Kyushu Institute of Technology

Department of Applied Science for Integrated System Engineering

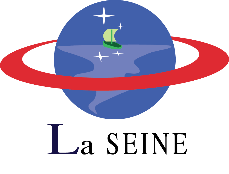
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A close up of a sign

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**FM Assembly Procedure**

Laboratory of Spacecraft Environment Interaction Engineering



|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Revision Number** | **Writer** | **Annotations** |
| 2020/01/01 | 1 | Yiğit ÇAY, Anibal MENDOZA | Initial Release |
| 2020/07/24 | 2 | Yiğit ÇAY | Added Rework Procedure |
| 2020/08/03 | 3 | Nozaki Yuma, Yiğit ÇAY | Modified step #13 at p. 34, updated fasteners checklist at p. 94 |

**1. Introduction**

This document shall be used as a guide to facilitate the proper assembly of the Structural Testing Model of the BIRDS-4 satellites. Necessary steps in the assembly are illustrated with relevant images and a checklist of parts, tools and fasteners required.

**2. Reference Documents**

[1] JX-ESPC-101133-C JEM Payload Accommodation Handbook. Vol 8

**3. Requirements**

1. Be sure to prepare on the day before assembly. Hence assume assembly work will take two days or more inevitably.
2. Perform RTV adhesion work on the preparation day and perform assembly work after 24 hours have elapsed
3. The AIT team shall comprise the following personnel;

* 1 member of structure team
* 1 member of interface team
* 1 member of safety team

1. When using a clean room, wear rubber gloves and hair cap, surgical face mask, dustproof coat.
2. The structure elements and subsystems shall not be assembled with bare hands, appropriate gloves shall be worn
3. During assembly of critical subsystem, at least one member of the critical sub-system must be present. A critical sub-system in this case shall refer to any sub-system that requires a separate assembly protocol other than indicated in this document.
4. If you’re unsure about any part of the procedure, ask the structure subsystem responsible. Do not proceed with assembly if you do not understand a step.
5. Carefully read and observe every precaution documented for each stage of the assembly (if any).

**4. Axis Definition**

The axis of the satellite shall be defined as shown below (Figure 1)

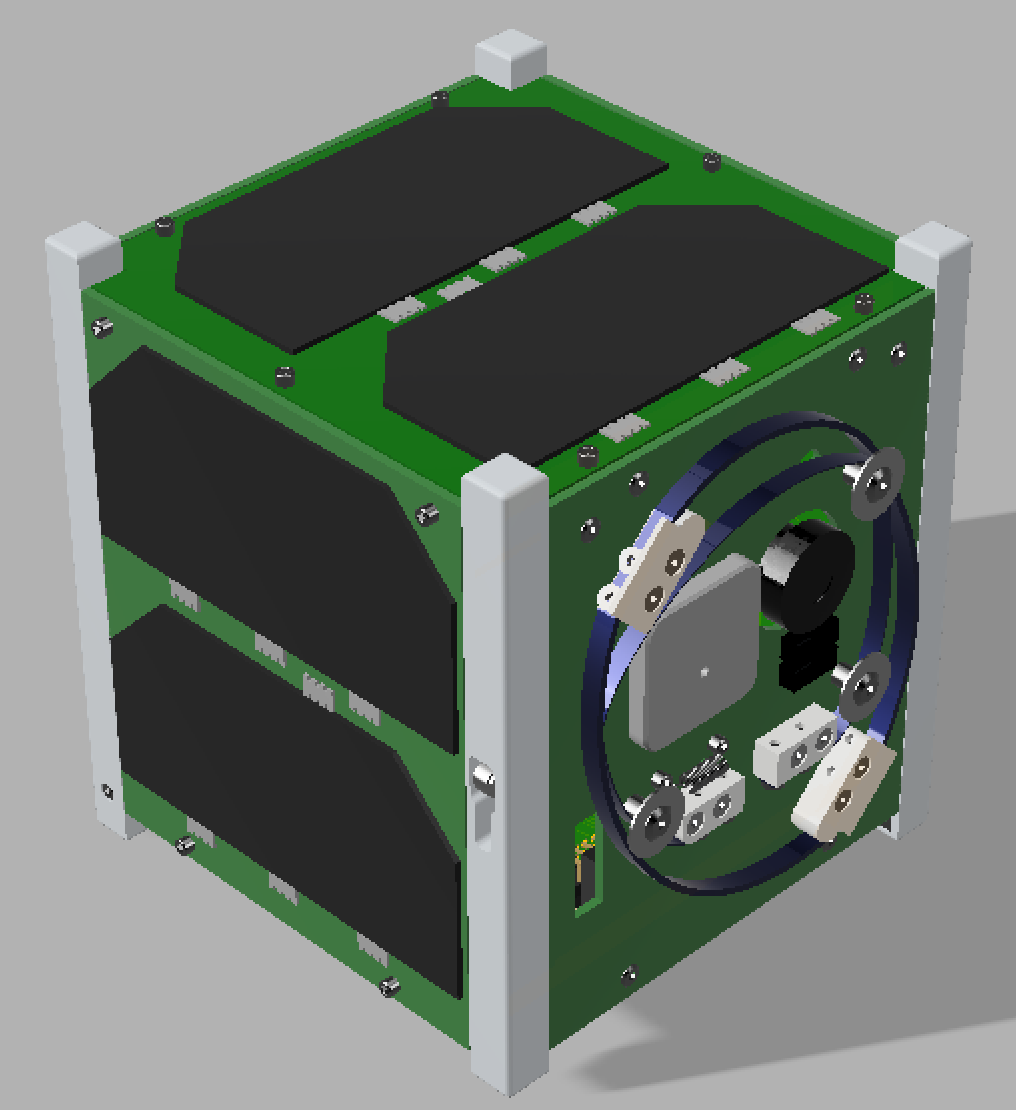
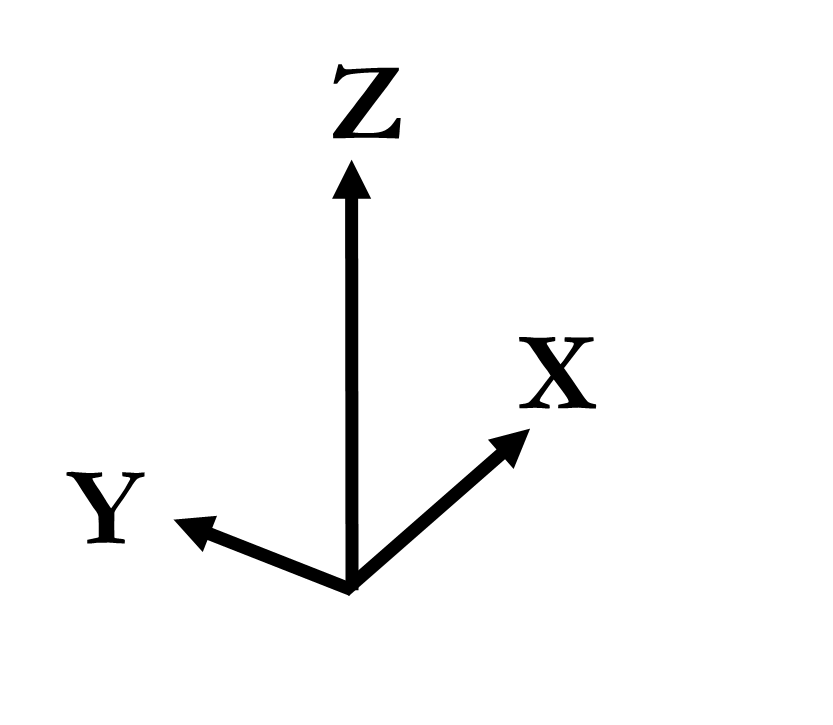


Figure 1 Satellite Axis Definition

**5. Structure Assembly Protocol**

1. **The team member that executes the assembly shall write his initial.**
2. **The AIT/Safety/Verification・member (or any member assigned) shall confirm that all checks were executed.**
3. **A photograph of each assembly step when completed shall be taken.**
4. **The structure should be cleaned with ethanol.**
5. **Hand gloves should be used at all times.**
6. **Care should be taken in handling electronic circuit boards.** **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.**
7. **Pins of extra length protruding from the electronic circuit board should be cut as short as possible to prevent short circuit due to contact with other parts.**
8. **All metal parts such as electronic circuit boards and deployment switches need to be insulated by pasting Kapton tape.**

**General Precautions**

1. **Confirm the torque for all fasteners before you tighten. Ensure you apply the required torque using the torque drive.**
2. **Always use the Support Provided for the Satellite structure, do not place directly on the table.**
3. **If unsure of a step, ask the Structure team members.**

**Day 1 (Preparation day)**

**Working process**

1. **Preparation and confirmation of the tools to be used**
2. **Preparation and confirmation of the parts to be used and weighing each parts**
3. **Preparation and confirmation of the fasteners to be used / Loctite application**
4. **Preparation of electronic circuit board**

* **Fix camera and GPS module to mission board by soldering and screws.**
* **Cut all extra length pins protruding from the electronic circuit board as short as possible.**
* **Insulate all metal parts such as electronic circuit boards and deployment switches with Kapton tape.**

1. **Assembling the battery**
2. **Assembling the reaction wheel**
3. **Inserting coil inserts to the PEEK frames**
4. **Assembling the -Y panel**
5. **Preparation and confirmation of the tools to be used**

|  |  |  |  |
| --- | --- | --- | --- |
| **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** | **https://jp.images-monotaro.com/Monotaro3/pi/full/mono39496493-140515-02.jpg** |  |
| **5** | **Torque driver socket (2 types)** |  |  |
| **6** | **Bit conversion adapter** |  |  |
| **7** | **Extension bit** |  |  |
| **8** | **Square** |  |  |
| **9** | **Digital tester** | 「テスター」の画像検索結果 |  |
| **10** | **Wire stripper** | 「ワイヤーストリッパー」の画像検索結果 |  |
| **11** | **Crimper** |  |  |
| **12** | **Vernier caliper** | 「ノギス」の画像検索結果 |  |
| **13** | **Height gauge** | 「ハイトゲージ」の画像検索結果 |  |
| **14** | **Digital weighing scale** |  |  |
| **Per Team** | | | |
| **15** | **Torque Driver (to be used for 0.09 and 0.176 N.m)** |  |  |
| **16** | **Hex bit 1.27 mm** | 56 ヘックスビットB 東日製作所 02469223 |  |
| **17** | **Hex bit 1.50 mm** |  |  |
| **18** | **Tweezers** | http://g01.a.alicdn.com/kf/HTB1CxsFKpXXXXX1aXXXq6xXFXXXa.jpg「ピンセット 逆作動」の画像検索結果 |  |
| **19** | **Scissors** | 「はさみ」の画像検索結果 |  |
| **20** | **Pliers** | 「ペンチ」の画像検索結果 |  |
| **21** | **Kapton tape** | 「カプトンテープ」の画像検索結果「カプトンテープ」の画像検索結果 |  |
| **22** | **Alcohol** | 「洗浄ボトル」の画像検索結果 |  |
| **23** | **KimWipes** | 「キムワイプ」の画像検索結果 |  |
| **24** | **Antistatic wrist strap** | 「静電気防止　リストバンド」の画像検索結果 |  |
| **25** | **Marker** | 「マッキーペン」の画像検索結果 |  |
| **26** | **Precision screwdriver** | M6SD 精密ドライバーセット モノタロウ 20366578 |  |
| **27** | **Spatula** |  |  |
| **28** | **Loctite 263 glue** | https://jp.images-monotaro.com/Monotaro3/pi/full/mono34933543-161109-02.jpg |  |
| **29** | **Araldite glue** | AR-S30 スタンダード 高性能エポキシ系強力接着剤 アラルダイト 33240715 |  |
| **30** | **Work table for assembly** |  |  |
| **31** | **Insertion tool (with tap handle)** |  |  |
| **32** | **Magnetic breaker** |  |  |
| **33** | **Paper clips (3)** | https://lh5.googleusercontent.com/Wl0XqDg5C1Sm3y0z7BCCMV9utVQLcKoQFvAg3J2AwQzS7mOsXexBw0itcrjlKRuWPLZ_xmZenMxB9ongh2mZI5jaKkiZCRP-pskokFXB7M8ohV7IhSMxP-aUoNqr1AtFE8zIqWd5 |  |

