System Margin | <margin\_cost> |
| Total Cost | <total\_cost> |

## Component Selection

### Communication Requirements

|  |  |  |
| --- | --- | --- |
| Parameter | Value | Unit |
| Required Downlink Data Rate | <req\_dl> | Kbits/s |

### Communication Selection

### Onboard Computer Requirements

|  |  |  |
| --- | --- | --- |
| Parameter | Value | Unit |
| Required Onboard data storage | <req\_store> | Gbit |

### Onboard Computer Selection

### ADCS Requirements

|  |  |  |
| --- | --- | --- |
| Parameter | Value | Unit |
| Required pointing accuracy | <req\_pa> | degree |

### ADCS Selection

### Battery Requirements

|  |  |  |
| --- | --- | --- |
| Parameter | Value | Unit |
| Required battery capacity | <req\_bc> | Wh |

### Battery Selection

### Solar Panel Requirements

|  |  |  |
| --- | --- | --- |
| Parameter | Value | Unit |
| Required solar panel power generation | <req\_spp> | W |

### Solar Panel Selection

|  |  |  |
| --- | --- | --- |
| Area | Cost | Mass |
| <sp\_area> | <sp\_cost> | <sp\_mass> |

### Structure

|  |  |  |
| --- | --- | --- |
| Parameter | Value | Unit |
| Form Factor | <str\_ff> | - |
| Structure Mass | <str\_m> | g |
| Structure Cost | <str\_c> | USD |
| Distance CoM to geometric center | <str\_d> | mm |

### Thermal Requirements

|  |  |  |
| --- | --- | --- |
| Max Temperature | Min Temperature | Temperature Margin |
| <ttmax> | <ttmin> | <ttmargin> |

### Thermal Coating Selection

### Thermal Heater Sizing

|  |  |  |
| --- | --- | --- |
| Heater Power | Cold Case with Heater | Cold Margin with Heaters |
| <th\_power> | <th\_cc> | <th\_cm> |