

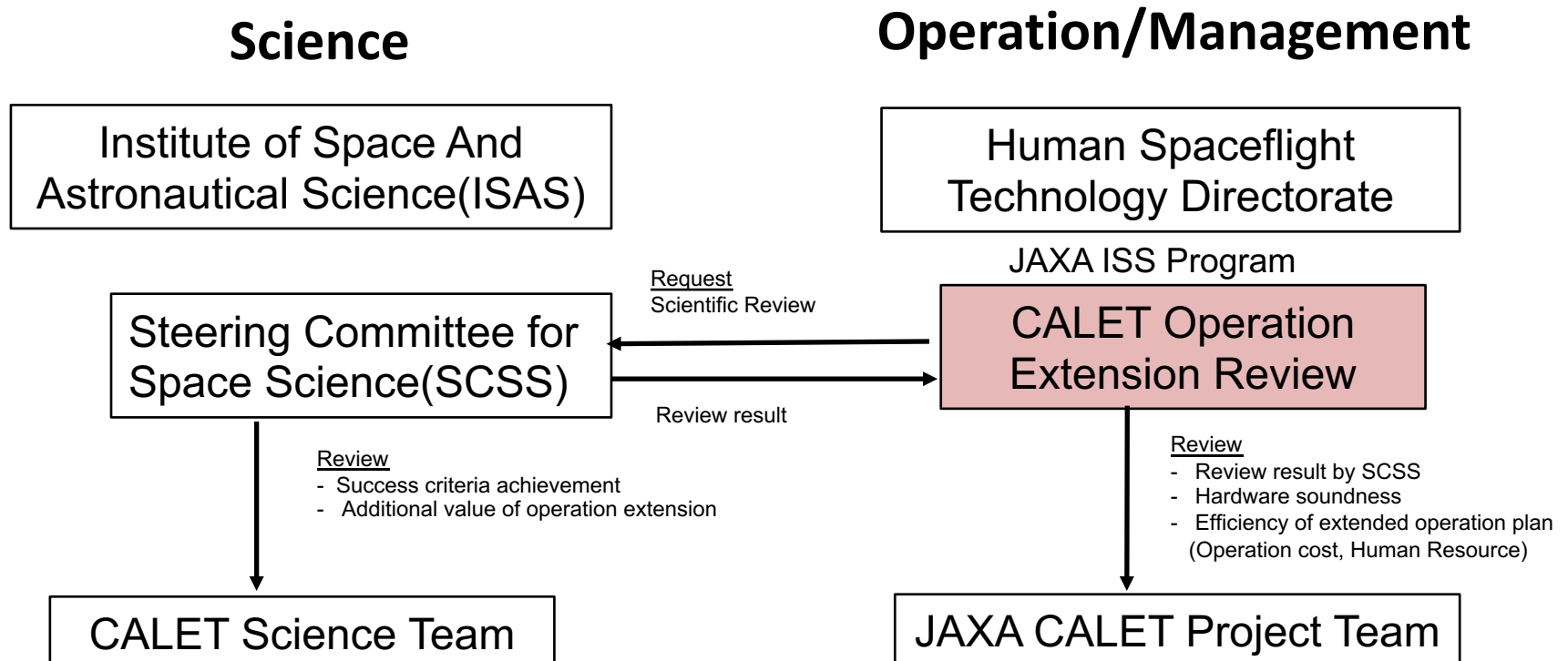
# Current status & future prospects of CALET

Shoji Torii, Waseda University

February 03, 2020@ IFAC-CNR

## 1. Review of CALET project

### Framework for CALET reviewing process



□ February 14, 2019@ Tsukuba Space Center :  
**Preliminary Review** for Extension Phase II after agreement of science review of the FSC by ISAS-SCSS.