1. **Preparation and confirmation of the parts to be used and weighing each parts**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Step# | Parts | Picture | Qty. | Check |
| 1 | 1, 2, 3 | Battery case |  | 1 |  |
| 2 | 1 | Battery heater |  | 1 |  |
| 3 | 1, 2 | Insulator |  | 6 |  |
| 4 | 2 | Battery |  | 1 |  |
| 5 | 2 | Thermistor |  | 1 |  |
| 6 | 3 | Battery cover |  | 1 |  |
| 7 | 9 | Nichrome wire |  | 1 |  |
| 8 | 9~27 | -Y panel |  | 1 |  |
| 9 | 11 | Antenna fixture (right) |  | 1 |  |
| 10 | 11 | Antenna fixture (left) |  | 1 |  |
| 11 | 11 | Antenna fixture (left, extended) |  | 2 |  |
| 12 | 12 | Dipole antenna (UHF) 18.3 mm |  | 2 |  |
| 13 | 12 | Dipole antenna (VHF) 48.8 mm |  | 2 |  |
| 14 | 13 | PE line |  | 1 |  |
| 15 | 33~36 | Deployment switch |  | 2 |  |
| 16 | 33, 34, 37 | Deployment switch (roller type) |  | 1 |  |
| 17 | 36, 38, 42 | Rail 1 (Frame 5A) | Different hole | 1 |  |
| 18 | 31, 36, 39 | Rail 2 (Frame 5B) |  | 1 |  |
| 19 | 31, 32, 37, 38, 42 | Rail 3 (Frame 6X) |  | 1 |  |
| 20 | 31, 39 | Rail 4 (Frame 6Y) |  | 1 |  |
| 21 | 31 | Frame 4 |  | 8 |  |
| 22 | 35, 36 | Frame 7 |  | 2 |  |
| 23 | 39 | Baseplate 1 (Frame 1) |  | 1 |  |
| 24 | 7, 38, 43, 44, 55 | Baseplate 2 (Frame 1F) |  | 2 |  |
| 25 | 40, 42 | Baseplate 3 (Frame 2) |  | 2 |  |
| 26 | 43, 44, 59, 64 | Baseplate 4 (Frame 2S) |  | 2 |  |
| 27 | 8, 43, 44, 55 | Baseplate 5 (Frame 3) |  | 1 |  |
| 28 | 41, 45 | Back plane Board |  | 1 |  |
| 29 | 47 | Front  Access  Board  (FAB) |  | 1 |  |
| 30 | 47 | RBF pin |  | 2 |  |
| 31 | 49 | OBC/EPS Board |  | 1 |  |
| 32 | 30, 53, 58, 68 | COM Board |  | 1 |  |
| 33 | 50~52, 58, 68 | Mission Board 1 |  | 1 |  |
| 34 | 28, 46, 58, 68 | Mission Board 2 |  | 1 |  |
| 35 | 29, 46 | Rear  Access Board  (RAB) |  | 1 |  |
| 36 | 53, 58, 68 | coaxial cable (UHF) |  | 1 |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 37 | 47, 58, 68 | coaxial cable (VHF) | 「MMCX SMA ケーブル」の画像検索結果  MMCX – SMA  (Mission Board 2 side / -Y panel side) | 1 |  |
| 38 | 58, 68 | coaxial cable (GPS) | uFL – MMCX  (Mission Board 1 side / -Y panel side) | 1 |  |
| 39 | 58, 68 | Coaxial cable  (HNT) | C:\Users\J_roc\Downloads\IMG_1690.JPG  uFL – uFL  (Mission Board 1 side / -Y panel side) | 1 |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 40 | 62, 63 | ±X panel |  | 2 |  |
| 41 | 61 | -Z panel |  | 1 |  |
| 42 | 67 | +Z panel |  | 1 |  |
| 43 | 66 | +Y panel |  | 1 |  |
| 44 | 70 | Separation spring |  | 2 |  |
| 45 | 6 | Brushless motor (reaction wheel) |  | 1 |  |
| 46 | 5, 6 | Reaction wheel holder plate |  | 1 |  |
| 47 | 4, 5 | Reaction wheel holder – Separator 1 |  | 2 |  |
| 48 | 4, 5 | Reaction wheel holder – Separator 2 |  | 2 |  |

1. **Preparation and confirmation of the fasteners to be used / Loctite application**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Fasteners Checklist** | | | | | | | | |
| **Note** | | **The fasteners to be applied Loctite during the assembly are written in bold.** | | | | | | |
| **No.** | **Step#** | | **Type** | **Part No** | **Length** | **Qty.** | **Vendor** | **Check** |
| 1 | 3 | | Screw | CBSTSR 2-5 | 5 | 8 | MISUMI |  |
| 2 | 4 | | Coil Insert | ES-M2-0.4-2D-SUS | 4 | 4 | MISUMI |  |
| 3 | 5 | | Screw | SNSS-M2-6-SD | 6 | 4 | MISUMI |  |
| 4 | 6 | | Screw | SNSS-M2-4-SD | 4 | 4 | MISUMI |  |
| 5 | 6 | | Screw | CBSTSR 2-4 | 4 | 1 | MISUMI |  |
| 6 | 6 | | Nut | SHNS-M2 | N/A | 5 | MISUMI |  |
| 7 | 7 | | Coil Insert | ES-M2-0.4-2D-SUS | 4 | 8 | MISUMI |  |
| 8 | 8 | | Coil Insert | ES-M2-0.4-2D-SUS | 4 | 4 | MISUMI |  |
| **9** | **9** | | **Screw** | **SNSS-M2-4-SD** | **4** | **2** | **MISUMI** |  |
| **10** | **9** | | **Nut** | **SHNS-M2** | **N/A** | **2** | **MISUMI** |  |
| **11** | **10** | | **Screw** | **CBSTSR 3-10** | **10** | **3** | **MISUMI** |  |
| 12 | 10 | | Washer | Antenna cover | N/A | 3 | KyuTech |  |
| 13 | 10 | | Spacer | CU-305PH D3-L5 | 5 | 3 | MISUMI |  |
| **14** | **10** | | **Nut** | **SLBNR3** | **10** | **3** | **MISUMI** |  |
| **15** | **11** | | **Screw** | **SSHS-M2-8** | **8** | **8** | **MISUMI** |  |
| **16** | **11** | | **Nut** | **SHNS-M2** | **N/A** | **8** | **MISUMI** |  |
| **17** | **12** | | **Screw** | **SSHS-M2-6** | **6** | **8** | **MISUMI** |  |
| 18 | 28 | | Screw | SLHS-M2-8 | 8 | 2 | MISUMI |  |
| 19 | 28 | | Spacer | C-302.5-5 | 2.5 | 2 | Hirosugi-Keiki |  |
| 20 | 28 | | Nut | SHNS-M2 | N/A | 2 | MISUMI |  |
| 21 | 29 | | Screw | SNSS-M3-6-FC | 6 | 1 | MISUMI |  |
| 22 | 29 | | Nut | SLBNR-3 | 10 | 1 | MISUMI |  |
| 23 | 30 | | Screw | M2-4-12 | 12 | 8 | - |  |
| 24 | 31 | | Screw | SNSS-M2-5 | 5 | 16 | MISUMI |  |
| 25 | 32 | | Screw | SNSS-M2-5 | 5 | 2 | MISUMI |  |
| **26** | **36** | | **Screw** | **SNSS-M1.6-5** | **5** | **2** | **MISUMI** |  |
| 27 | 37 | | Screw | SLHS-M2-8 | 8 | 2 | MISUMI |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Fasteners Checklist** | | | | | | | | |
| **Note** | | **The fasteners to be applied Loctite during the assembly are written in bold.** | | | | | | |
| **No.** | **Step#** | | **Type** | **Part No** | **Length** | **Qty.** | **Vendor** | **Check** |
| 28 | 38 | | Screw | SNSS-M2-4 | 4 | 2 | MISUMI |  |
| 29 | 39 | | Screw | SNSS-M2-4 | 4 | 2 | MISUMI |  |
| 30 | 40 | | Screw | SNSS-M2-4 | 4 | 2 | MISUMI |  |
| 31 | 42 | | Screw | SNSS-M2-4 | 4 | 2 | MISUMI |  |
| **32** | **43** | | **Screw** | **SNSS-M2-4** | **4** | **16** | **MISUMI** |  |
| 33 | 45 | | Screw | SLHS-M2-8 | 8 | 4 | NBK |  |
| 34 | 47 | | Rod | FABS-M3-L96 | 96 | 2 | MISUMI |  |
| 35 | 47 | | Spacer | C-305-0 | 5 | 2 | Hirosugi-Keiki |  |
| 36 | 47 | | Nut | SLBNR3 | N/A | 2 | MISUMI |  |
| 37 | 48 | | Spacer | C-3017-5 | 17.5 | 2 | Hirosugi-Keiki |  |
| 38 | 49 | | Spacer | C-306-0 | 6 | 1 | Hirosugi-Keiki |  |
| 39 | 50 | | Spacer | C-305-5 | 5.5 | 2 | Hirosugi-Keiki |  |
| 40 | 53 | | Screw | SNSS-M2-6-SD | 6 | 4 | MISUMI |  |
| 41 | 54 | | Spacer | C-315-0 | 15 | 2 | Hirosugi-Keiki |  |
| 42 | 54 | | Spacer | C-308-0 | 8 | 2 | MISUMI |  |
| 43 | 54 | | Spacer | C-309-0 | 9 | 2 | MISUMI |  |
| 44 | 54 | | Spacer | C-309-5 | 9.5 | 2 | MISUMI |  |
| 45 | 54 | | Nut | SLBNR3 | N/A | 2 | MISUMI |  |
| **46** | **55** | | **Screw** | **SNSS-M2-4** | **4** | **4** | **MISUMI** |  |
| 47 | 56 | | Rod | FABS-M3-L96 | 96 | 2 | MISUMI |  |
| 48 | 56 | | Nut | SLBNR3 | N/A | 2 | MISUMI |  |
| 49 | 56 | | Spacer | C-305-0 | 5 | 2 | Hirosugi-Keiki |  |
| 50 | 56 | | Spacer | C-3017-5 | 17.5 | 2 | Hirosugi-Keiki |  |
| 51 | 56 | | Spacer | C-306-0 | 6 | 1 | Hirosugi-Keiki |  |
| 52 | 56 | | Spacer | C-305-5 | 5.5 | 2 | Hirosugi-Keiki |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Fasteners Checklist** | | | | | | | | |
| **Note** | | **The fasteners to be applied Loctite during the assembly are written in bold.** | | | | | | |
| **No.** | **Step#** | | **Type** | **Part No** | **Length** | **Qty.** | **Vendor** | **Check** |
| 53 | 56 | | Spacer | C-315-0 | 15 | 2 | Hirosugi-Keiki |  |
| 54 | 56 | | Spacer | C-309-5 | 9.5 | 2 | Hirosugi-Keiki |  |
| 55 | 57 | | Nut | SLBNR3 | N/A | 2 | MISUMI |  |
| 56 | 59 | | Screw | SNSS-M2-4 | 4 | 4 | MISUMI |  |
| **57** | **61** | | **Screw** | **SNSS-M2-6-SD** | **6** | **6** | **MISUMI** |  |
| **58** | **62** | | **Screw** | **SNSS-M2-6-SD** | **6** | **4** | **MISUMI** |  |
| **59** | **63** | | **Screw** | **SNSS-M2-6-SD** | **6** | **4** | **MISUMI** |  |
| **60** | **64** | | **Screw** | **SNSS-M2-4** | **4** | **4** | **MISUMI** |  |
| **61** | **65** | | **Rod** | **FABS-M3-L96** | **96** | **4** | **MISUMI** |  |
| **62** | **65** | | **Nut** | **SLBNR3** | **N/A** | **8** | **MISUMI** |  |
| **63** | **66** | | **Screw** | **SNSS-M2-6-SD** | **6** | **4** | **MISUMI** |  |
| **64** | **67** | | **Screw** | **SNSS-M2-6-SD** | **6** | **6** | **MISUMI** |  |
| **65** | **69** | | **Screw** | **CBSTSR 2-6** | **6** | **6** | **MISUMI** |  |
| **66** | **70** | | **Separation Spring** | **-** | **-** | **2** | **JAXA** |  |

