LITEBIRD EXTERNAL COLLABORATOR POLICY VERSION.1.2

Preamble

LiteBIRD is a satellite project to map CMB polarization over the full sky at large angular scales with ultimate precision. The scientific objective of LiteBIRD is to test all the representative inflation models that satisfy single-field slow-roll conditions and lie in the large-field regime. To this end, the requirement on the precision of the tensor-to-scalar ratio, r, at LiteBIRD is equal to or less than 0.001.

The LiteBIRD proposal was submitted to ISAS/JAXA in February 2015. A US participation to LiteBIRD was also proposed to NASA in December 2014. Both proposals have passed the initial down selection.

The US LiteBIRD team, called "NASA Phase-A team" hereafter, started NASA Phase-A studies in August 2015. The studies will continue until July 2016. The Japanese LiteBIRD team will enter the Phase-A from April 2016[1]. The team is called "the ISAS/JAXA Phase-A team" hereafter. When we combine both teams, the total number of members is approximately 130 as of January 1, 2016[2]. They are collectively called "Phase-A members" in this document.

Joint Study Groups (called JSGs hereafter) are organized to extend these Phase-A studies by inviting experts as "External Collaborators" from all over the world. Currently there are two JSGs, one for foreground separation and the other for mitigations of systematic uncertainties. The framework of JSGs is in particular useful to incorporate lessons learned from Planck and other CMB projects without redefining already-established Phase-A teams.

External Collaborators have rights to access most internal information in Phase-A teams. When some studies are done, they can publish results using such information. Yet the rights and responsibilities of the External Collaborators are different from those of Phase-A members.

This document defines the policy for admitting a new member to the LiteBIRD JSGs as an External Collaborator. Rights and responsibilities of the External Collaborator are also described.

Date: February 2, 2016.

[1]The Phase-A period of JAXA is separated into two stages, Phase-A1 and Phase-A2 Strictly speaking, therefore, the Japanese team will enter "the Phase-A1" from April 2016.

[2]Both US and Japanese teams also include participants from other countries.

1. Organization

1.1. The organization of the ISAS/JAXA Phase-A team is shown in Fig. 1. The team is in charge of the spacecraft, the bus system, the telescope system including optical modulation system, Kelvin-level cooling system, launch and operation.

1.2. The organization of the NASA Phase-A team is shown in Fig. 2 and Table 1. The team focuses on the focal plane sysytem and sub-K cooling system.

1.3. Contact persons between two Phase-A teams are listed in Table 2. Point of Contacts (POCs) are responsible for keeping good communications and documentations to minimize misunderstanding in information exchange.

1.4. The organization of the JSGs is shown in Fig. 3 and Table 3. Each JSG has two conveners, one from the ISAS/JAXA Phase-A team and the other from the US Phase-A team. Conveners are responsible for promoting joint studies among two Phase-A teams and External Collaborators.

1.5. There are two JSGs established "ab initio"; the foreground separation study group and the systematic error mitigation group. In case needed, a new JSG can be formed if both LPOCs approve.

1.6. Everyone who is a member of one of Phase-A teams is eligible for membership of any JSG.

1.7. These organization charts are valid during the Phase-A periods. Laying out the structure for Phase-B onwards is an activity in Phase-A (the expectation is that productive members of the JSG are eligible for a role in later phases of the experiment).

2. Joining Procedure

2.1. Each JSG convener or POC can make a proposal to invite a new member to JSGs as an External Collaborator. The proposal should be associated with a short description on who is invited, what he/she is supposed to do in JSGs and why the invitation is good. The proposal can be made any time when needed.

2.2. For anyone to become an External Collaborator, the proposal needs to be approved by both LPOCs.

3. Rights

3.1. An External Collaborator can access a set of LiteBIRD internal information defined by JSG conveners and approved by LPOCs.

3.2. An External Collaborator can send JSG conveners requests for computing resources to carry out studies. JSG conveners are responsible for allocating available resources.

