Birds webinar Comparison between Gardens satellite and Birds bus

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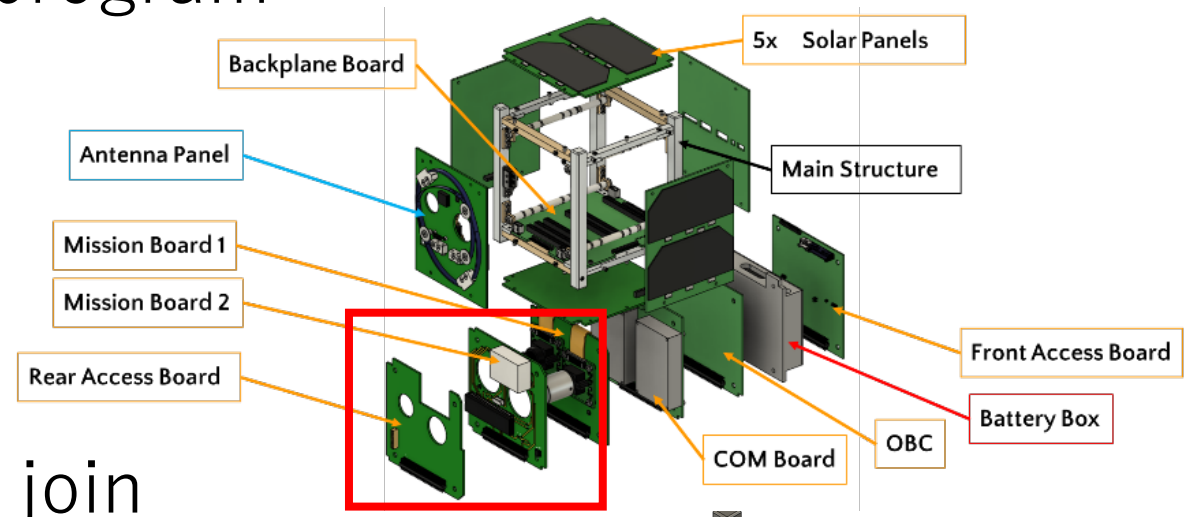
※暫定版
Growing
Advanced and
Refined space
Development
E
Ngineers in
succession and under the
satellite
GARDENs-01

Scope

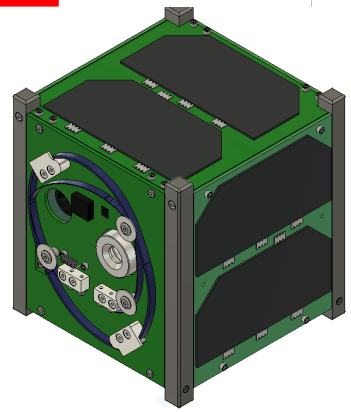
- This document addresses difference between Gardens and Information Gardens access to git hub.

Program summary

- Starting in 2021, This is educational program that develops up to 9 cubesats
- ISS JSSOD is applicable
- **Bus bus is** applicable
- **From sophomore**
- **Students all department** are able to join
- Mission plan, design, manufacturing, test, operation
- Goal「**Must Work Cubesat**」