1. **Preparation of the electronic circuit boards**

|  |  |  |  |
| --- | --- | --- | --- |
| **Adhesive Applied Location Checklist** | | | |
| **No.** | **Boards** | **Position** | **Check** |
| **1** | **Mission Board 2** | **Camera** |  |
| **2** | **Mission Board 1** | **GPS connector** |  |
| **3** | **Mission Board 1** | **Reaction wheel cable connection** |  |
| **4** | **-Y panel** | **GPS module** |  |
| **~~5~~** | **FAB** | **RBF pin connector** |  |
| **6** | **-Y panel** | **Photodiode** |  |
| **7** | **-Y panel** | **Perovskite solar cells** |  |
| **8** | **-X panel, -Z panel, Mission Board 1** | **Magnetorquer** |  |

* **Cut all extra length pins protruding from the electronic circuit board as short as possible.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Cutting Location Checklist** | | | |
| **No.** | **Boards** | **Position** | **Check** |
| **1** | **Back Plane Board** | **Solar cell connection pins** |  |
| **2** | **Back Plane Board** | **All 50 pin connector** |  |
| **3** | **FAB** | **50 pin connector** |  |
| **4** | **FAB** | **Front access connector (right)** |  |
| **5** | **FAB** | **RBF** |  |
| **6** | **FAB** | **Solar cell connection pins** |  |
| **7** | **FAB** | **Front Access connector**  **(left)** |  |
| **8** | **OBC board** | **50 pin connector** |  |
| **9** | **COM board** | **50 pin connector** |  |
| **10** | **Mission Board 1** | **50 pin connector** |  |
| **11** | **Mission Board 2** | **Camera connection pins** |  |
| **12** | **Mission Board 2** | **APRS module pins** |  |
| **13** | **RAB** | **50 pin connector** |  |
| **14** | **RAB** | **Transistor (FET) pins** |  |

* **Insulate all metal parts such as electronic circuit boards and deployment switches with Kapton tape.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Taping Location Checklist** | | | |
| **No.** | **Parts** | **Position** | **Check** |
| **1** | **Backplane** | **Solar cell connection pin** |  |
| **2** | **Backplane** | **All 50 pin connector** |  |
| **3** | **Backplane** | **2 corners**  **(to prevent harness cutting of the deployment switch)** |  |
| **4** | **FAB** | **50 pin connector** |  |
| **5** | **FAB** | **Battery connector** |  |
| **6** | **FAB** | **RBF** |  |
| **7** | **FAB** | **Front Access connector** |  |
| **8** | **FAB** | **Solar cell connection pin** |  |
| **9** | **OBC Board** | **50 pin connector** |  |
| **10** | **COM Board** | **50 pin connector** |  |
| **11** | **COM Board** | **Front surface** |  |
| **12** | **COM Board** | **Back surface** |  |
| **13** | **Mission Board 1** | **50 pin connector** |  |
| **14** | **Mission Board 1** | **Magnetorquer** |  |
| **15** | **Mission Board 2** | **50 pin connector** |  |
| **16** | **Mission Board 2** | **Camera module connector** |  |
| **17** | **RAB** | **50 pin connector** |  |
| **18** | **Deployment switch** | **Harness connection part** |  |
| **19** | **Dipole Antennas** | **Wire attachment part** |  |
| **20** | **Roller type deployment switch** | **Harness connection part** |  |

**Precautions for tightening screws**

1. **In order to apply force as evenly as possible, please tighten the screw so that it is diagonal to the screw that you just tightened. As the order of screw tightening is stated, please follow it.**
2. **Please tighten by hand without applying torque at first.**

**Instead of tightening them all at once, please be sure to tighten them separately several cycles.**

**The depth of tightening within one cycle should be the same.**

**At this time, please stop just before the screw head hits.**

1. **Next, please apply torque in the same order as above.**
2. **If screws are difficult to fit, do not try to force them, please remove all screws once and try again. When redoing, please shorten the tightening depth and repeat several cycles and gradually tighten.**
3. **Please ensure the end creep of the coil insert is located inside the part. After inserting the coil check to insure the open side of the insert is at the same level as the surface of the part.**
4. **Next, please break the end creep of the coil insert with breaking tool and make sure the creep end is out safely.**

**Precautions for Loctite (fastener bond)**

1. **Preliminarily clean the surface to be coated with Loctite by alcohol.**
2. **Fix fasteners within 20 minutes after application of the Loctite.**
3. **Maintain the satellite in a clean room for 24 hours to dry the Loctite after assembly.**
4. **Wipe off the residue when using the Loctite.**
5. **Assembling the battery**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **1** | **Install the insulator in the battery case and attach the temperature sensor** | | | | |
|  | | | Parts | | | |
| Name | | Qty. | Check |
| Battery case | | 1 |  |
| Insulator | | 5 |  |
| Battery heater | | 1 |  |
| Harness | | | |
| Connection source | Access point | Qty. | Check |
| Battery case | - | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **2** | **Install the battery in the battery case and attach the temperature sensor** | | | | |
| **Note** | **Pass the battery and heater harness through the hole of the battery case.**  **After inserting the battery, cover the insulator from above.** | | | | | |
|  | | | Parts | | | |
| Name | | Qty. | Check |
| Battery case | | 1 |  |
| Temperature sensor | | 1 |  |
| Battery set (3 cells per set) | | 2 |  |
| Insulator | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **3** | **Lock the battery case with the battery cover** | | | | | | | |
| **Note** | **Pay attention to the order of tightening the screws** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Battery case | | | | | 1 |  |
| Battery cover | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [1] CBSTSR  2-5 | | 1.27 | 0.176 | 8 |  |
| Harness | | | | | | |
| Connection source | | Access point | | | Qty. | Check |
| Battery set | | - | | | 2 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Responsible | |  | | | | |

1. **Assembling the Reaction Wheel**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **4** | **Attach the coil inserts to the separators** | | | | | | | |
| **Note** | **After inserting the coil check to insure the open side of the insert is at the same level as the surface of the part** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Reaction wheel holder – Separator 1 | | | | | 2 |  |
| Reaction wheel holder – Separator 2 | | | | | 2 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Coil Insert | [2] ES-M2-0.4-2D-SUS | | - | - | 4 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Responsible | |  | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **5** | **Screw the plate to the separators** | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Reaction wheel holder – Separator 1 | | | | | 2 |  |
| Reaction wheel holder – Separator 2 | | | | | 2 |  |
| Reaction wheel holder plate | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [3] SNSS-M2-6-SD | | 1.5 | - | 4 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Responsible | |  | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **6** | **Screw reaction wheel to the plate** | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Reaction wheel holder plate | | | | | 1 |  |
| Reaction wheel | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [4] SNSS-M2-4-SD | | 1.5 | 0.176 | 4 |  |
| Screw | ［5］ CBSTSR  2-4 | | 1.27 | 0.176 | 1 |  |
| Nut | [6] SHNS-M2 | | - | - | 5 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Responsible | |  | | | | |

1. **Inserting coil inserts to the PEEK frames**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **7** | **Attach the coil inserts to the Frame 1F** | | | | | | | |
| **Note** | **After inserting the coil check to insure the open side of the insert is at the same level as the surface of the part.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Frame 1F | | | | | 2 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Coil Insert | [7] ES-M2-0.4-2D-SUS | | - | - | 8 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Responsible | |  | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **8** | **Attach the coil inserts to the Frame 3** | | | | | | | |
| **Note** | **After inserting the coil check to insure the open side of the insert is at the same level as the surface of the part.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Frame 3 | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Coil Insert | [8] ES-M2-0.4-2D-SUS | | - | - | 4 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Responsible | |  | | | | |