Presenter: CALET Project Team in JAXA + Science Team  
**Preliminary approval of extension phase II by March, 2021 is done. However, it is asked to extend the LOA with NASA by end of 2020.**

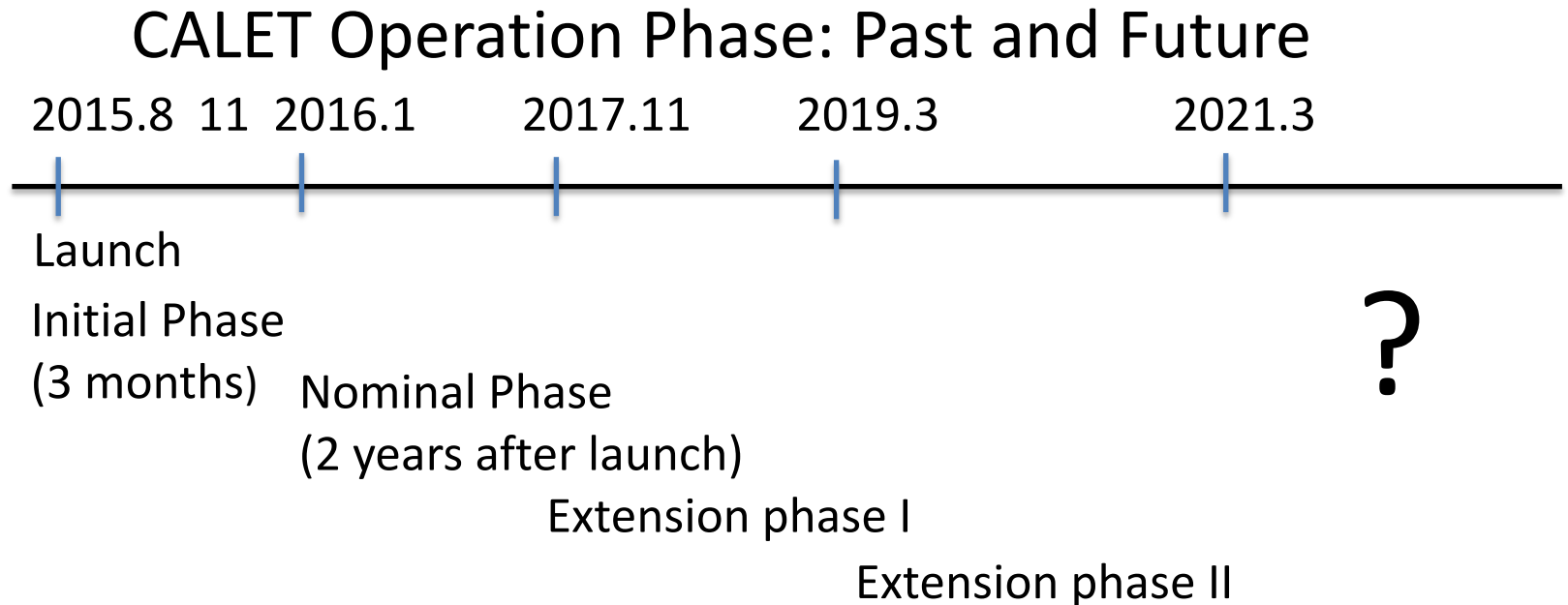
- Direct Measurement of the Cosmic-Ray Proton Spectrum from 50 GeV to 10 TeV with the Calorimetric Electron Telescope on the International Space Station, submitted to PRL in December 2018, Y. Asaoka, P.S.Marrocchesi, S.Torii
- Characteristics and Performance of the CALorimetric Electron Telescope (CALET) Calorimeter for Gamma-Ray Observations Astrophysical Journal Supplement Series 238(5) 1-16 (2018) N. Cannady, Y. Asaoka
- Search for GeV Gamma- Ray Counterparts of Gravitational Wave Events by CALET, Astrophysical Journal 863, 2, 160 (2018), Y.Asaoka, M.Mori
- Extended Measurements of Cosmic-ray Electron and Positron Spectrum from 11 GeV to 4.8 TeV with the Calorimetric Electron Telescope on the International Space Station, Physical Review Letters 120 (261102) 1-7 (2018), Y.Asaoka, S.Torii

□ March 1, 2019@ Tsukuba Space Center :

Full review for Extension Phase II with 130 pages presentation by CALAET project + science team

Presenter: CALET Project Team in JAXA + Science Team

The extension phase II is agreed. Further extension will be decided by end of 2020 under condition that the JAXA-NASA LOI will be extended by this timing. JAXA will have discussions with NASA by June, 2020. Extra Success is requested !!



