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Change Password       Ite       Proceeding Paper         Title       DEVELOPMENT OF A CLOCK GENERATION AND TIME DISTRIBUTION SYSTEM FOR HYPER-KAMIOKANDE         Authors       Lucile Mellet* ③, Mathieu Guigue ④, Boris Popov, Stefano Russo, Vincent Voisin         Abstract       The construction of the next-generation water Cherenkov detector Hyper-Kamiokande (HK) has started. It will have an about ten times larger fiducial volume compared to the existing Super-Kamiokande detector and increased detector performances. The data taking is planned from 2027. Time stability is crucial, as detecting physics events relies on reconstructing Cherenkov rings based on the coincidence between the photomultipliers. The above requires a distributed clock jitter at each endpoint smaller than 100 ps. In addition, since this detector will be mainly used to detect neutrinos produced by the J-PARC accelerator in Tokal, each event needs to be timed-tagged with a precision better than 100 ns with respect to UTC in ord to be associated with a proton spill from J-PARC, or events observed or other detectors for multi-messeng astronomy. The HK collaboration sis na R&D phase and several groups are working in parallel for the electronics system. This proceeding will discuss the clock generation, including the connection scheme between the GNSS receiver (Septentrio) and the atomic clock (free-running Rubidium), the precisic calibration of at two-stage distribution system that sends the clock and various timing-sensitive information each front-end electronics module, using a custom protocol.         Volunteer Preferences       Author's Reply to the Review Report (Reviewer 1)       Please provide a point-by-point response to the reviewer's comments and either enter it in the box below or upodat in as a Word/PDF file. Please write down "Please see th	Home	Manuscript ID	psf-2088638					
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Comments and Suggestions for Authors	The paper lacke callerent hevery and realine recommend it for publication.								
	The abstract says " a	novel	novel design for a time synchronization system" but it is not novel.						
This paper describes a basically identical scheme: DOI 10.1088/1681-7575/ac0f31									
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		iation on this scheme ( it doesn't use CGGTTS, just the receiver's one 1 pps output, GPS) is described here:							

https://tsapps.nist.gov/publication/get\_pdf.cfm?pub\_id=905719

https://tsapps.nist.gov/publication/get\_pdf.cfm?pub\_id=925660

In short, the method is well known and well-described already in the literature.

To be publishable, the paper needs descriptions of steering algorithms used etc, and a through evaluation of performance.

A few other comments:

In 2.1, second paragraph, the first few sentences are clearly about the behaviour of a Rb – the comments do not apply to all atomic clocks.

In 2.2, it says the "PolaRx5 .. will track .. for 13 minutes" which is misleading. The PolaRx5 is continously tracking, but reporting CGGTTS data in 13 minute tracks, as per the CGGTTS specification.

In 2.3, it says "The time differences ... do not directly give UTC time tags ..". I think what is meant is that the REFSYS values are not with respect to UTC.

In 3.1, "All individual components were calibrated" do you mean antenna+receiver delay was calibrated by SYRTE. What uncertainty was assigned to this?

In 3.1, if number of visible satellites is of concern, why not use additional GNSS?

Your delay calibration for GPS can be transferred to other GNSS, with minimal increase in uncertainty.

The paper lacks sufficient novelty and I cannot recommend it for publication.

The abstract says "... a novel design for a time synchronization system ..." but it is not novel.

This paper describes a basically identical scheme:

**DOI** 10.1088/1681-7575/ac0f31

NICT implement a system like this (feedback to the remote reference is not described in this paper but was subsequently implemented)

https://www.nict.go.jp/publication/shuppan/kihou-journal/journal-vol50no1.2/050402.pdf

Another variation on this scheme (it doesn't use CGGTTS, just the receiver's one 1 pps output, aligned with GPS) is described here:

https://tsapps.nist.gov/publication/get\_pdf.cfm?pub\_id=905719

https://tsapps.nist.gov/publication/get\_pdf.cfm?pub\_id=925660

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