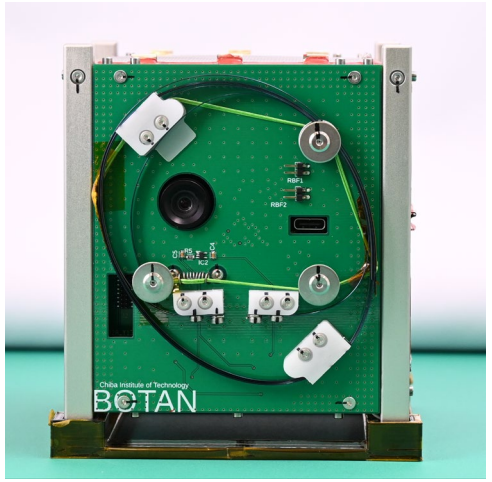


ミッション部



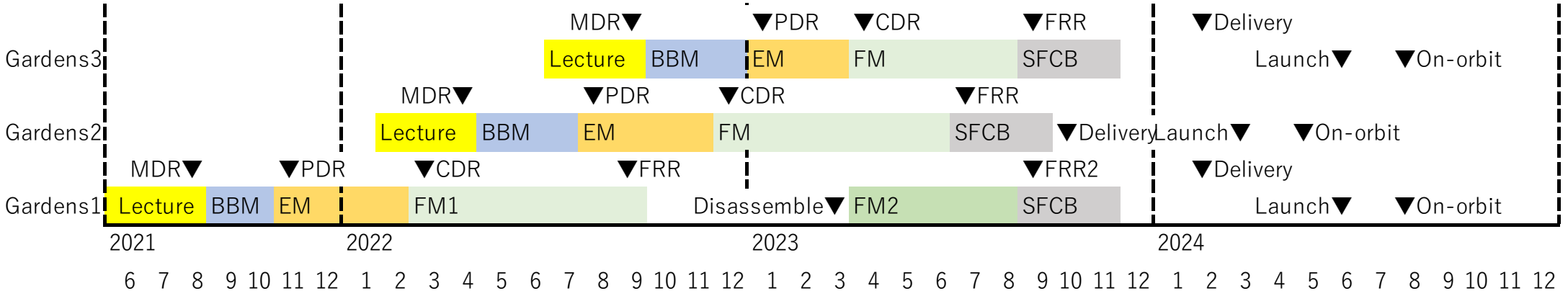
Mission spec

Sat name	CAMERA	CAM MCU	APRS	ETC
YOMOGI	Band filter RGB	Rpi CM4	CM4 + TT4 + BIM1H	-
KASHIWA	Fish eye x2	Rpi zero 2 x2	Zero2 + TT4 +BIM1h	-
SAKURA	ND filter RGB	Rpi zero2	PIC + TT4 + BIM1h	-
BOTAN	RGB	Rpi zero2	PIC + TT4 + BIM1h	Arduino R4 +Gyro sensor



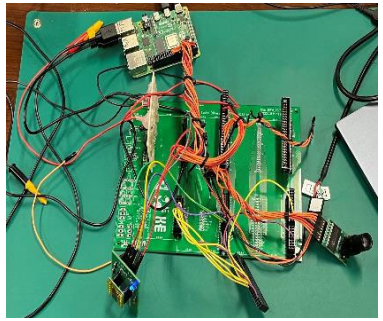
Schedule control

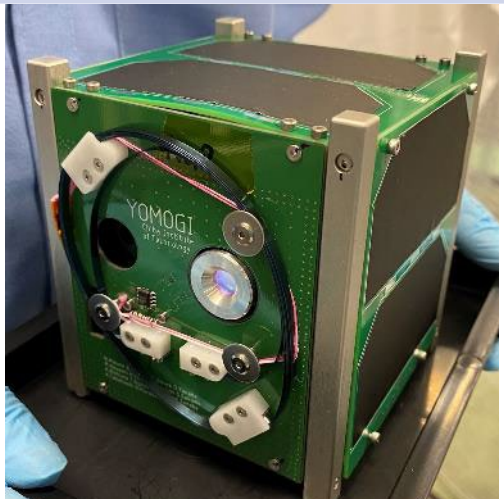
- Gardens1 took for **2 years and 3 month** for development.
  - Delay by frequency coordination, JAXA SFCB, birds bus improvement, and graduation
- Gardens2 took for **1 year and 5 month**
  - 4 month delay by frequency coordination
- Gardens3 took for **1 year and 2 month.**
  - No delay

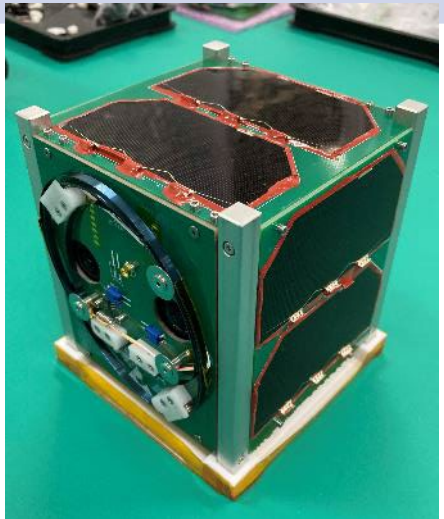


Educational system

	BBM	EM	FM
Hardware	Bus same as Previous heritage Development upon mission	Modified by mission	Identical to EM
Skill	Skill qualification	Skill qualified Students only	EM qualified Students Only
Documentations	Performing testing with heritage documentations	Modified by mission	EM with FM modification
Tool	Identical to previous Introducing New tools	Modified by mission	Identical to EM
Team Building,	Educated by Instructor and upper grade students	Students with	Students Only