Time schedule of review process for further extension after April, 2021

□ Science review by ISAS-SCSS: September, 2020

Extra Success Criteria: One ( at least ) of 13 criteria should be achieved.

Possible targets for achievement of criteria are following.

- 1) Electron observation extended to 10 TeV
  - 2) Gamma-ray observation extended to 1 TeV
  - 3) Heavy nuclei measurement up to 100 TeV/particle  
B/C ratio measurement up to TeV region
  - 4) Observation of solar modulation and the interpretation by Drift Model
  - 5) GW follow-up observation with CGBM and CAL and detection of signal and/or giving upper limits.
  - 6) Investigation of three-types time variation of EMIC and REP by cooperative observation with ERG satellite
- \*) Publication expected for Science Review

□ Program review by HSTD@Tsukuba: December, 2020

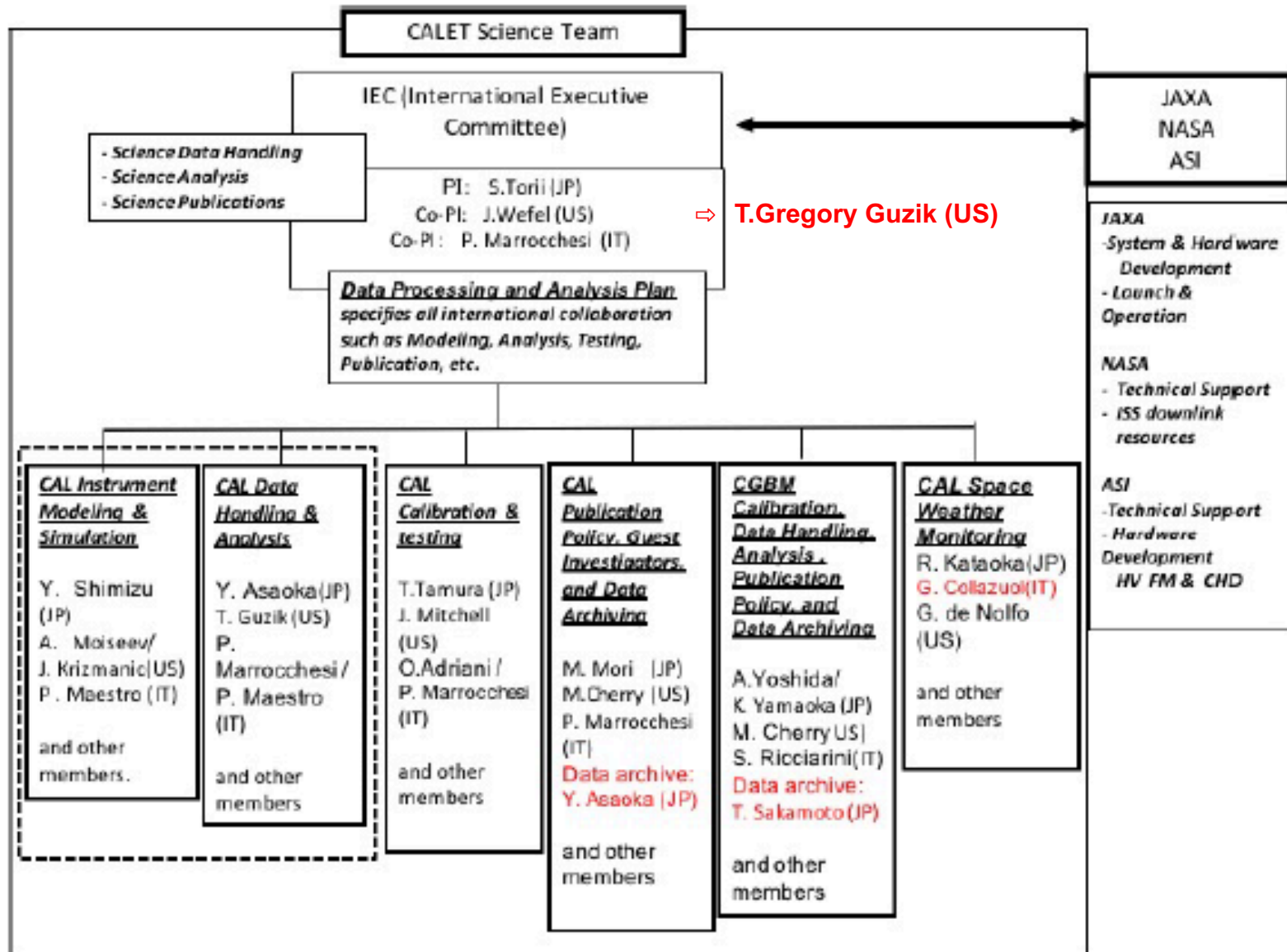
- Science review
- JAXA-NASA LOI
- JAXA-ASI LOI