1. **Assembling the -Y panel**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **9** | **Attach the Nichrome wire to the –Y panel** | | | | | | | |
| **Note** | **Apply Loctite to fasteners (see p. 24)** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| -Y panel | | | | | 1 |  |
| Nichrome wire | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [9] SNSS-M2-4-SD | | 1.5 | 0.176 | 2 |  |
| Nut | [10] SHNS-M2 | | - | - | 2 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque mark | |  | | **Loctite** | |  |
| Responsible | |  | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **10** | **Attach the inadvertent Antenna deployment prevention device to the -Y panel** | | | | | | | |
| **Note** | **Apply Loctite to fasteners (see p. 24)** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| -Y panel | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [11] CBSTSR  3-10 | | 1.5 | 0.63 | 3 |  |
| Washer | [12] Antenna cover | | - | - | 3 |  |
| Spacer | [13] CU-305PH  D3-L5 | | - | - | 3 |  |
| Nut | [14] SLBNR3 | | - | - | 3 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque mark | |  | | **Loctite** | |  |
| Responsible | |  | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **11** | **Attach the Antenna connector and the Antenna fixture to the -Y panel** | | | | | | | |
| **Note** | **Apply Loctite to fasteners (see p. 24)** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| -Y panel | | | | | 1 |  |
| Antenna fixture right | | | | | 1 |  |
| Antenna fixture left | | | | | 1 |  |
| Antenna fixture left extended | | | | | 2 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [15] SSHS-M2-8 | | 1.27 | 0.176 | 8 |  |
| Nut | [16] SHNS-  M2 | | - | - | 8 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque mark | |  | | **Loctite** | |  |
| Responsible | |  | | | | |
| **Step#** | **12** | **Attach the dipole antennas to the Antenna fixture** | | | | | | | |
| **Note** | **Apply Loctite to fasteners (see p. 24)** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| -Y panel | | | | | 1 |  |
| Dipole UHF antennas 18.3 mm | | | | | 2 |  |
| Dipole VHF antennas 48.8 mm | | | | | 2 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [17] SSHS-M2-6 | | 1.27 | 0.09 | 8 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque mark | |  | | **Loctite** | |  |
| Responsible | |  | | | | |
| **Step#** | **13** | **Tie antenna** | | | | | | | |
| **Note** | **Tie by two half-hitches. One string is on the top, another is on the bottom.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| -Y panel | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | | Torque  [N.m] | Qty. | Check |
| PE line (fishing string) | | | | - | 2 |  |
| Checklist | | | | | | |
| Picture | |  | | | | |
| Responsible | |  | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **14** | **Tie antenna** | | | | |
| **Note** | **Bend the right side UHF antenna** | | | | | |
| https://lh5.googleusercontent.com/uCO2w-COJ8uPwBEvba5PtzSi6GU7EiT3FUxJTnNs0qRVMOKlWKHk54OR7QuIFRNI5CGuhei1vCAu3GGXBxmUvgyzA0bMvot3cJXr-qBePn0GUA52lSBuoM5uxLjMILRWZcBULLpw | | | Parts | | | |
| Name | | Qty. | Check |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **15** | **Tie antenna** | | | | |
| **Note** | **Stow all antennas by rolling the lower VHF antenna in counterclockwise direction.** | | | | | |
| https://lh6.googleusercontent.com/K6ZGGnIa4jLryCRlUKv1yCuswszKZilfRd8NzkXUiy_s5Z5pDHaAmTd1HL1pi9uC4Ci5Z01qRK42EKO8GmEuvYAYW02HZicICzQ47YXutRcYrXdZ0227_PwNBCwbRsmgU2y1ZbtB  https://lh3.googleusercontent.com/pi_q_0p_IIazpd4eht4PR6rzZhSQqDTYQquqK3zcvotcAo6nekbpU2PXbcuyYqv-cDyqxPtfQvpufc3efU1oEFW1y5qlJ9M8JW3-kTnIitejGMpPFzI-oC-OTT61xKnyRazLPE6O | | | Parts | | | |
| Name | | Qty. | Check |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **16** | **Fix the right side by the paper clip.** | | | | |
| **Note** | **Upper VHF antenna is rolled to the left side.** | | | | | |
| https://lh4.googleusercontent.com/_rRn_dypJ7d5X-M4CpLXnIQQYfs8E8axSAOte2OcDgzJD2_GkRXzsNgMVtRSfKZA-Mmqm5KaFkaG-QvcJ0whaBcF_OUL5hjbzMKo3pj8K8q0yLjb0s_ogY3sIh8aeSgdYq2pi2Ld  https://lh6.googleusercontent.com/0vfRRWAY30rHVQBOfFunw7J7kMNArI9gbb_2A1J4salHunbDV3qqS2bQCPgN_HPyuVKvlhaUqmgBVCazeoadueTqpnXIlZUy45rfb9UPleqL_zxAuE4TvYiMK36it4aTYTyAAuv7 | | | Parts | | | |
| Name | | Qty. | Check |
| Paper clip | | 1 |  |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **17** | **Lift up the stowed antennas with tweezer** | | | | |
| **Note** | **Ensure not harming the panel and firmly hold the stowed antenna.** | | | | | |
| https://lh4.googleusercontent.com/7lrQhsF2vQEoN9pSYIkI2Fkgyk_G18HCuF3uPOMFKp9mMdl7Z23dngg82N4ZlnoYG0mjZ8o5f4Bld-EqwYzza3T6e0xapMm3T6C3jTxJub7taaJkKJm4GlA4bBjyANIHiT3MOL4Y  https://lh3.googleusercontent.com/ZwDRD53lwbUwVphXQ6IdxllsYRrMtp_WqeIj7gNLNnG7U4SHISUFMJI3vHHQr6qgAP8g0w4lqxX2z7MjvwyaclQWqalnCr5O1ZkND8TPLZCnaCfbxUaqjvNxlh9LJMbNNSbNrmgz | | | Parts | | | |
| Name | | Qty. | Check |
| Tweezer | | 1 |  |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **18** | **Pull the strings towards the first paper clip** | | | | |
| **Note** | **Strings must go under the antennas. Attach the strings with paper clips.** | | | | | |
| https://lh6.googleusercontent.com/dckag5pAxfN2O-7HZ-9ki7psZdIQleX45umNys9p6qHvLTH4R5v0H3JFrmVlW6Cy2QpGGTobrZo7rZLD8_6XODZq1QGrkKZngL-l0WzWA_LQNezJqashi7_j4jUITMBo2Ks38-wl  https://lh6.googleusercontent.com/4FrRgub81iP2co4RORkhD3ZVwwwlWh9tRCinNOnbRgktQyW5-AjUsFDnZW6p3Yw_4TQjK69LJH6O8hqF5gUVoQt0qo1ywlis7pBp6Xvk9oTqzpn24gTJUcHCZQGRLWOLdln8YIAj | | | Parts | | | |
| Name | | Qty. | Check |
| Paper clip | | 2 |  |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **19** | **Separate the strings** | | | | |
| **Note** | **One string is connected to upper VHF antenna’s end while the other is separated.** | | | | | |
| https://lh5.googleusercontent.com/ujjZbjWrziw_QSn_PUQSxaNnT914W_y44D9WwElHs1X3OtKE9KgReGY38eNcI15uJ2lo8p6zN3tpnBNSWZCFPrPlVZ5uAHEcZKfrj3tsyGtnLYl-ROgDr_q6Nb6Mbp_JnQmQPCSg  https://lh5.googleusercontent.com/U90aEzyjPWGGpkUMFQnbm4AgN6u6swxfvAr9pLlv8AV7D1v2NB4Wg6k9Ru-uEeIBYiCijMypYIizVZMaxc8sfIJj7LGzRQPLUK8qGsBVDjMbw_N03bcezE1uYL9bF7kr6E_Hee4R  https://lh3.googleusercontent.com/JvgE3bTKzWkwqC7DiZKc2lyO_I7Mf_4gQuz9IN1F4Gdu_OHH8DLtS6f0MHes7BioCBzvBln80gi3me91E_JZr2PwPScFfhSB_n1fV7HAYtIcCJaFUMN7bnOEKkEgtsoyki9Mm3Vu | | | Parts | | | |
| Name | | Qty. | Check |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **20** | **Lift up the stowed antennas with tweezer once more** | | | | |
| **Note** | **Ensure not harming the panel and thread could pass easily.** | | | | | |
| https://lh6.googleusercontent.com/CJ-mKGivdFQHXNg7DPskkp-SJ5Icuzf4CE1gH8UmvWGWJ8p2oszejg1uKV2wIAyWVXaRZOHOKazQ5t4hIUBxg293wH-mn0cY9w6TMGXJIHxFUmn3AnteCSFhN14doE301_ZEKysJ  https://lh3.googleusercontent.com/Yx7EDTSuJWQZJvsEZ85EHglfWOV__LXalPsCi9LD4we6zntK2xoCC3MVRi8drzcQpWowywcTwOEMvz4-0_b-cUu1SZziEk4luCd0x17osSAM-OrIA6AdgFqUaXFWnxVnO0XYiePF | | | Parts | | | |
| Name | | Qty. | Check |
| Tweezer | | 1 |  |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **21** | **Push the first string to the inner side of the panel** | | | | |
| https://lh5.googleusercontent.com/jGTe2R0HtjLzGzfqaIJQZI4mpieAI1v9UkA-RjRXIxQzhDCxZ9KSMJ10yUReW4K7Omzf6joarjlY21CfvneBbxV_8i-Q1z1KpWNJsIq--_t73eBS0cT2nIJsknC0cLB5xGUstDz0  https://lh4.googleusercontent.com/OVUbP-rcJ7vT1CieCx373qsjgAqd95hw0uZ2uNNb8vcewB78YgCyKc161HpqVz9vzcn99SLEX4dgzJSlcy6ycZv2AJMBkiThSymvIjEMvwDHzO1ofqJz58ECoGkCaTU1jtsk-TFN | | | Parts | | | |
| Name | | Qty. | Check |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **22** | **Push the second string to the inner side of the panel through the second hole.** | | | | |
| https://lh4.googleusercontent.com/kPM5eMRvUfVNjeTw21IXQ3IiFOJhSTL1G2CYtFMFQuE1E-gNZZwZSsIQg0z0jPYnaKs0zs4RjhK96PG7bLsruW20dlkSTOU8OQ-HSx_vEC_0QwZnGhdmj5c9PeEE_I5zhewqYlXe  https://lh3.googleusercontent.com/Tf5VdDROEHbliWxmoYDoW6776kDj67C6JhNFF-9FZCB-DM8ESK4tMItSJPNrYRs7Y9aEG5r7njdAM7AK6_BnY3kB8OKPPqbCldw1rFal0OkUUavLSoyODXfpz0d_2iFMRu4U0Ru2  https://lh3.googleusercontent.com/KxEVUdROTN99-UF7Qe0tzWnsb1CzFcYZMfYTCxO3mJ8KM5zDHot_bpIHECqe4y-IGp9GBAcKuSqUzqhEinedX-c40oIzXoDUONHLsmKGsUXWPIdwlcjl0KUH3aCzXfwUIYIlgg-8 | | | Parts | | | |
| Name | | Qty. | Check |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |
| **Step#** | **23** | **Gently pull the two strings** | | | | |
| https://lh5.googleusercontent.com/cnGHdkuBuZdYtz0aZb9PWggMwEP4T94cbf77MmzPorFAuHD2yPiC_NFDl8LhPbE1C4jowl3F2IPMdgB7ojPY4yJ1UtlhS7H1ROfvsQbfjH_T9yicmbFfm9t_dw8a6aR5IMfAh_jy | | | Parts | | | |
| Name | | Qty. | Check |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |
| **Step#** | **24** | **Attach another paper clip to lock the strings.** | | | | |
| https://lh3.googleusercontent.com/JY76_pv2kmaHBezQHav4HnF88qTOLTu--QIn6i8o-k54X6Wu-lPEaj9KHmpF-Qg-wgdL4EkApuyK7Vwwt6CKNoHgTdKEd0-bYCSTCAiQMvMBpkcCxa2oUF3rQLaPc98_24VIVPA0  https://lh5.googleusercontent.com/nvpHGph8eOJm3XEaZPjgZjiHCz3T8xPcpUguUARmdFLdUpENVf4iTyCHwcAMhez6vqQ1ao9eM125JHmVOEr_vwoF1Xd8LWxOtLGnGSjKErpTwvO3iCgt_TqwfGTm99nbO1jTp1jf | | | Parts | | | |
| Name | | Qty. | Check |
| Paper clip | | 1 |  |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **25** | **Push the strings in following directions around burner coil** | | | | |
| https://lh4.googleusercontent.com/A1mmGlYg4XHuEHRZCsMKHVvY4-oE78qqaiOscMf16r9IgO6tHphzZTt0IMHpOIZDU7XwdLY3zdCAuHLeSj38_4v_dW32CtRx_hHNnLck07jAzUi2uh_JxSsNKnPUr6Tt1LNisRVI  https://lh5.googleusercontent.com/0JtlSmOvaRDv2FCL5LTX51jIe2iDUFcA_N1UdmrAWKwXens3BuaeM3dLeOzHacDoXgghwlkRcHWT2GiFZ8vBUFfQcdTRXEXqj4je4tPDz7z5FjZ1GtLN71R7xG2MH_DWq0U7TtaX  https://lh6.googleusercontent.com/ZA40hhNeoFEyRP9BvQNUh_TV1-PMgXDEmmut77Ms1t9CucurqCPulgT_BlBXO9bxtXeaTGCkuiHL6HKaDHXXhrH8E30P9_mzaN8f1yBfSSsP5MIcy6j7aV_zjfLAj8Ld6YWJiwTQ  https://lh3.googleusercontent.com/VOZEHrMN6tGr2O5BfG4MwI78GVg_hhx2TQR9l8vwdQ5ejkLO--WGQeSOBg4nx1kbHZgaTazaOgmz-IkqOpgncleSwE672UP0HXeGD1n3tKHqyWam-fJKhmXbo1T1CR1fmag40rXg | | | Parts | | | |
| Name | | Qty. | Check |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **26** | **Tie strings by two half hitches around antenna leader** | | | | |
| https://lh6.googleusercontent.com/jfBAeMnXggWSne4voBCf7aU5U2W2vnKHm_24e7uNn9wYE0GWzwxXlEPBwT1SKDVprfH7JY2XqrzilpXEGgkHZ4jgWH-_exlRRY8H5OwgoTxcJRJa_xcsC_LajzZaE7TgQgRQ61GK  https://lh3.googleusercontent.com/74Y9rAsnZSt72Fod4wBsNtfbqURZQRtOU8tzMvCp8_Ur4qk6FHLPKcgc-_G5UODFZF1nrVfxUlVg3Ognw63Up_kcHhVI_QpAkUGAf0UkW4ARFgu_LCIT4Z97ARel2Vl9aTlaX1c6  https://lh6.googleusercontent.com/3c17EwCrVGNLbs38oOAaTjyJNdy07sv1ImGzHISjrqjZjweDn1gZovmN4spT6IYweNQK_tPOoKP1uHznS-oXMuR0sPYpjjGDRkgz5QMgmfEDdceHRFlx3sjPMRHZZzeZDHqHd_ou  https://lh4.googleusercontent.com/sYBRH2AP8EmDYfO8bqi0OCjSc-pwFCcLBYnfRDsRkGuXqZCY9IPpBHigunbmIxVRC1P1TiSDMU8DkyErkU427kXa_K_zV4xuWqTszJBPwaP6_aldeeFwUFeFAL_CkaoVFgl_tglx  https://lh4.googleusercontent.com/HUvgWfr29Q6smgCkfWwAl_dv25T5ndiAZH4B8Hxs17MCiseBwO_2DnaPv9m0V6ePGLWt2VIDKPaW_fcF1J9c73G_QkizS_RgaM5sxxhcXDMt-GKx_WVc4h1dSQAxkt_ODSOmimQk  https://lh6.googleusercontent.com/6fBK8njFp5syp5iJj4vlMQZkT4KEQzpYUADyqi-FE5qBh_Flqvq1gnwNKyvU55eNFLBuGwU6DOE0jQ4IVPQdO9CHgvFwHxiM51OY90ecrfY8KxMwyVhqWaPl94441bNr-Elz9Qsf | | | Parts | | | |
| Name | | Qty. | Check |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **27** | **Cut the unnecessary strings with a nipper** | | | | |
| https://lh6.googleusercontent.com/PuciQjn6gAgq-MyGeEpioXRbe20sNfXaXShOx126WBW3ZCoGAzfhK6HfFjUd740HGK-Quebrwala2NedGRVOw7uoqOFRT5Tmgxt2asK0W1j14bAyi6HZ5sOl1IbHPLfD3uyK_XdM  https://lh3.googleusercontent.com/gvoA5SEe2aTw0mqivlLOlGeUyppVT7q_DMAoqYf-kvsbLaWBvSdEoMGNmtKzCjCrwCN0BpvynDtxl0WPyZN8eAr--w72DULZgHxW2V3FE7BQ4Uu5YFdP2VBpfGhWC1bNgGnlGZip | | | Parts | | | |
| Name | | Qty. | Check |
| Nipper | | 1 |  |
| -Y panel | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

