

**Title: IACHEC Timing WG telecom****Date: 28 April, 2020****Time: 13:00 UTC = 22:00 JST = 15:00 CEST = 9:00 EDT = 6:00 PDT****Zoom:** <https://us02web.zoom.us/j/86397822485?pwd=S1RaaVRuMEtuN20rUzITWkdhOXFPZz09>**Notes:** https://docs.google.com/document/d/16Rd3K5CI5Hc7beNvorDI_47wFHOzBifs04ezcBTC1Fg/edit?usp=sharing**Participants:** Matteo Bachetti, Gulab Dewangan, Takaaki Tanaka, Yukikatsu Terada, Felix Fuerst, Katja Pottschmidt, Teruaki Enoto, Vinay Kashyap, Makoto Sawada

Items listed before telecom in Red, Notes in Blue

Agenda

1. Quick remind of the goal of Timing group
2. Update short term plan, which was discussed in the last IACHEC meeting at Shonan.
3. Set up action items & plan by September meeting

1. Goal of Timing WG*The followings are defined in the last 14th IACHEC meeting*

1. Share information on Timing calibration methods/protocol, lessons learned (to enhance timing capability)
 - Suzaku, Hitomi (2017,2018, 2019)
 - NuSTAR(2019), NICER (2018)
 - HXMT(2018), Astrosat
 - eROSITA
 - Future missions (XRISM, Athena, etc)
2. In-orbit timing calibration plan/observations
 - Calibration plans for near future missions
 - Requirement of timing coordinated observations
 - Analyses of GO coordinated observations
3. Studies on Timing
 - effects on timing products (power spec, light curve etc) by the detector's behavior (dead time, grade selection of calorimeter etc)
 - Others.

Q. Any other ideas?

2. Short term plan*The followings are defined in the last 14th IACHEC meeting. Discussion points are shown in red.*

1. Share information
 - Summary of current timing status & lessons learned from missions
 - ✓ Gather published papers on timing by missions & Update Timing group wiki page to **Let's list up papers on your own or favorite. (*a)** better to share documents on Google and/or IACHEC slack (A/I) consider the best solution.
 - 1) Wiki: <https://wikis.mit.edu/confluence/display/iachec/Timing>
 - 2) We can also use IACHEC slack for quick communication. Setting up a Timing channel. (A/I) Join IACHEC slack. https://join.slack.com/t/iachec/shared_invite/zt-dwd4i44z-D1AMVHf7ZsXrZJT99zSHGw
 - ✓ Consider publishing current results on conference like SPIE etc. **Q. Do you have plan? (*b)**
 - Identify problems on timing by missions
 - ✓ Set up Timing MLs. (A/I Yuki sets up) **Q. Can we make ML for Timing WG, with the current list?** iachec org ML has some technical problems. → Yuki will set up ML in Japan, using the current list, but open for everybody interested in this topic (sign up option).

Shall we summarize “Timing Requirement/Goal” + “In-orbit timing calibration target (with paper)”?
 Any good idea? (*c)

Strategy of Timing Calibration, problems summarized in a single document by mission.
 (A/I) set up a summary table, and then (A/I) fill values, detail description.

MB: e.g.

Mission/instrument	Clock stability (e.g. Allan variance or millisecc rms)	Precision wrt UTC time	Reported issues
NuSTAR/FPM	0.1 ms	0.1 ms	~5ms offset using millisecond pulsars (Lucien Kuiper)

2. In-orbit timing calibration plan/observations

- Survey current archive data of coordinated observations and perform analyses on timing calibration aspects
 ✓ This is the action item(*d)
- Circulate requests on timing calibration among timing MLs
 ✓ NICER could be the reference of timing in these days (like RXTE in previous IACHEC activities)

3. Studies

- Note: NuSTAR has published papers on effects of dead time etc.
- This is the next step.

3. Action Items, Scope in 15th IACHEC in September

Q. Do you attend the 15th IACHEC meeting?

Anyway, first step is to share (gather) information on the wiki. (confirm the following A/I candidates)

- (A/I) Wiki set up ... Yuki
- (A/I) Post paper information (Published papers /Future publication) to ML (*a)(*b) ... members
- (A/I) Post “Timing Requirement/Goal” of your instrument + “In-orbit timing calibration target you use / planned to use / will use /(with paper information)” to ML (*c)... members
- (A/I) Other Ideas from discussion.

(A/I) Update iachec.org Timing Page by Yuki, and link to a repository (Wiki page) where members can edit.

The definition of Point-of-Contact (PoC): confirm the PoC / confirmed

- Chandra Vinay Kashyap
- XMM-Newton Felix Fuerst
- Swift Katja Pottschmidt can ask Amy Lien
- INTEGRAL Guillaume Belanger, Volodymyr SAVCHENKO
- NuSTAR Matteo Bachetti, Katja Pottschmidt (programmatic)
- NICER Craig Markwardt, Teruaki Enoto
- HXMT Xiaobo LI
- Astrosat Gulab Dewanga, Dipankar Bhattacharya (to be confirmed)
- eROSITA Vadim Burwitz (Katja will confirm)
- RXTE Keith Jahoda (Katja will confirm), Katja Pottschmidt
- Suzaku Yukikatsu Terada
- Hitomi Yukikatsu Terada

- (*d) Survey current archive data of coordinated observations and perform analyses on timing calibration aspects
- First step is to list archive data, coordinated observation between multiple X-ray missions, suitable for timing calibration (i.e., variable, periodical, etc).
Who checks? How? Any good idea? → Matteo will check the simultaneous observations in archive.
 - Next step is the actual analyses.

4. Other Discussions, if we need

Coordinated observation on timing ; we can discuss on IACHEC slack workspace.

“Timing tools” coordinate with calibration statistic group (Vinay)

Note: the doodle poll for our virtual meeting of statistic group — <https://doodle.com/poll/krw7mwkq7qtn33q5>

- #### 5. Next telecom
- to be defined in May? June?**
→ after setting up a repository etc. (end of May -- June)

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