Presentation by S. Doi (JAXA) in this afternoon session.

**JAXA strategy of JEM/EF utilization and extension of CALET mission**

## 2. Science team organization

DPAP Rev.D



M&S team and DH&A team will cooperate each other for checking data results.

# 3. Revision of Member list

## Modification as of Jan. 2020 from update version of DPAP Rev. D

O. Adriani<sup>1,2</sup> , Y. Akaike<sup>3,4</sup>, K. Asano<sup>5</sup> , Y. Asaoka<sup>6,7</sup> , M. G. Bagliesi<sup>8,9</sup>, E. Berti<sup>1,2</sup>, G. Bigongiari<sup>8,9</sup>, W. R. Binns<sup>10</sup> , A. Bruno<sup>37</sup> , **S. Bonechi<sup>8,9??</sup>**, M. Bongi<sup>1,2</sup> , P. Brogi<sup>8,9</sup>, J. H. Buckley<sup>10</sup>, N. Cannady<sup>11</sup>, G. Castellini<sup>12</sup>, C. Checchia<sup>13,14</sup> , M. L. Cherry<sup>11</sup> , G. Collazuol<sup>13,14</sup>, V. Di Felice<sup>15,16,17</sup> , K. Ebisawa<sup>18</sup> , H. Fuke<sup>18</sup>, T. G. Guzik<sup>11</sup>, T. Hams<sup>3,19</sup>, ~~N. Hasebe<sup>6</sup>~~, K. Hibino<sup>21</sup>, M. Ichimura<sup>22</sup>, K. Ioka<sup>23</sup> , W. Ishizaki<sup>5</sup>, M. H. Israel<sup>10</sup> , K. Kasahara<sup>6</sup> , J. Kataoka<sup>6</sup> , R. Kataoka<sup>24</sup> , Y. Katayose<sup>25</sup>, C. Kato<sup>26</sup>, N. Kawanaka<sup>27,28</sup> , Y. Kawakubo<sup>29</sup>, H. S. Krawczynski<sup>10</sup> , J. F. Krizmanic<sup>3,19</sup>, K. Kohri<sup>30</sup>, ~~T. Lomtadze<sup>9</sup>~~, **J. Link<sup>3,4</sup>**, P. Maestro<sup>8,9</sup>, P. S. Marrocchesi<sup>8,9</sup>, A. M. Messineo<sup>9,31</sup>, J. W. Mitchell<sup>4</sup>, S. Miyake<sup>32</sup>, A. A. Moiseev<sup>19,33</sup>, ~~K. Mori<sup>6,18</sup>~~, M. Mori<sup>34</sup> , N. Mori<sup>2</sup> , H. M. Motz<sup>35</sup>, K. Munakata<sup>26</sup> , H. Murakami<sup>6</sup>, S. Nakahira<sup>36</sup>, J. Nishimura<sup>18</sup>, G. A. de Nolfo<sup>37</sup>, S. Okuno<sup>21</sup>, J. F. Ormes<sup>38</sup>, **N. Ospina<sup>14</sup>**, S. Ozawa<sup>6</sup>, L. Pacini<sup>1,2,12</sup>, F. Palma<sup>15,16</sup>, **V. Pal'shin<sup>28</sup>**, P. Papini<sup>2</sup>, B. F. Rauch<sup>10</sup>, S. B. Ricciarini<sup>2,12</sup> , K. Sakai<sup>3,19</sup>, T. Sakamoto<sup>29</sup>, M. Sasaki<sup>19,33</sup>, Y. Shimizu<sup>21</sup>, A. Shiomi<sup>40</sup>, R. Sparvoli<sup>15,16</sup> , P. Spillantini<sup>1</sup>, F. Stolzi<sup>8,9</sup>, **S. Sugita<sup>28</sup>** J. E. Suh<sup>8,9</sup> , A. Sulaj<sup>8,9</sup>, I. Takahashi<sup>41</sup>, ~~M. Takayanagi<sup>18</sup>~~, M. Takita<sup>5</sup>, T. Tamura<sup>21</sup>, T. Terasawa<sup>36</sup>, ~~H. Tomida<sup>18</sup>~~, S. Torii<sup>6,42</sup>, Y. Tsunesada<sup>43</sup> , Y. Uchihori<sup>44</sup>, ~~S. Ueno<sup>18</sup>~~, E. Vannuccini<sup>2</sup>, J. P. Wefel<sup>11</sup>, K. Yamaoka<sup>45</sup>, S. Yanagita<sup>46</sup>, A. Yoshida<sup>29</sup>, and K. Yoshida<sup>47</sup>