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| **Step#** | **28** | **Attach the Camera module to the Mission Board 2** | | | | | | | |
| D:\assembly procedure\camera.JPG | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Mission Board 2 | | | | | 1 |  |
| CAMERA module | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | ［18］SLHS-M2-8 | | 1.27 | 0.176 | 2 |  |
| Spacer | ［19］ C302.5-5 | | - | - | 2 |  |
| Nut | ［20］SHNS-M2 | | - | - | 2 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Responsible | |  | | | | |

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| **Step#** | **29** | **Attach the component to the RAB** | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| RAB | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | ［21］SSHS-M3-6-FC | | 1.27 | 0.63 | 1 |  |
| Nut | [22] SLBNR3 | | - | - | 1 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Responsible | |  | | | | |

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| **Step#** | **30** | **Check if the screw in COM board is tightened** | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| COM board | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [23] M2-4-12 | | 1.5 | 0.176 | 8 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Responsible | |  | | | | |

**Day 2 (Structure Assembly)**

**General precautions:**

1. **Ensure the deployment switches are working.**
2. **Check if the deployment switch harness is crimped.**
3. **Clean the structure with isopropyl alcohol**
4. **Do not place the rails directly on the digital weighing balance, use a soft tissue under.**
5. **Make sure the responsibilities are assigned (i.e. who does checking, who takes picture… etc.).**

**Precautions for tightening screws**

1. **In order to apply force as evenly as possible, please tighten the screw so that it is diagonal to the screw that you just tightened.** **As the order of screw tightening is stated, please follow it.**
2. **Please tighten by hand without applying torque at first.**

**Instead of tightening them all at once, please be sure to tighten them separately several cycles.**

**The depth of tightening within one cycle should be the same.**

**At this time, please stop just before the screw head hits.**

1. **Next, please apply torque in the same order as above.**
2. **If screws are difficult to fit, do not try to force them, please remove all screws once and try again. When redoing, please shorten the tightening depth and repeat several cycles and gradually tighten.**

**Precautions for Loctite (fastener bond)**

1. **Preliminarily clean the surface to be coated with Loctite by alcohol.**
2. **Fix fasteners within 20 minutes after application of the Loctite.**
3. **Maintain the satellite in a clean room for 24 hours to dry the Loctite after assembly.**
4. **Wipe off the residue when using the Loctite.**

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| **Step#** | **31** | **Attach the Frame 4 to all rails** | | | | | | | |
| **Note** | **Tighten the screw so that the end faces are aligned.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Frame 4 | | | | | 8 |  |
| Rail1 (Frame 5A) | | | | | 1 |  |
| Rail 2 (Frame 5B) | | | | | 1 |  |
| Rail 3 (Frame 6X) | | | | | 1 |  |
| Rail 4 (Frame 6Y) | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [24] SNSS-  M2-5 | | 1.5 | 0.09 | 16 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque Mark | |  | | | | |
| Responsible | |  | | | | |

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| **Step#** | **32** | **Attach the Deployment switch holder to the Rail 3** | | | | | | | |
| **Note** | **Cover the deployment switch holder’s inside with the Kapton tape**  **Tighten the screw so that the end faces are aligned.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Rail 3 (Frame 6X) | | | | | 1 |  |
| Deployment switch holder | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [25] SNSS-  M2-5 | | 1.5 | 0.09 | 2 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque Mark | |  | | | | |
| Responsible | |  | | | | |

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| **Step#** | **33** | **Solder the harness to the deployment switches** | | | | |
| **Note** | **Solder firmly as small as possible so that the solder part does not bulge** | | | | | |
|  | | | Parts | | | |
| Name | | Qty. | Check |
| Deployment switch | | 2 |  |
| Deployment switch (roller type) | | 1 |  |
| Harness | | | |
| Connection source | Access point | Qty. | Check |
| Deployment switch | - | 2 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

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| **Step#** | **34** | **Paste Kapton tape on the deployment switch** | | | | |
| **Note** | **Thinly cover all conductive parts** | | | | | |
|  | | | Parts | | | |
| Name | | Qty. | Check |
| Deployment switch | | 2 |  |
| Deployment switch (roller type) | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

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| **Step#** | **35** | **Pass the harness of the deployment switch through the hole of Frame 7** | | | | |
| **Note** | **Be careful while handling the harness of the deployment switch**  **Fit the deployment switch into Frame 7** | | | | | |
|  | | | Parts | | | |
| Name | | Qty. | Check |
| Deployment switch | | 2 |  |
| Frame 7 | | 2 |  |
| Harness | | | |
| Connection source | Access point | Qty. | Check |
| Deployment switch | - | 4 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

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| **Step#** | **36** | **Install the deployment switch into the rail and fasten the switch cover** | | | | | | | |
| **Note** | **Ensure to check whether the deployment switch is in contact with the rail**  **If it is in contact, reapply Kapton tape to the deployment switch**  **Apply Loctite to fasteners (see p. 24)** | | | | | | | | |
| Check the Deployment Switch using a digital tester before and after installation | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Frame 7 | | | | | 2 |  |
| Deployment switch | | | | | 2 |  |
| Rail 1 (Frame 5A) | | | | | 1 |  |
| Rail 2 (Frame 5B) | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [26] SNSS-  M1.6-5 | | 1.5 | 0.09 | 2 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque mark | |  | | **Loctite** | |  |
| Responsible | |  | | | | |

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| **Step#** | **37** | **Install the roller type deployment switch into the rail with its holder** | | | | | | | |
| **Note** | **Ensure to check whether the deployment switch is in contact with the rail**  **If it is in contact, reapply Kapton tape to the deployment switch** | | | | | | | | |
| Check the Deployment Switch using a digital tester before and after installation | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Deployment switch | | | | | 1 |  |
| Deployment switch holder | | | | | 1 |  |
| Rail 3 (Frame 6X) | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [27] SLHS-  M2-8 | | 1.5 | 0.09 | 2 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque Mark | |  | | | | |
| Responsible | |  | | | | |

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| **Step#** | **38** | **Attach the Rail 1 and 3 to the Baseplate 2** | | | | | | | |
| **Note** | **Just tighten the screw loosely** | | | | | | | | |
| outwards  How to identify Frame 1F? It has 4 screw holes.  A possible mistake is attaching Frame 1F inside out. Check that the middle hole facing outwards from the structure as shown above. | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Rail 1 (Frame 5A) | | | | | 1 |  |
| Rail 3 (Frame 6X) | | | | | 1 |  |
| Baseplate 2 (Frame 1F) | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [28] SNSS- M2-4 | | 1.5 | - | 2 |  |
| Checklist | | | | | | |
| Picture | |  | | | | |
| Responsible | |  | | | | |

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| **Step#** | **39** | **Attach the Rail 2 and 4 to the Baseplate 1** | | | | | | | |
| **Note** | **Just tighten the screw loosely** | | | | | | | | |
| outwards  How to identify Frame 1? It has 4 screw holes.  A possible mistake is attaching Frame 1F inside out. Check that the middle hole facing outwards from the structure as shown above. | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Rail 2 (Frame 5B) | | | | | 1 |  |
| Rail 4 (Frame 6Y) | | | | | 1 |  |
| Baseplate 1 (Frame 1) | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [29] SNSS- M2-4 | | 1.5 | - | 2 |  |
| Checklist | | | | | | |
| Picture | |  | | | | |
| Responsible | |  | | | | |

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| **Step#** | **40** | **Install 2 Frame 2s to the Rail 2 and 4** | | | | | | | |
| **Note** | **Just tighten the screw loosely** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| Baseplate 3 (Frame 2) | | | | | 2 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [30] SNSS-M2-4 | | 1.5 | - | 2 |  |
| Checklist | | | | | | |
| Picture | |  | | | | |
| Responsible | |  | | | | |

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| **Step#** | **41** | **Mount the Back Plane Board between the rails** | | | | |
| **Note** | **Pass the harness through the hole and connect the switches to the Back Plane Board** | | | | | |
|  | | | Parts | | | |
| Name | | Qty. | Check |
| Main structure | | 1 |  |
| Back Plane Board | | 1 |  |
| Harness | | | |
| Connection source | Access point | Qty. | Check |
| Deployment switch | - | 2 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Step#** | **42** | **Connect all rails with Baseplate 3** | | | | | | | |
| **Note** | **Just tighten the screw loosely** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| Rail 1 (Frame 5A) | | | | | 1 |  |
| Rail 3 (Frame 6X) | | | | | 1 |  |
| Baseplate 3 (Frame 2) | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [31] SNSS- M2-4 | | 1.5 | - | 2 |  |
| Checklist | | | | | | |
| Picture | |  | | | | |
| Responsible | |  | | | | |

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| **Step#** | **43** | **Assemble the rail into a regular square by applying a torque to the screw using a square with Baseplates 2, 4 and 5.** | | | | | | | | | |
| **Note** | **Tighten the screw while pressing down from the side and the top**  **Before tightening, remove each screw to apply Loctite (see p. 24) to the screws inserted on baseplates 1, 2 and 3 (Frame 1, 1F and 2, respectively)**  **Try to give the square shape by aligning frames to the braches of the rail** | | | | | | | | | | |
| **Press**   |  |  | | --- | --- | | Rail1 (R1Vo2) | 2 |   **ss** | | | Parts | | | | | | | | |
| Name | | | | | | Qty. | | Check |
| Main structure | | | | | | 1 | |  |
| Baseplate 2 (Frame 1F) | | | | | | 1 | |  |
| Baseplate 4 (Frame 2S) | | | | | | 2 | |  |
| Baseplate 5 (Frame 3) | | | | | | 1 | |  |
| Fasteners | | | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | | Qty. | | Check |
| Screw | [32] SNSS- M2-4 | | 1.5 | 0.176 | | 16 | |  |
| Checklist | | | | | | | | |
| Double Check | |  | | Picture | | | |  |
| Torque mark | |  | | **Loctite (8)** | | | |  |
| Responsible | |  | | | | | | |
| **Step#** | **44** | **Insert main structure into JSSOD and check movement (First fit check)** | | | | | | | | | |
| **Note** | **Remove the 2 Baseplate 4 after the fit check and return it to its original position and draw torque mark in step #39-40**  **If the structure does not fit smoothly, retry the step #39-40** | | | | | | | | | | |
|  | | | Parts | | | | | | | | |
| Name | | | | | | Qty. | | Check |
| Main structure | | | | | | 1 | |  |
| Checklist | | | | | | | | |
| Picture | |  | | | Video | |  | |
| Responsible | |  | | | | | | |
| **Step#** | **45** | **Fix the back plane board to the Baseplates 1 and 3** | | | | | | | | | |
| **Note** | **Attach the extension bit to the torque driver and tighten the screw** | | | | | | | | | | |
| 2  3  4  1 | | | Parts | | | | | | | | |
| Name | | | | | | Qty. | | Check |
| Main structure | | | | | | 1 | |  |
| Back plane board | | | | | | 1 | |  |
| Fasteners | | | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | | Qty. | | Check |
| Screw | [33] SLHS- M2-8 | | 1.27 | 0.09 | | 4 | |  |
| Checklist | | | | | | | | |
| Double Check | |  | | Picture | | | |  |
| Torque Mark | |  | | | | | | |
| Responsible | |  | | | | | | |

