Title: IACHEC Timing WG telecom
Date: 12 May 2021
Time: 14:00 UTC = 23:00 JST = 10:00 EDT = 7:00 PDT = 16:00 CEST
Zoom: https://zoom.us/j/91292380493 (passcode: iachec)
Notes:
  https://suitc-my.sharepoint.com/:w:/g/personal/terada_mail_saitama-u_ac_jp/ERtJ8Dy9gddAn8pZdW8EKFQBmLM9G9DVo1WCWBbkb6zY4g?e=PxQYvV

Participants: Yuki, Taka, Amy, Dipankar, Katja, Matteo, Simon, Teru, Felix

Meeting Notes are shown in Red. (Participants can edit this page.)

Agenda

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0. Scope of this meeting
- The IACHEC WG report on 17-19 May 2021
- Scope today
  - ➢ Check the status after the last meeting on 20 April 2021.
  - ➢ Check the presentation for plenary report session.

1. Working Group Communication (short announcement)
1.1 Current Members & Mission
　　Yukikatsu Terada (Suzaku,Hitomi, XRISM), & his student Minami Sakama (XRISM)
　　Craig Markwardt (NICER),
　　Teruaki Enoto (NICER),
　　Matteo Bachetti (NuSTAR),
　　Katja Pottschmidt (NuSTAR),
　　Felix Fuerst (XMM-Newton),
　　Simon Rosen (XMM-Newton),
　　Vinay Kashyap (Chandra),
　　Arnold Rots (Chandra),
　　Amy Lien (Swift),
　　Guillaume Belanger(INTEGRAL),
　　Volodymyr SAVCHENKO(INTEGRAL),
　　Lucien Kuiper(INTEGRAL)
　　Xiaobo LI (HXMT),
　　Gulab Dewangan (Astrosat),
　　Dipankar Bhattacharya(Astrosat)
　　Makoto Sawada(XRISM),
　　Takaaki Tanaka (XRISM)

1.2 IACHEC Timing ML : iachec-time@heal.phy.saitama-u.ac.jp   (Please ask Yuki to update.)
　　terada@mail.saitama-u.ac.jp,
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gulabd@iucaa.in,
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L.M.Kuiper@sron.nl

1.3 IACHEC Slack
- 10 members on IACHEC/Timing Slack at this moment
  - ➤ Yuki, Vinay, Felix, Gulab, Katja, Matteo, Simon, Teru, Takaaki, Xiaobo
- Please Join.(invitation this week)
  - ➤ https://join.slack.com/t/iachec/shared_invite/zt-padwl8dd-agdsBrGAaLNc5Ljmf7uCuQ

1.4 IACHEC Timing WWW
- Address: https://iachec.org/timing/
- Please ask Yuki to update.

1.5 IACHEC Timing Wiki page
- Address: https://wikis.mit.edu/confluence/display/iachec/Timing
- Instruction to get account to edit this Wiki page: https://iachec.org/iachec-wiki/ (Ask Eric)
- Do you have some trouble getting an account?

2. Activity I: Summary Table of Timing Performance/Calibration

- Purpose:
  - ➢ gather the information on timing calibration / performance of multiple missions.
- Please see https://wikis.mit.edu/confluence/display/iachec/Timing
- Organizer: Yuki
- Status
  - ➢ Table updated (thank you for sending us the information).
  - ➢ Please check the latest version on the Wiki (Because Yuki may have failed to reflect the values in the table.)
- Missing
  - ➢ RXTE PCA & HEXTE … no value
  - ➢ Chandra ACIS/HRC … the value is offset or deviation?
  - ➢ XMM EPIC-MOS … no value (--> remove)
  - ➢ INTEGRAL SPI … no value
  - ➢ HXMT … no value but Xiaobo will provide.
  - ➢ eROSITA … no value
- Discussion
  - ➢ Definition of negative / positive in the offset time? --> not checket yet.
  - ➢

3. Activity II: Systematic survey of Timing Calibration of multi missions using Crab pulsar

- **Purpose**: comparison of Crab ephemeris among instruments.
  - ➢ 1. Cross Calibration
  - ➢ 2. Systematic check of the delay of main pulse in the X-ray to Radio
    Note: please see the presentation by Kuiper in IACHEC 2018.
- Organizer: Matteo
- Status
  - ➢ send barycenter event fits file to Matteo from PoCs on the following repository
    - ✧ https://drive.google.com/drive/folders/15Zoz3M7BkeoC33ip3ezP0kWXLOtcS94C?usp=sharing
    - ✧ Need your Google account
  - ➢ barycenter event files
    - ✧ barycentric correction into DE430 (not DE200)
  - ➢ mission specific issues
    - ✧ Suzaku HXD, definition of PIs … closed.
    - ✧ XMM data do not write the PLEPHEM keyword, or equivalent, in the FITS header. It would be great if SAS were updated to include this information.
    - ✧ One XMM observation has a very large offset, about 6 ms (obsid 0122330801).
    - ✧ The NICER dataset was too large for my laptop and home connection 😊   < 100MB

UPDATE (May 11th) -- Matteo

Current status of experiment: a working pipeline that:

- loads an event list
- downloads the best Crab ephemeris corresponding to that observation
- Folds the events to that ephemeris
- Compares to a (for now single) standard template
- Calculates residuals.
- Updates a summary table that gets plotted by a simple interactive web app (local, for now) that allows to browse the observations and single out the "problematic" ones. Draft results, based on the data processed so far, below.