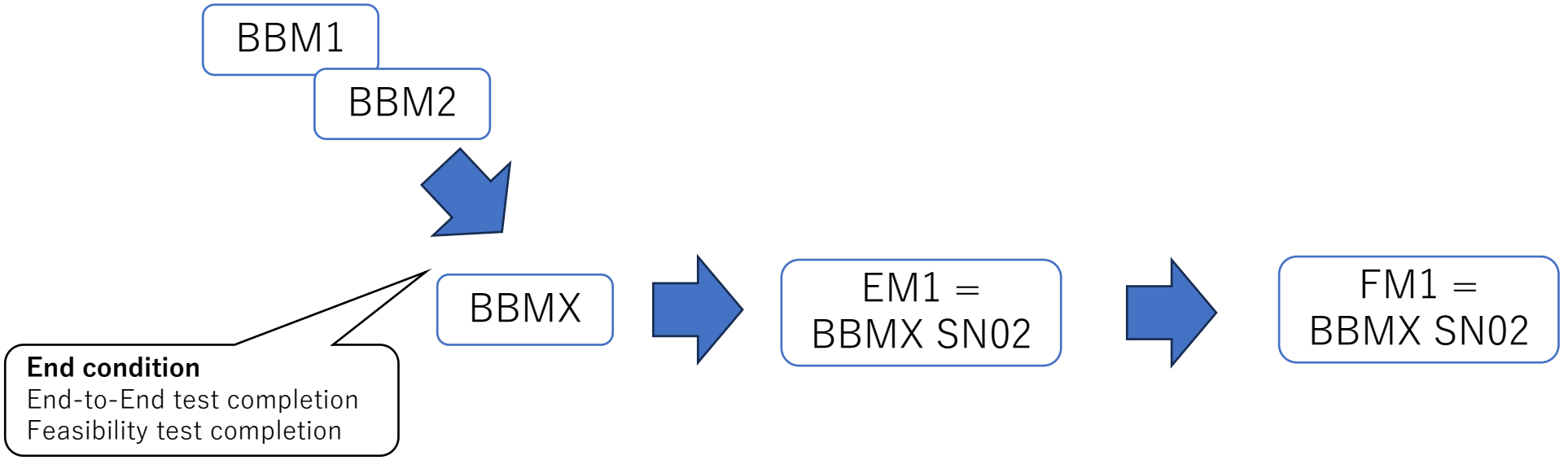




Difference between Gardens and Birds

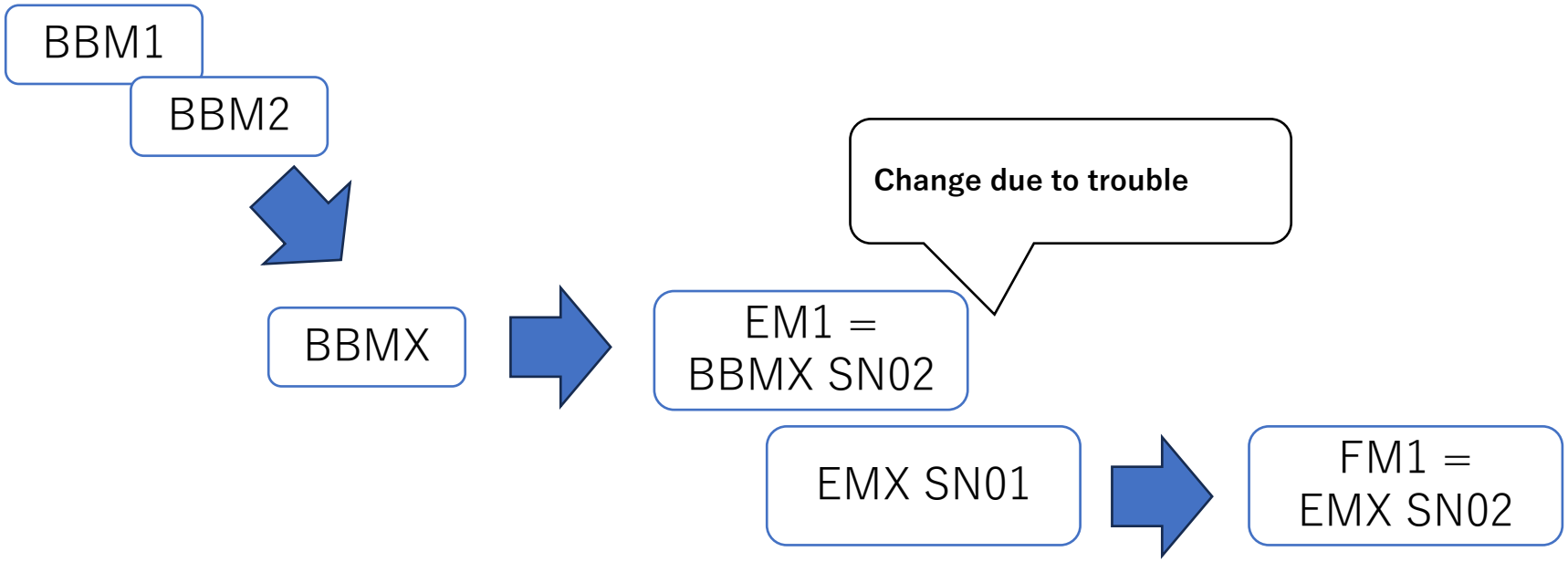
	Gardens	Birds	Remarks
Flight Hardware/ Software Design	BBM development Any time Any PIC printf debug Mission software IICD	Not known Selective debug Not known	
Skill	No change	N/A	
Documentations	Design Review slide Plan / Procedure / report document Frequency coordination Safety review	Birds3 only review Not Known	
Tool, Jig	Supplier selection Board supplier Electrical Jig (BOB, FAB harness)	N/A N/A Not Known	
Test	Board Subsystem System integration System test	Not Known	
Team Building,	5 management documentation TB/TR	Not Known	