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| **Step#** | **46** | **Install RAB and Mission Board 2 to the Back Plane Board** | | | | | | |
| **Note** | **No need to put spacers at this step** | | | | | | | |
|  | | | Parts | | | | | |
| Name | | | | Qty. | Check |
| Main structure | | | | 1 |  |
| RAB | | | | 1 |  |
| Mission Board 2 | | | | 1 |  |
| Checklist | | | | | |
| Picture | |  | | | |
| Responsible | |  | | | |
| **Step#** | **47** | **Install FAB** | | | | | | |
| **Note** | **Make sure the VHF antenna cable (SMA) goes in front of RAB before installing the board onto the back plane board.** | | | | | | | |
|  | | | Parts | | | | | |
| Name | | | | Qty. | Check |
| Main structure | | | | 1 |  |
| FAB | | | | 1 |  |
| RBF pin | | | | 2 |  |
| Fasteners | | | | | |
| Model | | | Torque [N.m] | Qty. | Check |
| Rod | [34] FABS  M3-L96 | | - | 2 |  |
| Spacer | [35] C-305-0  L5 | | - | 2 |  |
| Nut | [36] SLBNR3 | | - | 2 |  |
| Checklist | | | | | |
| Picture | |  | | | |
| Responsible | |  | | | |
| **Step#** | **48** | **Install the battery box** | | | | | | |
| **Note** | **First attach the spacer to the rod and fit the box afterwards** | | | | | | | |
|  | | | Parts | | | | | |
| Name | | | | Qty. | Check |
| Main structure | | | | 1 |  |
| Battery box | | | | 1 |  |
| Fasteners | | | | | |
| Model | | | Torque [N.m] | Qty. | Check |
| Spacer | [37] C-317-5  L17.5 | | - | 2 |  |
| Checklist | | | | | |
| Picture | |  | | | |
| Responsible | |  | | | |
| **Step#** | **49** | **Install the OBC board** | | | | | | |
| **Note** | **First attach the spacer to the rod and fit the board afterwards.**  **If the rod going through the shield has a problem to fit in, remove the board and check the shield position.** | | | | | | | |
|  | | | Parts | | | | | |
| Name | | | | Qty. | Check |
| Main structure | | | | 1 |  |
| OBC board | | | | 1 |  |
| Fasteners | | | | | |
| Model | | | Torque [N.m] | Qty. | Check |
| Spacer | [38] C-306-0  L6 | | - | 1 |  |
| Checklist | | | | | |
| Picture | |  | | | |
| Responsible | |  | | | |

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| **Step#** | **50** | **Install COM board** | | | | | | |
| **Note** | **Make sure the UHF antenna cable (SMA) goes in front of RAB before installing the board onto the Back Plane Board.**  **Attach the spacer to the rod at first and fit the board afterwards** | | | | | | | |
|  | | | Parts | | | | | |
| Name | | | | Qty. | Check |
| Main structure | | | | 1 |  |
| COM board | | | | 1 |  |
| Fasteners | | | | | |
| Model | | | Torque  [N.m] | Qty. | Check |
| Spacer | [39] C-305-5  L5.5 | | - | 2 |  |
| Checklist | | | | | |
| Picture | |  | | | |
| Responsible | |  | | | |

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| **Step#** | **51** | **Put RW assembly on Mission Board 1** | | | | | | | |
| **Note** | **Gently place the last lines of the RW holder to the Mission Board 1’s top (+Z) side** | | | | | | | | |
| Do not force the cable to the connector. | | | Parts | | | | | | |
| Name | | | | Qty. | | Check |
| Reaction wheel assembly | | | | 1 | |  |
| Mission Board 1 | | | | 1 | |  |
| Checklist | | | | | | |
| Picture | |  | | | | |
| Responsible | |  | | | | |
| **Step#** | **52** | **Lock the Reaction wheel connector cable to the Mission Board 1.** | | | | | | | |
| **Note** | **Gently push right and left sides of the connector by using a tweezer**  **Put Kapton tape on the connector** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | Qty. | | Check |
| Reaction wheel assembly | | | | 1 | |  |
| Mission Board 1 | | | | 1 | |  |
| Tweezer | | | | 1 | |  |
| Harness | | | | | | |
| Connection source | Access Point | | Qty. | | Check | |
| Reaction wheel | Mission Board 1 | | 1 | |  | |
| Checklist | | | | | | |
| Picture | |  | | | | |
| Responsible | |  | | | | |

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| **Step#** | **53** | **Install Mission Board 1 with reaction wheel assembly.** | | | | | | |
| **Note** | **Attach the spacer to the rod at first and fit the board afterwards. Apply torque to the Reaction Wheel holder’s screws after the successful insertion** | | | | | | | |
|  | | | Parts | | | | | |
| Name | | | | Qty. | Check |
| Main structure | | | | 1 |  |
| Mission Board 1 with reaction wheel assembly | | | | 1 |  |
| Fasteners | | | | | |
| Model | | | Torque  [N.m] | Qty. | Check |
| Screw | [40] SNSS-M2-6-SD | | 0.176 | 4 |  |
| Checklist | | | | | |
| Picture | |  | | | |
| Responsible | |  | | | |

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| **Step#** | **54** | **Lock the rod by putting the lower spacers between the remaining boards** | | | | | | | | |
| **Note** | **Attach the spacer at the OBC/EPS shield side at first**  **Temporarily lock the lower rods with a nut** | | | | | | | | | |
|  | | | Parts | | | | | | | |
| Name | | | | Qty. | | Check | |
| Main structure | | | | 1 | |  | |
| Fasteners | | | | | | | |
| Model | | | Torque  [N.m] | | Qty. | | Check | |
| Spacer  (COM-Mission Board 1) | [41] C-315-0-L15 | | - | | 2 | |  | |
| Spacer  (Mission Board 1-2) | [42] C-308-0-L8 | | - | | 2 | |  | |
| Spacer (Mission Board 2-RAB) | [43] C-309-0-L9 | | - | | 2 | |  | |
| Spacer (RAB-Frame 4) | [44] C-309-5-L9.5 | | - | | 2 | |  | |
| Nut | [45] SLBNR3 | | - | | 2 | |  | |
| Checklist | | | | | | | |
| Picture | |  | | | | | |
| Responsible | |  | | | | | |

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| **Step#** | **55** | **Assemble Baseplate 2 and 5 to the main structure.** | | | | | | | | |
| **Note** | **Make sure the front holes at the upper side of the baseplates are looking outwards.**  **Apply Loctite to fasteners (see p. 24)** | | | | | | | | | |
|  | | | Parts | | | | | | | |
| Name | | | | | Qty. | | Check |
| Main structure | | | | | 1 | |  |
| Baseplate 2 (Frame 1F) | | | | | 1 | |  |
| Baseplate 5 (Frame 3) | | | | | 1 | |  |
| Fasteners | | | | | | | |
| Model | | | Torque  [N.m] | | Qty. | | Check |
| Screw | [46] SNSS-M2-4 | | 0.176 | | 4 | |  |
| Checklist | | | | | | | |
| Torque Mark | |  | | **Loctite** | |  | |
| Double Check | |  | | Picture | |  | |
| Responsible | |  | | | | | |

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| **Step#** | **56** | **Insert the upper spacers** | | | | | | |
| **Note** | **Attach the spacer at the OBC/EPS shield side at first.** | | | | | | | |
|  | | | Parts | | | | | |
| Name | | | | Qty. | Check |
| Main structure | | | | 1 |  |
| Fasteners | | | | | |
| Model | | | Torque  [N.m] | Qty. | Check |
| Rod | [47] FABS  M3-L96 | | - | 2 |  |
| Nut | [48] SLBNR3 | | - | 2 |  |
| Spacer  (Frame 4 - FAB) | [49] C-305-0  L5 | | - | 2 |  |
| Spacer (FAB-Battery box) | [50] C-317-5  L17.5 | | - | 2 |  |
| Spacer (Battery box - OBC) | [51] C-306-0  L6 | | - | 1 |  |
| Spacer (OBC-COM) | [52] C-305-5  L5.5 | | - | 2 |  |
| Spacer  (COM-Mission Board 1) | [53] C-315-0 L15 | | - | 2 |  |
| Spacer (RAB-Frame 4) | [54] C-309-5  L9.5 | | - | 2 |  |
| Checklist | | | | | |
| Picture | |  | | | |
| Responsible | |  | | | |

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| **Step#** | **57** | **Fix all internal boards** | | | | | | |
| **Note** | **Temporarily lock the upper rods with a nut** | | | | | | | |
|  | | | Parts | | | | | |
| Name | | | | Qty. | Check |
| Main structure | | | | 1 |  |
| Fasteners | | | | | |
| Model | | | Torque  [N.m] | Qty. | Check |
| Nut | [55] SLBNR3 | | - | 2 |  |
| Checklist | | | | | |
| Picture | |  | | | |
| Responsible | |  | | | |

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| **Step#** | **58** | **Connect the coaxial cables of the COM board, Mission board 1-2 and GPS module in Mission Board 1.** | | | | |
| **Note** | **Fix the RF cables using the Kapton tape** | | | | | |
| https://lh5.googleusercontent.com/MABxbWIlXBmMogmLtjPkT8RBVDwjdi8C6bJhQZ8ulmHbnoa9KVoQsXEXx9WE2YyEQq7sJj_LhgovSeL-G4QvOisciOry53jDYvRc67oXWW-gIV2XdMWqa9ge8lDwtdM6ak35Sl8 | | | Parts | | | |
| Name | | Qty. | Check |
| Main structure | | 1 |  |
| Coaxial cable | | 4 |  |
| Harness | | | |
| Connection source | Access point | Qty. | Check |
| COM board (UHF) | -Y panel | 1 |  |
| Mission Board 1 | GPS module in  -Y panel | 1 |  |
| Mission Board 1 (HNT) | HNT module in  -Y panel | 1 |  |
| Mission Board 2 (VHF) | -Y Panel | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

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| **Step#** | **59** | **Install Baseplate 4 to the rails** | | | | | | | |
| **Note** | **Make sure the carved part of the baseplate 4 are looking inside of the satellite**  **Apply Loctite to fasteners (see p. 24)** | | | | | | | | |
| Carved parts | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| Baseplate 4 (Frame 2S) | | | | | 2 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | [56] SNSS- M2-4 | | 1.5 | 0.176 | 4 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Responsible | |  | | | | |