- ✓ From following publications ( to be submitted after this TIM) , the member list will be used for CALET collaboration papers.
- ✓ The member list in DPAP will be revised in next version Rev. E

## 4. Data Archiving

Archiving Center (will be) established

➤ JAPAN      JAXA-ISAS      DARTS

<http://darts.isas.jaxa.jp/astro/calet>

CGBM data has started from May, 2018

➤ USA      NASA-Goddard      HEASARC

➤ Italy      ASI      SSCDC

- ❑ Details of archiving will be presented on Wednesday (teleconf)
  - K. Ebisawa,  
CALET data archive at ISAS/JAXA's science archive DARTS
  - L. Angelini, HEASARC CALET archive status
- ❑ Calorimeter Data Archives are necessary in similar way with CGBM on the Level 3 and higher (published) data. **- DONE**
- ❑ CHD count rates in day-by-day are archived. **-DONE**  
, necessary for publications of Space Weather

## 5. Collaboration with LVC, MAXI, SEDA

### □ LIGO and VIRGO

#### **Memorandum of Understanding between CALET and LIGO and VIRGO**

regarding follow-up observations of gravitational wave event candidates

April 5, 2014

Status: One collaboration paper published

CALET will join with collaboration of O3 run which will start from next year.

For expected engineering runs in October 2018, we are preparing the software update of CALET for the observation timing of CGBM and CAL.

**GCN Circulars related to O3 observation were continuously published.**

### □ MAXI

#### **Letter of Intent for collaboration**

between CALET Science Team and MAXI Science Team December 21, 2016

December 21, 2016

Status: **Collaboration paper\* is published.**

### □ SEDA

#### **Letter of Intent for collaboration**

between CALET Science Team and SEDA-AP Science Team

October 10, 2017

Status: SEDA operations were terminated. **Collaboration paper\* is published.**



## Collaboration paper\*

Using **CHD data and SEDA/SDOM and MAXI/RBM data**

“Radiation dose during relativistic electron precipitation events at the International Space Station” , H.Ueno et al.

*Published in Space Weather ( Dec. 2019)*

## 5. New collaboration proposal and Publication

- New collaboration with ERG (Exploration of energization and Radiation in Geospace) is under consideration. **Cancelled**
- Using only CHD count rates , which are obtained when ISS and ERG satellite are at same place, we can get important information of geospace science.

**Paper submitted to JGR in collaboration with ERG , will be reported by R.Kataoka on Wednesday (teleconf)**

- We need the Web archiving the CHD count rate for publication by a rule of this field ( say JGR). **Done**

## 7. DPAP revision Rev.D => Rev.E

The following revision issues will be done .