BBM development



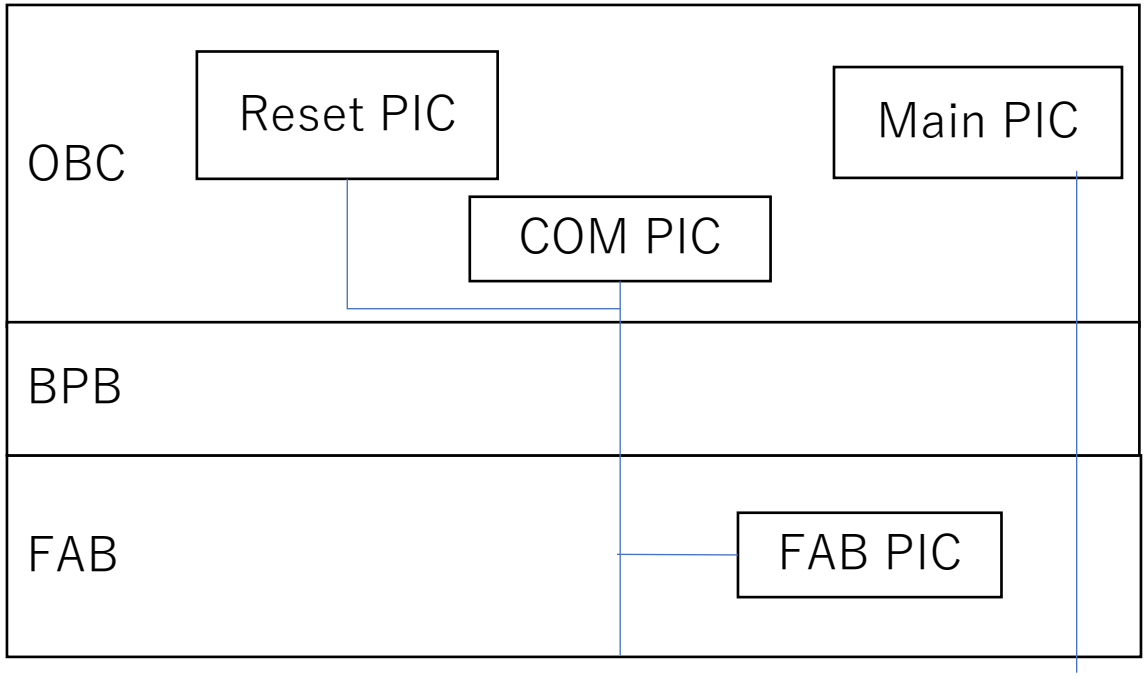
- The purpose is reduce EM risk and identical process between EM and FM