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| **Step#** | **60** | **Insert main structure into JSSOD and check movement (Second fit check)** | | | | | | |
| **Note** | **If structure does not fit smoothly, retry step #55 and #59**  **Loosen the screw No. 56 (step #59) after the fit check** | | | | | | | |
| https://lh6.googleusercontent.com/P-zRpyNwGHsA3-pBuTRfAsMv6vbsscyCsMemeePqRO5SSn1PNCs-Ew4Ucs3yZKUgrfzxYrkvfkFA4-AENC8Y_NuyMxx3J514_0AIu6oJguTSkKpY5ywrREIREjtN6bkypDx0cpg | | | Parts | | | | | |
| Name | | | Qty. | | Check |
| Main structure | | | 1 | |  |
| Checklist | | | | | |
| Picture |  | Video | |  | |
| Responsible |  | | | | |

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| **Step#** | **61** | **Attach -Z panel to main structure** | | | | | | | |
| **Note** | **Be careful with solar cell handling**  **Apply Loctite to fasteners (see p. 24)**  **Follow the numbers indicated in the figure when putting the screws** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| -Z panel | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | Qty. | Check |
| Screw | [57] SNSS-M2-6-SD | | 1.5 | 0.176 | 6 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque mark | |  | | **Loctite** | |  |
| Responsible | |  | | | | |

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| **Step#** | **62** | **Attach -X panel to main structure** | | | | | | | |
| **Note** | **Be careful with solar cell handling**  **Apply Loctite to fasteners (see p. 24)**  **Follow the numbers indicated in the figure when putting the screws** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| -X panel | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | Qty. | Check |
| Screw | [58] SNSS-M2-6-SD | | 1.5 | 0.176 | 4 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque mark | |  | | **Loctite** | |  |
| Responsible | |  | | | | |
| **Step#** | **63** | **Attach +X panel to main structure** | | | | | | | |
| **Note** | **Be careful with solar cell handling**  **Apply Loctite to fasteners (see p. 24)**  **Follow the numbers indicated in the figure when putting the screws** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| +X panel | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | Qty. | Check |
| Screw | [59] SNSS-M2-6-SD | | 1.5 | 0.176 | 4 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque mark | |  | | **Loctite** | |  |
| Responsible | |  | | | | |

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| **Step#** | **64** | **Apply torque to the Baseplate 4s** | | | | | | | | | |
| **Note** | **Apply Loctite to fasteners (see p. 24)** | | | | | | | | | | |
|  | | | Parts | | | | | | | | |
| Name | | | | | | Qty. | Check | |
| Main structure | | | | | | 1 |  | |
| Baseplate 4 (Frame 2S) | | | | | | 2 |  | |
| Fasteners | | | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | | Qty. | Check | |
| Screw | [60] SNSS- M2-4 | | 1.5 | 0.176 | | 4 |  | |
| Checklist | | | | | | | | |
| Double Check | |  | | | Picture | | |  |
| Torque Mark | |  | | | **Loctite** | | |  |
| Responsible | |  | | | | | | |

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| **Step#** | **65** | **Apply torque to the rod** | | | | | | | | |
| **Note** | **Apply Loctite to fasteners (see p. 24)**  **For the rod, only apply to the tips**  **Attach the bit socket to the torque driver using the conversion adapter and tighten the nut**  **Be careful so that the end face of the rod does not protrude the end face of the nut**  **Double check the torque applied in this step not to change the shape of the assembly** | | | | | | | | | |
| Don't protrude | | | Parts | | | | | | | |
| Name | | | | | Qty. | | Check |
| Main structure | | | | | 1 | |  |
| Fasteners | | | | | | | |
| Model | | | Torque  [N・m] | | Qty. | | Check |
| Rod | [61] FABS-M3-L96 | | - | | 4 | |  |
| Nut | [62] SLBNR3 | | 0.09 | | 8 | |  |
| Checklist | | | | | | | |
| Double Check | |  | | Picture | |  | |
| Torque Mark | |  | | **Loctite** | |  | |
| Responsible | |  | | | | | |

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| **Step#** | **66** | **Attach +Y panel to main structure** | | | | | | | | | | |
| **Note** | **Be careful with solar cell handling**  **Apply Loctite to fasteners (see p. 24)**  **Follow the numbers indicated in the figure when putting the screws** | | | | | | | | | | | |
|  | | | Parts | | | | | | | | | |
| Name | | | | | | | Qty. | | Check |
| Main structure | | | | | | | 1 | |  |
| +Y panel | | | | | | | 1 | |  |
| Fasteners | | | | | | | | | |
| Model | | | Bit  size | | Torque  [N・m] | | Qty. | | Check |
| Screw | [63] SNSS-M2-6-SD | | 1.5 | | 0.176 | | 4 | |  |
| Harness | | | | | | | | | |
| Connection Source | | | | Access point | | Qty. | | Check | |
| Deployment  Switch | | | | Back plane  connector | | 1 | |  | |
| Checklist | | | | | | | | | |
| Double Check | |  | | | Picture | | | |  |
| Torque mark | |  | | | **Loctite** | | | |  |
| Responsible | |  | | | | | | | |

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| **Step#** | **67** | **Attach +Z panel to main structure** | | | | | | | |
| **Note** | **Be careful with solar cell handling**  **Apply Loctite to fasteners (see p. 24)**  **Follow the numbers indicated in the figure when putting the screws** | | | | | | | | |
| https://lh4.googleusercontent.com/2eY8iS1yKlQeQ6AVvHgehSJpE45fUkasezv6q8GzCTSXa9D5RkE_2hljIN8xM0iHXzCNV64lx_GmFHht1mYZN2dN49oDdfmicAHrlg5-GQRuDuaBOU8jLq734aUe5QnNY9i0TXY | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| +Z panel | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | Qty. | Check |
| Screw | [64] SNSS-M2-6-SD | | 1.5 | 0.176 | 6 |  |
| Harness | | | | | | |
| Connection source | | | Access point | | Qty. | Check |
| Battery box | | | FAB | | 2 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque mark | |  | | **Loctite** | |  |
| Responsible | |  | | | | |

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| **Step#** | **68** | **Connect the coaxial cables to the antenna connectors of the -Y panel** | | | | |
| **Note** | **Ensure the coaxial cable is not under torsion when the connection is made.** | | | | | |
|  | | | Parts | | | |
| Name | | Qty. | Check |
| Main structure | | 1 |  |
| Coaxial cables | | 4 |  |
| Harness | | | |
| Connection source | Access point | Qty. | Check |
| COM board (UHF) | -Y panel | 1 |  |
| Mission Board 1 | GPS module in  -Y panel | 1 |  |
| Mission Board 1 (HNT) | HNT module in -Y panel | 1 |  |
| Mission Board 2 (VHF) | -Y Panel | 1 |  |
| Deployment switch | Back Plane Board connector | 1 |  |
| Roller type deployment switch | Back Plane Board connector | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

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| **Step#** | **69** | **Attach –Y panel to the main structure** | | | | | | | |
| **Note** | **Apply Loctite to fasteners (see p. 24)**  **Follow the numbers indicated in the figure when putting the screws** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| -Y panel | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | Qty. | Check |
| Screw | [65] CBSTSR 2-6 | | 1.27 | 0.176 | 6 |  |
| Checklist | | | | | | |
| Double Check | |  | | Picture | |  |
| Torque mark | |  | | **Loctite** | |  |
| Responsible | |  | | | | |

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| **Step#** | **70** | **Install separation spring** | | | | | | |
| **Note** | **Be careful with the solar cell handling** | | | | | | | |
|  | | | Parts | | | | | |
| Name | | | Qty. | | Check |
| Main structure | | | 1 | |  |
| Separation spring | | | 2 | |  |
| Checklist | | | | | |
| Double Check |  | Picture | |  | |
| Torque mark |  | **Loctite** | |  | |
| Responsible |  | | | | |

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| **Step#** | **71** | **Completion** | | | | |
|  | | | Parts | | | |
| Name | | Qty. | Check |
| Main structure | | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

**Rework for Replacing Rail 1 (Frame 5A)**

Rework activities on BIRDS-4’s FM satellites are applied in July 16-17, 2020 and 2 of the outer panels were successfully removed for these activities, namely -Y and +Y panels. Through these activities, a screw got broken and stuck inside of Frame 5A of Maya-2. This part of the procedure is prepared only for removing Frame 5A and inserting a new one. After step R-14, assembly is to be performed exactly as the steps 31-71 related to rework. Additional check marks are going to be added to the related steps during the re-assembly following the sequence given in the fastener checklist for the re-assembly provided after the procedure.

**General precautions:**

1. **Preparation and confirmation of the tools to be used for rework (put second check marks to the tools checklist).**
2. **Before screw removal, ensure to apply alcohol around the screw.**
3. **Ensure the deployment switches are working.**
4. **Mark the visual check if there is no damage on the components during the removal activities.**
5. **Check if the deployment switch harness is crimped.**
6. **Clean the structure with isopropyl alcohol.**
7. **Do not place the rails directly on the digital weighing balance, use a soft tissue under.**
8. **Make sure the responsibilities are assigned (i.e. who does checking, who takes picture… etc.).**
9. **Ensure the proper tools are prepared for the rework.**

**Precautions for tightening screws**

1. **In order to apply force as evenly as possible, please tighten the screw so that it is diagonal to the screw that you just tightened.** **As the order of screw tightening is stated, please follow it.**
2. **Please tighten by hand without applying torque at first.**

**Instead of tightening them all at once, please be sure to tighten them separately several cycles.**

**The depth of tightening within one cycle should be the same.**

**At this time, please stop just before the screw head hits.**

1. **Next, please apply torque in the same order as above.**
2. **If screws are difficult to fit, do not try to force them, please remove all screws once and try again. When redoing, please shorten the tightening depth and repeat several cycles and gradually tighten.**

**Precautions for Loctite (fastener bond)**

1. **Preliminarily clean the surface to be coated with Loctite by alcohol.**
2. **Fix fasteners within 20 minutes after application of the Loctite.**
3. **Maintain the satellite in a clean room for 24 hours to dry the Loctite after assembly.**
4. **Wipe off the residue when using the Loctite.**

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| **Additional Tools Checklist** | | | |
| **No.** | **Tool** | **Picture** | **Check** |
| **Common** | | | |
| **R-1** | **Screw removal plier** | 説明がありません |  |
| **R-2** | **Allen key (1.5 mm – for M2)** | Fender Allen Key for American/Bridge – Thomann Elláda |  |

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| **Step#** | **R-1** | **Remove +Z panel from main structure** | | | | | | | |
| **Note** | **Be careful with solar cell and antenna panel handling.**  **Before screw removal, ensure to apply alcohol around the screw.**  **Follow the numbers indicated in the figure when removing the screws.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| +Z panel | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | Qty. | Check |
| Screw | SNSS-M2-6-SD | | 1.5 | - | 6 |  |
| Harness | | | | | | |
| Connection source | | | Access point | | Qty. | Check |
| Battery box | | | FAB | | 2 |  |
| Checklist | | | | | | |
| Visual Check | |  | | Picture | |  |
| Responsible | |  | | | | |

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| **Step#** | **R-2** | **Remove +X panel from main structure** | | | | | | | |
| **Note** | **Be careful with solar cell and antenna panel handling.**  **Before screw removal, ensure to apply alcohol around the screw.**  **Follow the numbers indicated in the figure when removing the screws.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| +X panel | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | Qty. | Check |
| Screw | SNSS-M2-6-SD | | 1.5 | - | 4 |  |
| Checklist | | | | | | |
| Visual Check | |  | | Picture | |  |
| Responsible | |  | | | | |
| **Step#** | **R-3** | **Remove -X panel from main structure** | | | | | | | |
| **Note** | **Be careful with solar cell and antenna panel handling.**  **Before screw removal, ensure to apply alcohol around the screw.**  **Follow the numbers indicated in the figure when removing the screws.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| -X panel | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | Qty. | Check |
| Screw | SNSS-M2-6-SD | | 1.5 | - | 4 |  |
| Checklist | | | | | | |
| Visual Check | |  | | Picture | |  |
| Responsible | |  | | | | |