3.3. An External Collaborator can become a Phase-A member if a JSG convener or POC makes a proposal and both LPOCs approve it.

3.4. An External Collaborator can give talks on and publish results of the studies done in a JSG. Rules are described in Section 5 and 6.

3.5. Rights to access real data from LiteBIRD observations are not defined in this document. Defining them is an activity in Phase-A (see also # 1.7 in Section 1).

4. Responsibilities

4.1. An External Collaborator is forbidden to leak any LiteBIRD internal information to outside the approved publication and talk channels as described in this document.

4.2. When using computing resources allocated for LiteBIRD, an External Collaborator should follow the rules applied to the resources. Examples of such rules include those at KEK-CC or NERSC.

4.3. An External Collaborator is responsible for proper and constructive use of LiteBIRD internal information.

5. Publications

5.1. Any result that uses LiteBIRD internal information needs to be presented at a JSG meeting before publication.

5.2. Any publication that uses LiteBIRD internal information needs to be examined by at least two internal reviewers who are appointed by the LPOCs. The main purpose of the review is to check if the LiteBIRD internal information is properly used and conclusions are valid.

5.3. When an External Collaborator publishes the studies done in a JSG as the corresponding author, he/she should send a proposed author list first to the POCs and JSG conveners prior to publication.

5.4. In case appropriate, LPOCs may suggest to include other people in JSGs as authors. In the case that the results address the core design of LiteBIRD, the LPOCs may suggest to include the entire members in the author list as the "LiteBIRD collaboration paper". The corresponding author needs to follow the suggestion in this case.

5.5. After LPOCs approve the author list proposal, the corresponding author needs to pass a draft of the paper to internal reviewers. Upon reviewers' approval, the draft should then be circulated to all the JSG members.

5.6. Once the draft is circulated, JSG members are encouraged to read it and raise questions. The corresponding author is responsible for answering questions and book-keeping all the Q & As. At least three weeks should be spent for this JSG-wide evaluation period.

5.7. After the end of JSG-wide evaluation period, one extra week should be spent as the final-reading phase, where the author list should be finalized.

5.8. Authors must all positively approve themselves as authors through a document approval process.

5.9. When LiteBIRD internal information is used in a review article in which descriptions on LiteBIRD are only a fraction of the document, the rules in this section are not applied if original papers are cited properly. In case a new result is described, however, the rules in this section should be followed.

6. Talks and Proceedings

6.1. Any result that uses LiteBIRD internal information needs to be presented at a JSG meeting before giving a talk.

6.2. When an External Collaborator gives a talk on the studies done in a JSG, presentation slides should be circulated to the JSG mailing list at least a week before the presentation is given. If any new result is included, it must be reviewed by JSG conveners and is given permission by them before the presentation is circulated to the JSG mailing list.

6.3. Writing proceedings should follow the same rules listed in Section 5. If there is no new result included, however, no internal reviewer is needed and the JSG-wide evaluation period is shortened to two weeks (i.e. the sum of JSG-wide evaluation period and the final-reading period is three weeks).

7. Effective Period

7.1. This document comes into force on February 2, 2016, and is effective during the Phase-A study period. A new policy document will be effective and supersede this document when either ISAS/JAXA enters Phase-A2 or NASA team enters Phase-B.