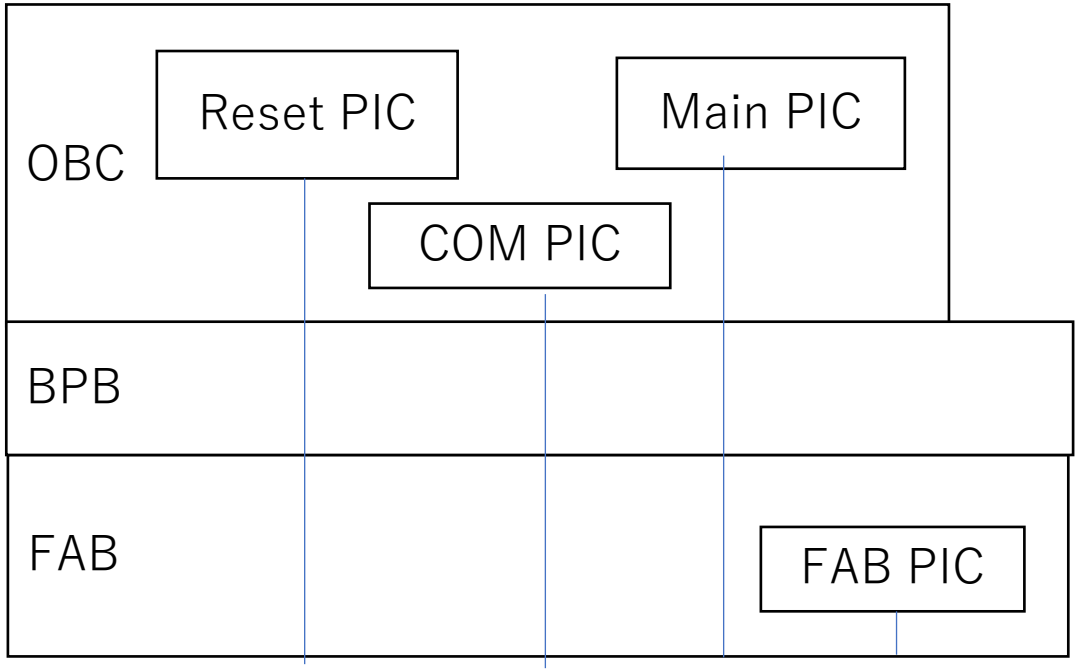
BBM development



- In case modification in EM, last EM followed serial number will be FM

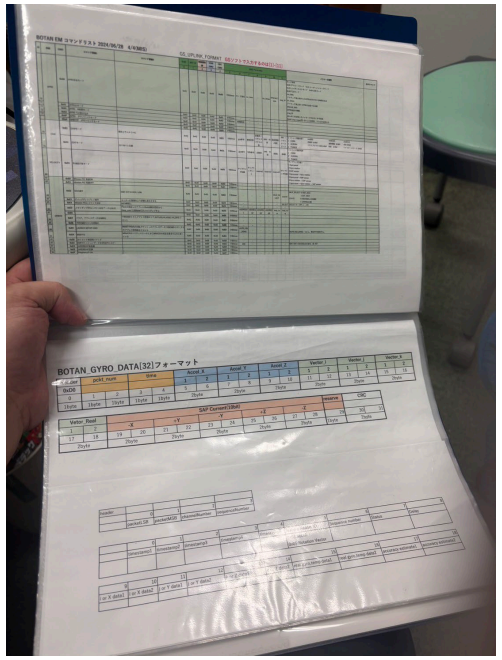
Any Time Any PIC printf debug





- In birds S/W uart degub port is selective between Reset PIC, COM PIC and FAB PIC
- For COM PIC, It is used to be COM setting change pin
- For FAB PIC, empty pin is used for uart degub
- For Reset and Main PIC, It did not change.

IICD



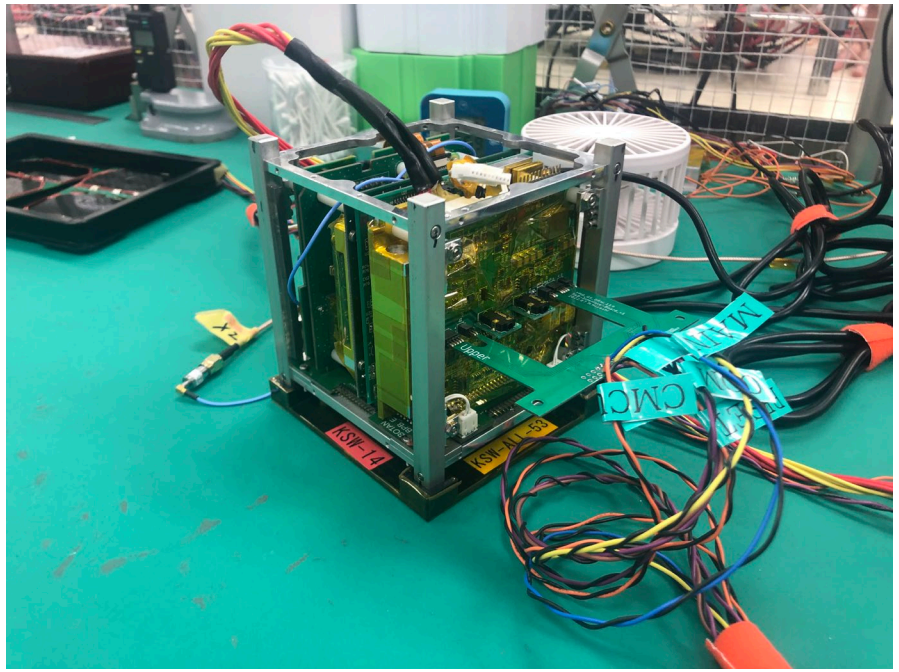
- In gardens ICD has
  - Electrical ICD (EICD)
  - Mechanical ICD (MICD)
  - Informational ICD (IICD)
- IICD has
  - HK format, uplink, ACK/NAC, COM downlink packet, CW
  - Reset PIC –Main PIC, FAB PIC- Main PIC, Main PIC - MIssions
  - MEMORY MAP
  - COMMAND list

