Kyushu Institute of Technology

Department of Applied Science for Integrated System Engineering

A close-up of a flag

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**BIRDS 5 Satellite Unpacking &**

**J-SSOD installation**

Laboratory of Spacecraft Environment Interaction Engineering

Logo

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| --- | --- | --- | --- |
| **Date** | **Revision number** | **Writer** | **Annotations** |
| 2022/3/30 | 1 | Victor Mukungunugwa | Initial Release |
| 2022/3/31 | 2 | Victor Mukungunugwa | corrections |
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**1. Introduction**

This document shall be used as a guide to facilitate the proper unpacking and installation into the J-SSOD of the Flight Model of the BIRDS 5. Necessary steps in the disassembly are illustrated with relevant images and a checklist of parts, tools and fasteners required.

**1.1 Satellite axis definition**

Shown in the image below is the satellite with its axis definition. This definition will be applied throughout the whole procedure document.

A picture containing chart

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**Fig 1 : BIRDS 5 1U Overview**

Diagram

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**Fig 2: BIRDS 5 1U Overview**

**1.2 Satellite axis definition**

The satellites are mounted with fragile solar cells therefore it is important to indicated in yellow

Graphical user interface

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**Fig 3: BIRDS 5 1U holding positions**

Graphical user interface, application

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**Fig 4: BIRDS 5 2U holding positions**

2. **Unpacking and installation Protocol**

1. The team member that executes the disassembly shall write his details.
2. The team shall confirm that all checks were executed.
3. An orthogonal photograph of the area of interest for each step when completed shall be taken.
4. Hand gloves should be always used.
5. Care should be taken in handling the satellite. Be sure to wear an antistatic wristband on your wrist or ankle. Make sure that the metal part of the wristband is touching the skin and connected to the ground at this time.

* **General Precautions**

1. The disassembly team shall comprise two members.
2. The satellite is to be unpacked in the cleanroom and personnel should wear rubber gloves and hair cap, surgical face masks, dustproof coats.
3. The satellite attachments such as RBF pins and Kapton tapes should not be assembled with bare hands, appropriate gloves shall be worn
4. Carefully read and observe every precaution documented for each stage of the assembly.
5. Please avoid touching solar cells
6. Make sure no-lose material that can drop on solar cells
7. Please avoid touching the lens glass

**Preparation and confirmation of the tools to be used**

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| **Tools Checklist** | | | |
| **No.** | **Tool** | **Picture** | **Check** |
| **Common** | | | |
| 1 | Rubber gloves | 関連画像 |  |
| 2 | Hair cap | 「川西工業 使い切りキャップ」の画像検索結果「川西工業 使い切りキャップ」の画像検索結果 |  |
| 3 | Surgical face mask | 「サージカルフェイスマスク」の画像検索結果「サージカルフェイスマスク」の画像検索結果 |  |
| 4 | Dustproof coat | **A picture containing clothing, person, person, wearing  Description automatically generated** |  |
| 5 | Antistatic wrist band | See the source image |  |
| 6 | Tweezer |  |  |

**3. PELICAN CASE REMOVAL PROCEDURE**

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| Step#1 | | | | | |
| Prepare a clean table and table make the pelican box lie on the bottom side as show in the picture below. | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |

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| Step#2 | | | | | |
| Open the pelican box by lifting the clamps as shown below: | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |

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| Step#3 | | | | | |
| Open the top lid, remove any foam around the satellite if necessary. | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |

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| Step#4 | | | | | |
| Gently hold the satellite in the +X and -X rail corners indicated in yellow squares in the image below and lift the satellite using two hands and place it on a flat table standing on the plus Z side as labeled. | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |
| Step#5 | | | | | |
| Remove Kapton tape 1&2 and lift each side of the bubble wraps. | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |

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| Step#6 | | | | | |
| Remover Kapton tape 3&4 and remove the bubble wrap right round | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |
| Step#7 | | | | | |
| Remover Kapton tape 5&6 and remove the bubble wrap | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |

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| Step#8 | | | | | |
| Remover Kapton tape 7&8 and remove the bubble wrap | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |

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| Step#9 | | | | | |
| Remover Kapton tape 9&10 and remove the bubble wrap | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |
| Step#10 | | | | | |
| Ensure full insertion of RBF pins and take pictures of all faces | | | | | |
|  | | | | | |
| Picture |  | Responsible  person |  | Sign |  |
| Step#11 | | | | | |
| Remover Kapton tape covering end rail switches, use tweezer too if necessary | | | | | |
| Map  Description automatically generated with low confidence | | | | | |
| Picture |  | Responsible  person |  | Sign |  |

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| Step#12 | | | | | |
| Pulling the cable attached to the RBF pins, remove the RBF pins, and perform the JSSOD installation procedure within 30minutes | | | | | |
| A picture containing text, indoor  Description automatically generated | | | | | |
| Picture |  | Responsible  person |  | Sign |  |

**4. SATELLITE J-SSOD INSTALLATION PROCEDURE**

Note: This procedure shall be performed within 30minutes

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| Step#1 | | | | | |
| Carefully hold the satellite in the designated holding positions as shown in the picture below | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |

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| Step#2 | | | | | |
| Holding the -Y rails with left hand and +Y rails with a right hand and gently insert in the JSSOD in the -Z direction | | | | | |
| A picture containing indoor, person, green, room  Description automatically generated | | | | | |
| Picture |  | Responsible  person |  | Sign |  |

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| Step#3 | | | | | |
| As the satellite is inserted to the J-SSOD, slowly remove the thumb without touching the solar cells and push the satellite to the end of the JSSOD | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |
| Step#4 | | | | | |
| Repeat the installation of the satellites in the order as shown in the picture and remove the satellites gently and immediately perform the procedures for re-installation into the shipping case | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |

1. Insert the satellites in the following order:
2. PEARAFRICASAT-1: UGANDA
3. TAKA: JAPAN
4. ZIMSAT-1: ZIMBABWE

**THE PROCEDURES FOR RE-INSTALLATION INTO THE SHIPPING CASE**

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| Step#1 | | | | | |
| Inhibit the satellite by putting Kapton tape and RBF pins | | | | | |
| Map  Description automatically generated with low confidenceA picture containing text, indoor  Description automatically generated | | | | | |
| Picture |  | Responsible person |  | Sign |  |
| Step#2 | | | | | |
| Put the bubble wrap to cover Y&Z faces and fasten with Kapton tape labeled 9&10 and label +Z face | | | | | |
| A picture containing text  Description automatically generated | | | | | |
| Picture |  | Responsible  person |  | Sign |  |

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| Step#3 | | | | | |
| Put the fasten with Kapton tape labeled 7&8 | | | | | |
| A picture containing text  Description automatically generated | | | | | |
| Picture |  | Responsible  person |  | Sign |  |
| Step#4 | | | | | |
| Tape the bubble wrap with Kapton tape labeled 5&6 and wrap around the X&Y faces | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |

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| Step#5 | | | | | |
| Fasten the end with Kapton tape 3&4 | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |

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| Step#6 | | | | | |
| Fold each side of the bubble wraps and fasten with Kapton tape labeled 1&2. Label +Z axis | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |

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| Step#7 | | | | | |
| Put the satellite in the pelican box with +X facing upwards holding the rail positions | | | | | |
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| Picture |  | Responsible  person |  | Sign |  |

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| Step#8 | | | | | |
| Close the pelican box and firmly clamp the locks | | | | | |
| A picture containing indoor  Description automatically generated | | | | | |
| Picture |  | Responsible  person |  | Sign |  |