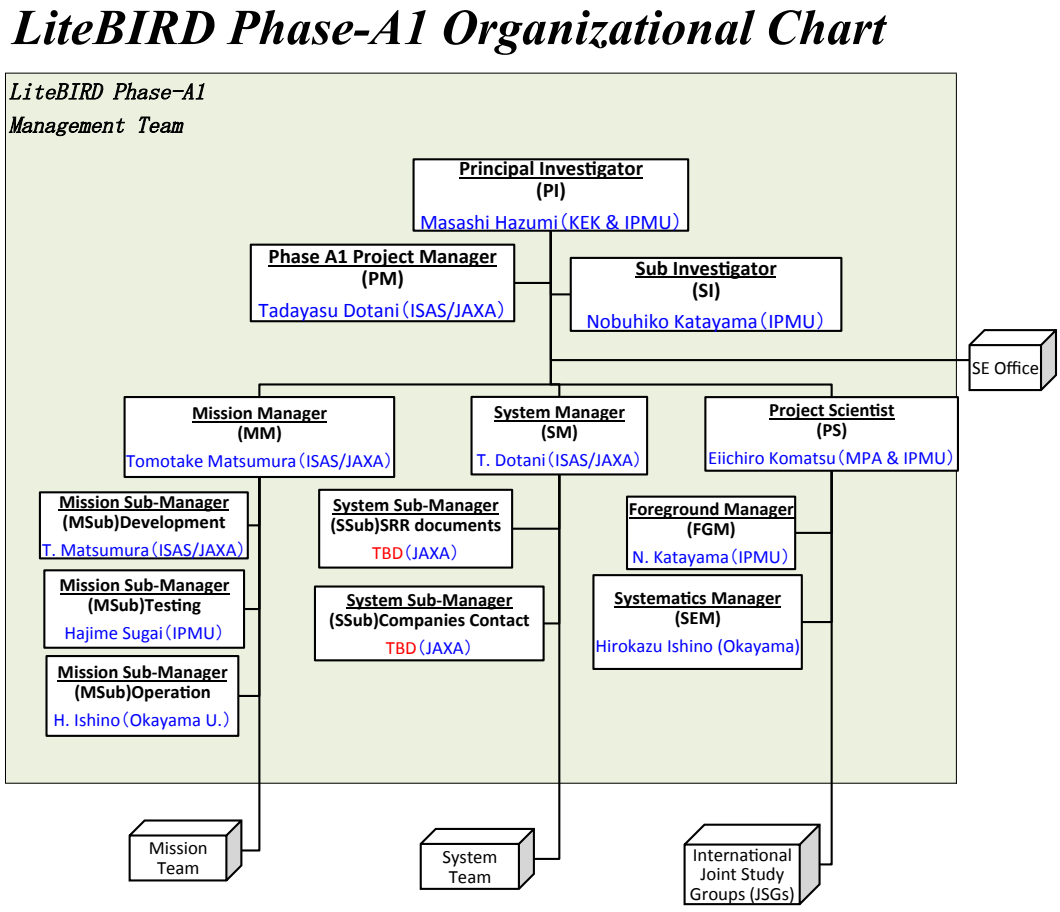

FIGURE 1. Organization chart of the Phase-A team under ISAS/JAXA.

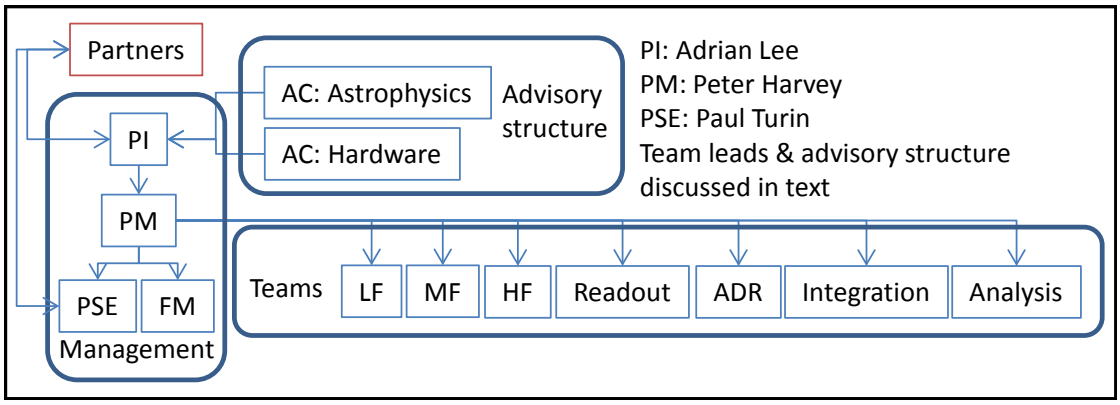

FIGURE 2. Organization chart of the NASA Phase-A team. The advisory committees will not be convened until Phase B. During Phase A, the technical point of contact with Japan is not the PSE, but is described in table 2.