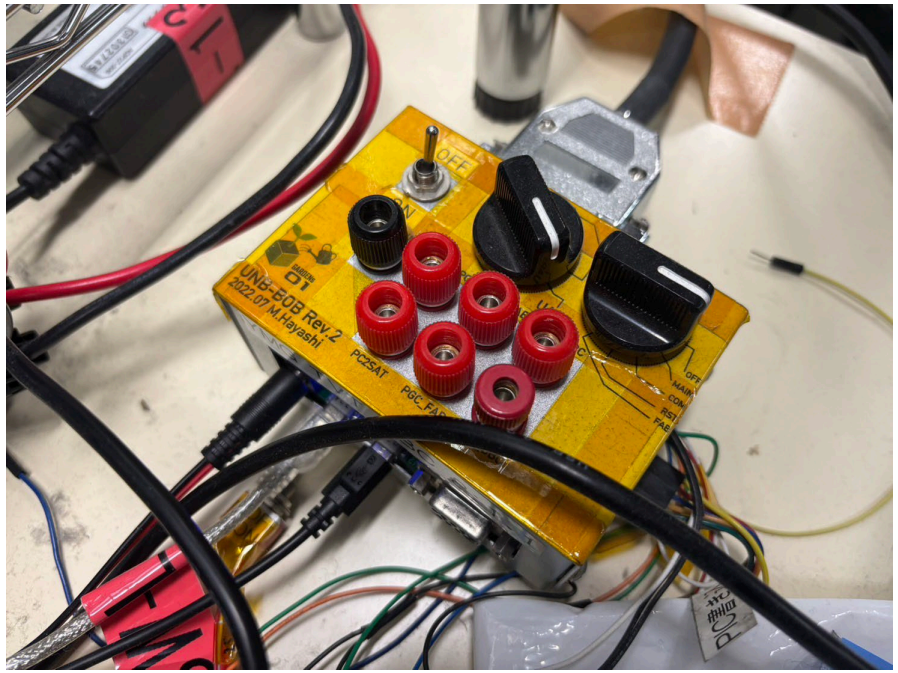
Supplier

- On BBM phase, supplier selection is permitted
  - Validity order, BBM order
- For Board supplier
  - 1st sat: P-BAN and JLPCB at same time and only P-BAN for flight
  - 2nd sat: JLCPCB and sagami
  - 3rd sat: JLCPCB and P-ban

Electrical JIGs and harness

- FAB harness and BOB(Break out box)





Design Review slide contents

- In the gardens design review slide contents are
  - Review of current activity
  - Plan of next activity
    - Engineering proposal and plan
    - Management plan
- For plan, it is very good to start next activity.

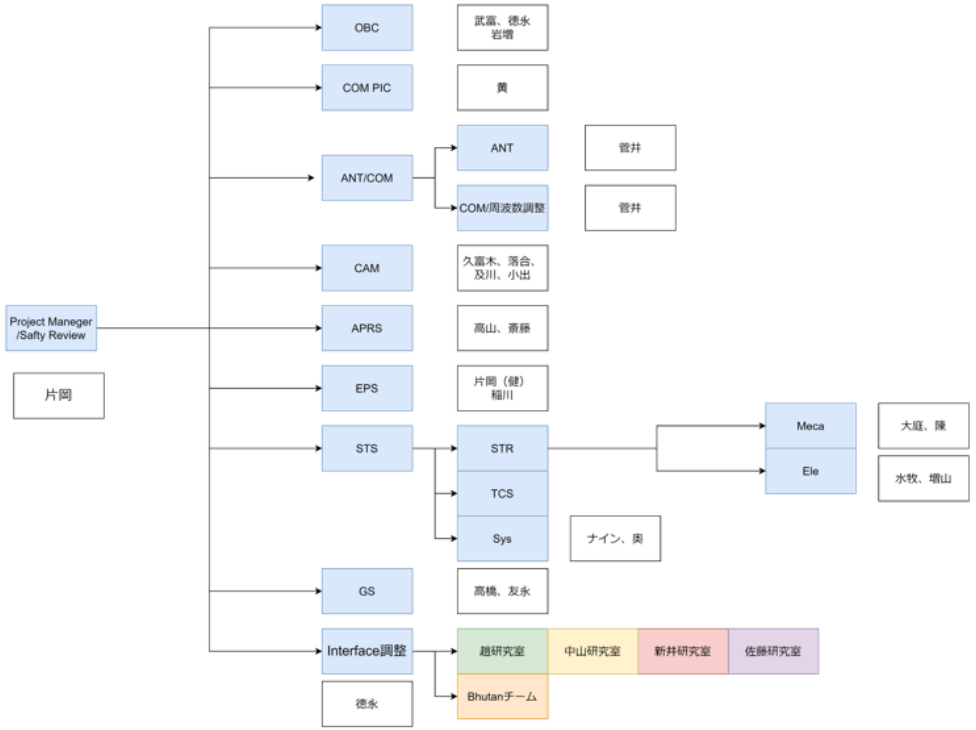
5 management documentation

- There is 5 management documentation is applicable
- Organization Chart (OC)
- Manufacturing Flow chart(MFC)
- Risk register
- Gant chart
- WBS