To do (Matteo):

- Currently, single template. Need to account for energy-dependent templates, and perform an energy-dependent analysis
- For NuSTAR and possibly others: dead-time modification to template
- Include possible pre-folded data (e.g. ISGRI)
- Improve the app so that it deploys the plot to a web page (e.g. the IACHEC website) every time a new observation is processed

To do (Others):

- Please provide more data!
- Comments are welcome
- Comment: Astrosat has fixed offset time. We should shift by hand. Dipankar will provide more files (reducing the file size, including > 5 million events.
- Comment on XMM: we want to see plots
- Comment on Swift: the pulse profile is noisy. Amy will send Matteo more data. --> Swift rofile in the simultaneous Crab observation in 2007 March seems to be better. **(A/I)** Ask Taka from Amy.
- Comment on Suzaku: Suzaku has trouble in time assignment due to ground station failure. --> **"known issues" should be also attached. (A/I)**
- Comments on NuSTAR: no correction of dead time yet.

- Comments on NICER: the size of event files is already reduced. --> **(A/I Teru)** send one by one. and/or cut by event numbers by 5 million events. Try to reduce < 100MB.
- Radio ephemeris has uncertainties ; usage of NICER is better.
- Any trends ?

Residuals
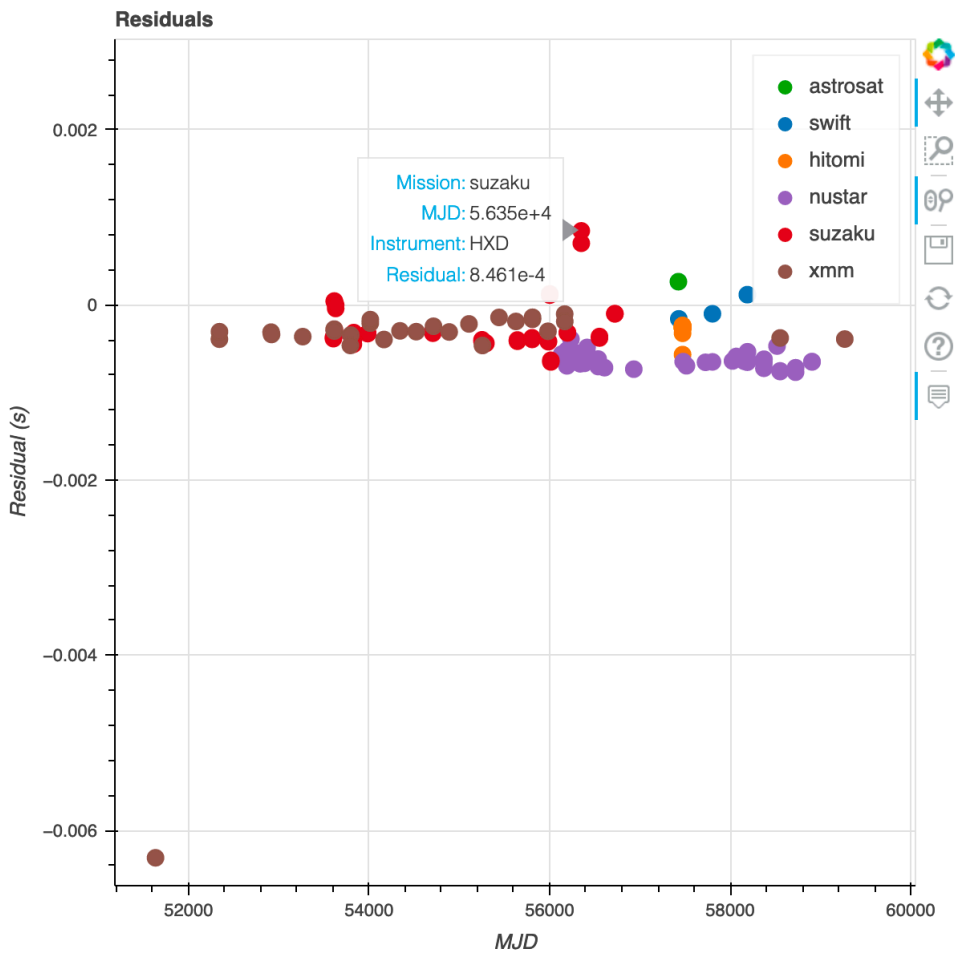
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- **Discussion & A/I**

4. Presentation

- Please check the following as a draft.;
  - ➢ https://suitc-my.sharepoint.com/:b:/g/personal/terada_mail_saitama-u_ac_jp/EeLf7p_dZz9PpTAIGUFDUywBoE7sLjAY9b1aBN74lCTVOA?e=aSKFWc
  - ➢