Team Name	Team Responsibility	Team Lead Name / Institution	Other significantly contributing institutions
LF	Design & delivery of the flight and spare LF focal plane sub-arrays, already validated	Nils Halverson / CU	NIST,UCB
MF	Design & delivery of the flight and spare MF focal plane sub-arrays, already validated	Aritoki Suzuki / UCB	Stanford
HF	Design & delivery of the flight and spare HF focal plane sub-arrays, already validated	Johannes Hubmayer / NIST	Stanford
CR	Design & delivery of the flight and spare focal plane cryogenic readout components	Kam Arnold / UCSD	NIST
ADR	Design, sub-contract, and validation of the sub-Kelvin cryogenic system and its thermal couplings	Kent Irwin / Stanford	UCB
Integration	Integration and validation of the entire assembly before integration with the JAXA spacecraft	Bill Holzapfel / UCB	All
Analysis	Development of the US pipeline and reduction of the data from timestreams to scientific products	Julian Borrill / UCB	Stanford

TABLE 1. Table of team leadership with a short description of team responsibilities.

Name	Japan	US	Scope
Leadership POC (LPOC)	Masashi Hazumi (KEK & Kavli IPMU)	Adrian Lee (UC Berkeley)	Shaping collaboration, changes to science goals or scope, communication with funding agencies
Management POC (MPOC)	Tadayasu Dotani (ISAS/JAXA)	Peter Harvey (SSL)	Financial, schedule, document control, submission of CSR and SRR
Technical POC (TPOC)	Tomotake Matsumura (ISAS/JAXA)	Kam Arnold (U. Wisconsin)	Interfaces, requirements, detector properties, flowchart of ADR & spacecraft decision, etc.

TABLE 2. Point of Contacts (POCs) between Japanese and US Phase-A teams.

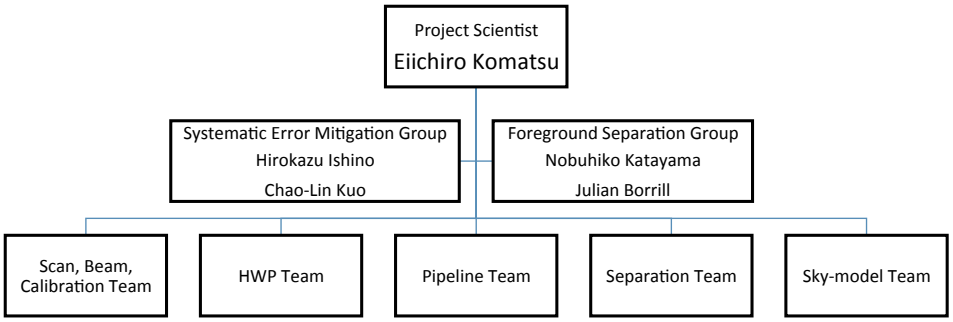

FIGURE 3. Organization chart of the JSGs.

Name	Japan	US	Scope
Foreground Separation Group Conveners	Nobuhiko Katayama (Kavli IPMU)	Julian Borrill (LBNL)	Come up with a reasonable estimate of the foregrounds and algorithms to remove them, develop tools for simulation and analysis, come up with the requirements for the system
Systematic Error Mitigation Group Conveners	Hirokazu Ishino (Okayama U.)	Chao-Lin Kuo (Stanford U.)	Make a list of systematic errors and estimate each of them, evaluate mitigations with HWP (and other methods if needed), come up with the requirements for the system

TABLE 3. JSG conveners.