5 management documentation

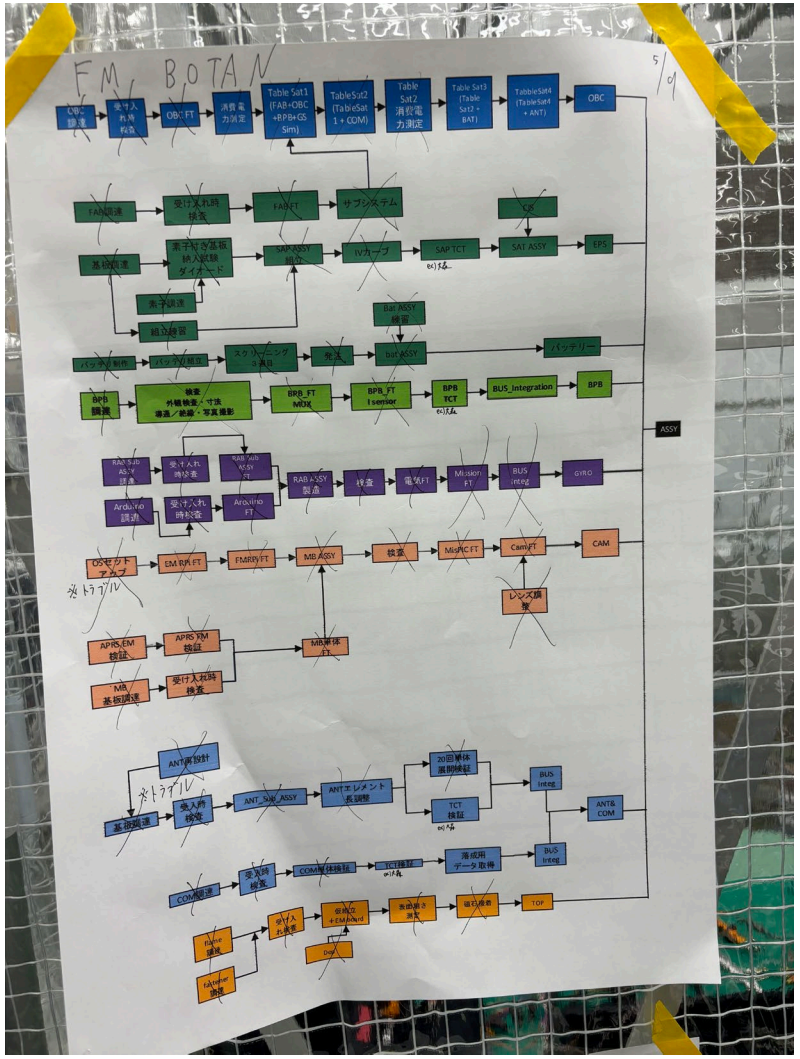
OC

五号機開発におけるOCを以下に示す。



- In the BBM phase, task is divided by subsystem
- From EM phase, task is divided by engineering field such as PCB design, S/W depending on BBM activity.

5 management documentation



- MFC visualize task group
- As progress, completion task is marked by color, the delayed task is visualized
  - task reassign

5 management documentation

リスク(試験)

	1	2	3
影響	手間になる	スケジュールの遅延につながる	進行が止まる
頻度	40%以下	40%以上80%未満	80%以上

大項目	内容	対策	影響	頻度	危険度（影響＊頻度）
試験	試験手順の手違い(配線ミス)による製品の破壊	手順をあらかじめ把握したうえで確認しながら作業を行う	2	1	2
	試験が予定通りの時刻通りに行われない	時間管理者を設け、また作業工程は余裕を持ったスケジュールにする	3	2	6
	試験場が変わることによる、ジグの再検討でスケジュールが遅れる	同じ試験場を前提とする	2	1	2
	インテグレーション試験の際に、関係者の都合が合わない	手順書を作成したうえで、複数人に手順書を使った試験をさせる	2	2	4
	試験に必要なものを忘れる	試験に必要なもののリストを作成する	3	2	6
	荷造りの手間取り、持っていくべきはずの部品を忘れる	1週間以上かけて準備する。荷造り担当(行く人)を任命する	2	3	6
	手順書が完成しない	期限を設け、手順書を完成させる	2	3	6
	試験装置のコンフィギュレーション、インターフェイスを間違える	設定の手順書を確認しながら作業を行う 近くに人がいれば、一緒に確認しながら作業をする	3	2	6
	試験直前にコンフィギュレーションを変更しない	変更する場合は試験前2週間以上であることを確認する また、前号機先輩に確認してもらい変更点があれば変更する	3	1	3
	完成した手順書に不備がある。MECEになっていない	レビュー回数を2回以上行う	3	1	3
	回路がショートして、部品、計測器が壊れる	回路のダブルチェックを行う	2	2	4
	試験のために、部品、試験環境が重なってしなう	試験のスケジュールを厳守する	2	2	4
	サブシステムをまたぐ部品で問題が発生する	関係するサブシステムを集めて相談する	2	1	2