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| **Step#** | **R-4** | **Remove -Z panel from main structure** | | | | | | | | | | | | |
| **Note** | **Be careful with solar cell and antenna panel handling.**  **Before screw removal, ensure to apply alcohol around the screw.**  **Follow the numbers indicated in the figure when removing the screws.** | | | | | | | | | | | | | |
|  | | | Parts | | | | | | | | | | | |
| Name | | | | | | | | | Qty. | | Check |
| Main structure | | | | | | | | | 1 | |  |
| -Z panel | | | | | | | | | 1 | |  |
| Fasteners | | | | | | | | | | | |
| Model | | | | | | Bit  size | Torque  [N・m] | | Qty. | | Check |
| Screw | | SNSS-M2-6-SD | | | | 1.5 | - | | 6 | |  |
| Checklist | | | | | | | | | | | |
| Visual Check | | | | |  | | Picture | | | |  |
| Responsible | | | | |  | | | | | | |
| **Step#** | **R-5** | **Remove nuts from the rods** | | | | | | | | | | | | |
| **Note** | **Be careful with antenna panel handling.**  **Before fastener removal, ensure to apply alcohol towards inside of the nut.** | | | | | | | | | | | | | |
|  | | | | Parts | | | | | | | | | | |
| Name | | | | | | | | Qty. | | Check |
| Main structure | | | | | | | | 1 | |  |
| Fasteners | | | | | | | | | | |
| Model | | | | | | Torque  [N・m] | | Qty. | | Check |
| Rod | | FABS-M3-L96 | | | | - | | 4 | |  |
| Nut | | SLBNR3 | | | | - | | 4 | |  |
| Checklist | | | | | | | | | | |
| Visual Check | | |  | | | | Picture | |  | |
| Responsible | | |  | | | | | | | |

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| **Step#** | **R-6** | **Remove Baseplate 4 from the mainframe** | | | | | | | |
| **Note** | **Be careful with antenna panel handling.**  **Before screw removal, ensure to apply alcohol around the screw.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| Baseplate 4 (Frame 2S) | | | | | 2 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N.m] | Qty. | Check |
| Screw | SNSS- M2-4 | | 1.5 | - | 4 |  |
| Checklist | | | | | | |
| Visual Check | |  | | Picture | |  |
| Responsible | |  | | | | |

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| **Step#** | **R-7** | **Disconnect deployment switch from the BPB** | | | | |
| **Note** | **Be careful with antenna panel handling.**  **Carefully remove the connection of the switch from the Back Plane Board.** | | | | | |
|  | | | Parts | | | |
| Name | | Qty. | Check |
| Main structure | | 1 |  |
| Back Plane Board | | 1 |  |
| Harness | | | |
| Connection source | Access point | Qty. | Check |
| Deployment switch | - | 1 |  |
| Checklist | | | |
| Picture |  | | |
| Responsible |  | | |

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| **Step#** | **R-8** | **Remove the upper spacers** | | | | | | | | |
| **Note** | **Be careful with antenna panel handling.**  **Remove the spacer at the OBC/EPS shield side at first.** | | | | | | | | | |
|  | | | Parts | | | | | | | |
| Name | | | | | Qty. | | Check |
| Main structure | | | | | 1 | |  |
| Fasteners | | | | | | | |
| Model | | | Torque  [N.m] | | Qty. | | Check |
| Rod | FABS  M3-L96 | | - | | 2 | |  |
| Nut | SLBNR3 | | - | | 2 | |  |
| Spacer  (RAB-Frame 4) | C-309-5  L9.5 | | - | | 2 | |  |
| Spacer (COM-Mission Board 1) | C-315-0 L15 | | - | | 2 | |  |
| Checklist | | | | | | | |
| Visual Check | |  | | Picture | |  | |
| Responsible | |  | | | | | |

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| **Step#** | **R-9** | **Remove the lower spacers** | | | | | | | | |
| **Note** | **Be careful with antenna panel handling.**  **Remove the spacer at the OBC/EPS shield side at first.** | | | | | | | | | |
|  | | | Parts | | | | | | | |
| Name | | | | | Qty. | | Check |
| Main structure | | | | | 1 | |  |
| Fasteners | | | | | | | |
| Model | | | Torque  [N.m] | | Qty. | | Check |
| Rod | FABS  M3-L96 | | - | | 2 | |  |
| Nut | SLBNR3 | | - | | 2 | |  |
| Spacer (RAB-Frame 4) | C-309-5-L9.5 | | - | | 2 | |  |
| Spacer (Mission Board 2-RAB) | C-309-0-L9 | | - | | 2 | |  |
| Spacer  (Mission Board 1-2) | C-308-0-L8 | | - | | 2 | |  |
| Spacer  (COM-Mission Board 1) | C-315-0-L15 | | - | | 2 | |  |
| Checklist | | | | | | | |
| Visual Check | |  | | Picture | |  | |
| Responsible | |  | | | | | |

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| **Step#** | **R-10** | **Remove Mission Board 1 with reaction wheel assembly, Mission Board 2 and Rear Access Board at once** | | | | | | | | |
| **Note** | **Remove torque of the Reaction Wheel holder’s screws before the removal.**  **Be careful with antenna panel handling and the harness connected to the removed boards.**  **Carefully remove the spacer from the rod at first and remove the board afterwards.** | | | | | | | | | |
|  | | | Parts | | | | | | | |
| Name | | | | | Qty. | | Check |
| Main structure | | | | | 1 | |  |
| Mission Board 1 with reaction wheel assembly | | | | | 1 | |  |
| Fasteners | | | | | | | |
| Model | | | Torque  [N.m] | | Qty. | | Check |
| Screw | SNSS-M2-6-SD | | - | | 4 | |  |
| Checklist | | | | | | | |
| Visual Check | |  | | Picture | |  | |
| Responsible | |  | | | | | |

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| **Step#** | **R-11** | **Remove main frame connections of Rail 1** | | | | | | | |
| **Note** | **Be careful with antenna panel handling.**  **Before screw removal, ensure to apply alcohol around the screw.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| Rail 1 (Frame 5A) | | | | | 1 |  |
| Baseplate 2 (Frame 1F) | | | | | 2 |  |
| Baseplate 3 (Frame 2) | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | Qty. | Check |
| Screw | SNSS- M2-4 | | 1.5 | - | 3 |  |
| Checklist | | | | | | |
| Visual Check | |  | | Picture | |  |
| Responsible | |  | | | | |

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| **Step#** | **R-12** | **Remove Rail 1 by taking the bolt connecting Frame 5A to BPB out** | | | | | | | |
| **Note** | **Be careful with antenna panel and connected harness handling.**  **Before screw removal, ensure to apply alcohol around the screw.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| Rail 1 (Frame 5A) | | | | | 1 |  |
| Back Plane Board | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | Qty. | Check |
| Screw | SLHS- M2-8 | | 1.27 | - | 1 |  |
| Checklist | | | | | | |
| Visual Check | |  | | Picture | |  |
| Responsible | |  | | | | |

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| **Step#** | **R-13** | **Remove Frame 7 from Rail 1** | | | | | | | |
| **Note** | **Be careful with antenna panel and connected harness handling.**  **Before screw removal, ensure to apply alcohol around the screw.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| Rail 1 (Frame 5A) | | | | | 1 |  |
| Frame 7 | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | Qty. | Check |
| Screw | SNSS-  M1.6-5 | | 1.5 | - | 1 |  |
| Checklist | | | | | | |
| Visual Check | |  | | Picture | |  |
| Responsible | |  | | | | |
| **Step#** | **R-14** | **Remove Frame 4 from Rail 1** | | | | | | | |
| **Note** | **Be careful with antenna panel and connected harness handling.**  **Before screw removal, ensure to apply alcohol around the screw.** | | | | | | | | |
|  | | | Parts | | | | | | |
| Name | | | | | Qty. | Check |
| Main structure | | | | | 1 |  |
| Rail 1 (Frame 5A) | | | | | 1 |  |
| Frame 7 | | | | | 1 |  |
| Fasteners | | | | | | |
| Model | | | Bit  size | Torque  [N・m] | Qty. | Check |
| Screw | SNSS-  M2-5 | | 1.5 | - | 4 |  |
| Checklist | | | | | | |
| Visual Check | |  | | Picture | |  |
| Responsible | |  | | | | |

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| **Fasteners Checklist for Re-assembly** | | | | | | | | |
| **Note** | | **The fasteners to be applied Loctite during the re-assembly are written in bold. All screws and nuts are changed with the new ones.** | | | | | | |
| **No.** | **Step#** | | **Type** | **Part No** | **Length** | **Qty.** | **Vendor** | **Check** |
| 1 | 31 | | Screw | SNSS-M2-5 | 5 | 4 | MISUMI |  |
| **2** | **36** | | **Screw** | **SNSS-M1.6-5** | **5** | **1** | **MISUMI** |  |
| 3 | 38 | | Screw | SNSS-M2-4 | 4 | 1 | MISUMI |  |
| **4** | **43** | | **Screw** | **SNSS-M2-4** | **4** | **2** | **MISUMI** |  |
| 5 | 45 | | Screw | SLHS-M2-8 | 8 | 1 | NBK |  |
| 6 | 53 | | Screw | SNSS-M2-6-SD | 6 | 4 | MISUMI |  |
| 7 | 54 | | Spacer | C-308-0 | 8 | 2 | MISUMI |  |
| 8 | 54 | | Spacer | C-315-0 | 15 | 2 | Hirosugi-Keiki |  |
| 9 | 54 | | Spacer | C-309-5 | 9.5 | 2 | MISUMI |  |
| 10 | 54 | | Spacer | C-309-0 | 9 | 2 | MISUMI |  |
| 11 | 54 | | Nut | SLBNR3 | N/A | 2 | MISUMI |  |
| **12** | **55** | | **Screw** | **SNSS-M2-4** | **4** | **1** | **MISUMI** |  |
| 13 | 56 | | Spacer | C-309-5 | 9.5 | 2 | Hirosugi-Keiki |  |
| 14 | 56 | | Spacer | C-315-0 | 15 | 2 | Hirosugi-Keiki |  |
| 15 | 57 | | Nut | SLBNR3 | N/A | 2 | MISUMI |  |
| 16 | 59 | | Screw | SNSS-M2-4 | 4 | 4 | MISUMI |  |
| **17** | **61** | | **Screw** | **SNSS-M2-6-SD** | **6** | **6** | **MISUMI** |  |
| **18** | **62** | | **Screw** | **SNSS-M2-6-SD** | **6** | **4** | **MISUMI** |  |
| **19** | **63** | | **Screw** | **SNSS-M2-6-SD** | **6** | **4** | **MISUMI** |  |
| **20** | **64** | | **Screw** | **SNSS-M2-4** | **4** | **4** | **MISUMI** |  |
| **21** | **65** | | **Nut** | **SLBNR3** | **N/A** | **4** | **MISUMI** |  |
| **22** | **66** | | **Screw\*** | **SNSS-M2-6-SD** | **6** | **4** | **MISUMI** |  |
| **23** | **67** | | **Screw** | **SNSS-M2-6-SD** | **6** | **6** | **MISUMI** |  |
| **24** | **69** | | **Screw\*** | **CBSTSR 2-6** | **6** | **6** | **MISUMI** |  |

**\***Screws to be used in order to re-assemble +Y and –Y panels are provided as item 22 and 24, respectively.

**Repeated procedure after the rework:** After successfully completing step#R-14, following items are followed:

1. Double-check the tools of assembly (pp. 4-8).
2. Check the fastener list given above.
3. Put star next to the repeated step#. **Do not apply Loctite before the fit check case is available.** The sequence to be followed is: Step #31, 36, 38, 41, 43, 45, 46, 53, 54, 55, 58, 59, 61, 62, 63, 64, 65, 66, 67, 69, 71.
4. Double-check the steps in item 3 and apply Loctite when necessary by performing multiple fit checks.