1. Member List
2. Data Archiving Plan
  - Level 3: published spectrum data

### 5) CALET Level 3 and Higher Level Data

*Definition: Level 3 data are classified to use for science analysis. ~~The data volume includes particle kind, particle energy and arrival direction for each event. Several different Level 3 (or higher) data volumes might be created as the need arises, and a suitable volume of the data will be submitted to the data archives.~~*

2019.3.27

- CHD count rate data ( for publication )

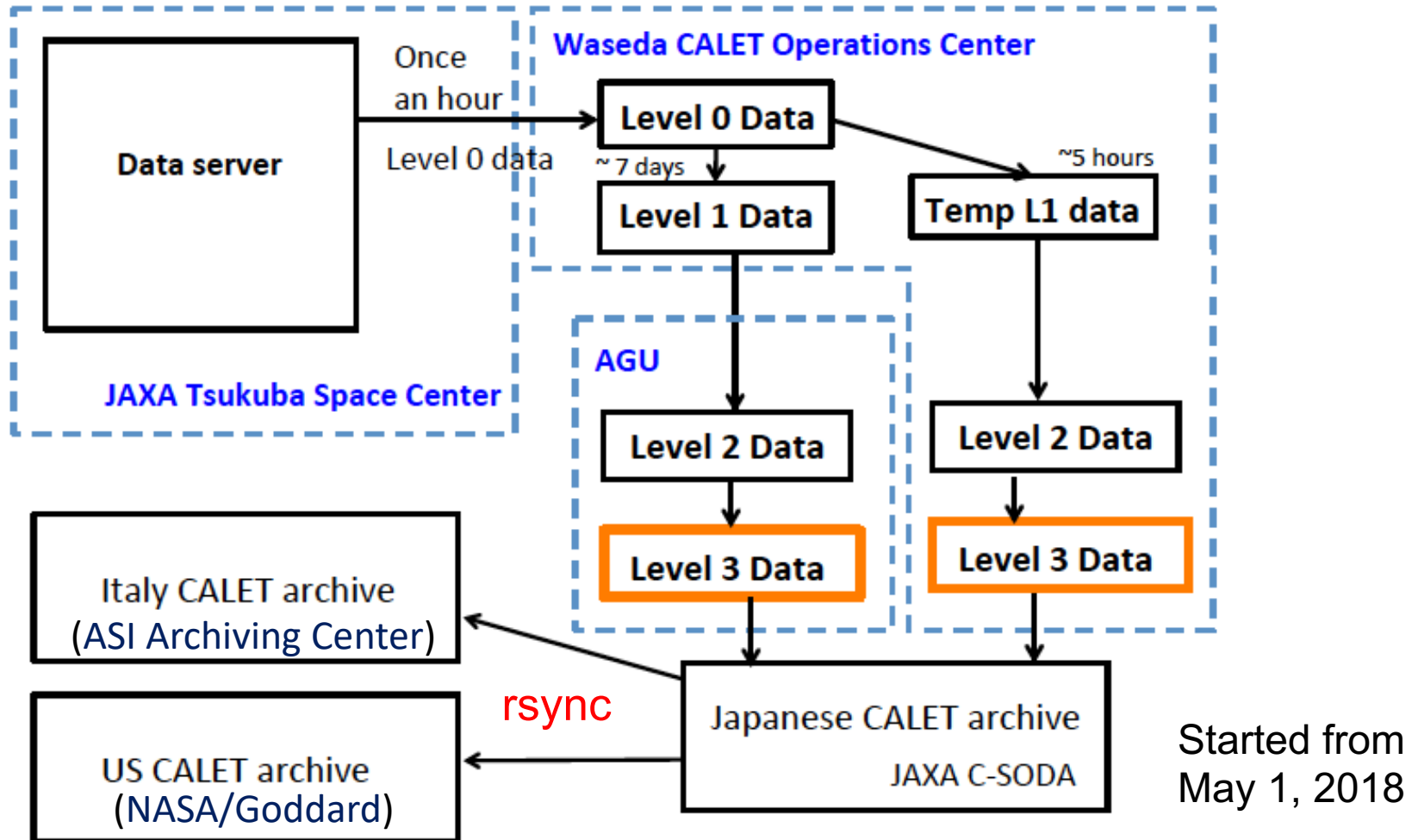
### 3. Publication Policy

Category 1 & 2:

Approval for author confirmation  
( in following publications )

**N.B** Publication using only CHD count rate ( archived ) is usually not categorized as collaboration paper.

# CGBM Data Flowchart



Please visit to <http://darts.isas.jaxa.jp/astro/calet>

# Conference of CALET Scientific Achievement on December 15 at Waseda University

CALET team, JAXA, Company, OB/OG of Torii Lab. in Waseda U.

JAXA award to companies contributed to CALET