試験に関するリスクを示し、危険度を数値化した。

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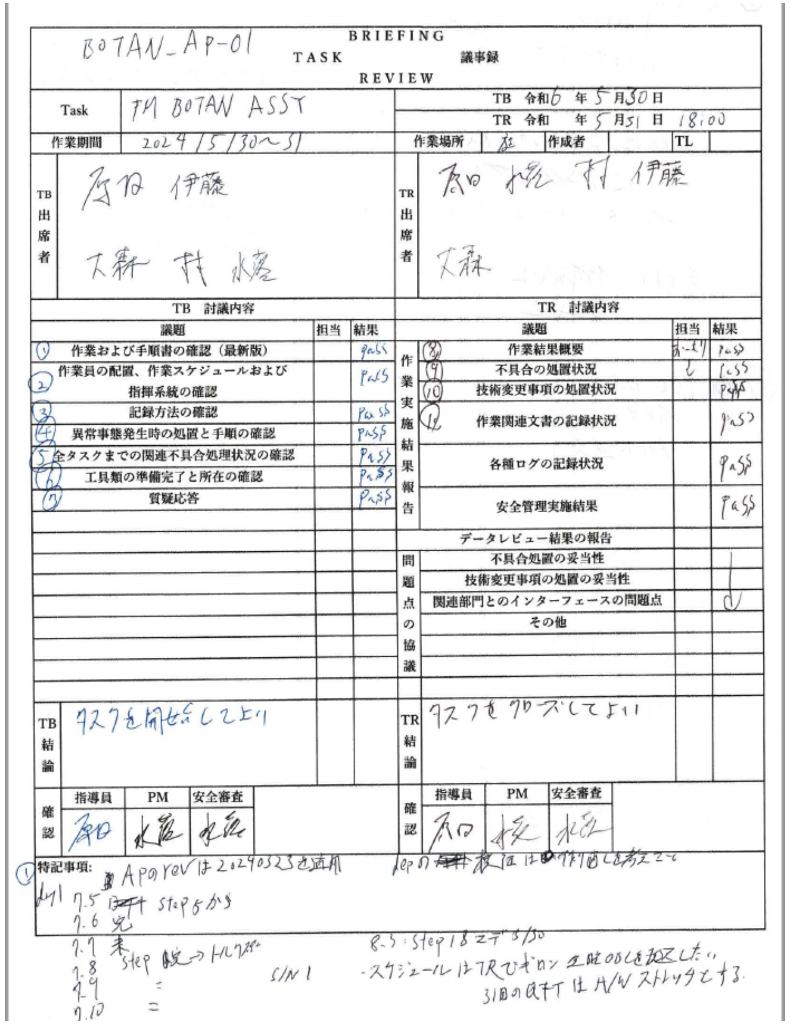
- Risk register identifies risk and control
- Risk control is performed in next phase

TB/TR



BOTAN_AP-01 TASK BRIEFING / REVIEW 議事録

Task	FM BOTAN ASST	TB 令和6年5月30日 / TR 令和 年5月31日 18:00	
作業期間	2024/5/30~31	作業場所	作成者 / TL

TB 出席者 / TR 出席者

TB 討議内容 議題	担当	結果
① 作業および手順書の確認（最新版）		pass
② 作業員の配置、作業スケジュールおよび指揮系統の確認		pass
③ 記録方法の確認		pass
④ 異常事態発生時の処置と手順の確認		pass
⑤ 全タスクまでの関連不具合処理状況の確認		pass
⑥ 工具類の準備完了と所在の確認		pass
⑦ 質疑応答		pass

TR 討議内容	議題	担当	結果
作業実施結果報告	⑧ 作業結果概要		pass
	⑨ 不具合の処置状況		pass
	⑩ 技術変更事項の処置状況		pass
	⑪ 作業関連文書の記録状況		pass
	各種ログの記録状況		pass
	安全管理実施結果		pass
	データレビュー結果の報告		
問題点の協議	不具合処置の妥当性		
	技術変更事項の処置の妥当性		
	関連部門とのインターフェースの問題点		
	その他		

TB 結論: タスクを開始してよい

TR 結論: タスクをクローズしてよい

確認	指導員	PM	安全審査
TB			
TR			

特記事項:

- Task briefing is a meeting prior to a test
  - Readiness of jig, document
  - Trouble in previous task
  - Planning of person, schedule, booking
- Task review is one after the test
  - Data review
  - Trouble was concluded
  - Changes is valid
  - Hand over to next task
  - Safety issues
- If any update during meeting, PM and safety will not sign until update.

Conclusion

- This document addressed difference between gardens and birds