

International Association of Geodesy Precise Point Positioning Ambiguity Resolution Working Group (IAG PPP-AR WG)

Members

Alcay	Salih	Necmettin Erbakan University	Turkey
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Lotfi	Massarweh	TU Delft	The Netherlands
Naciri	Nacer	NASA Jet Propulsion Laboratory	USA
Ogutcu	Sermet	Necmettin Erbakan University	Turkey
Pan	Yuanxin	ETH Zürich	Switzerland
Wareyka-Glaner	Marcus	Technische Universität Wien	Austria
Xiao	Guorui	Information Engineering University	China
Yi	Ding	York University	Canada
Zhang	Qiyuan	Wuhan University	China

Agenda

- welcome
- introduction round
- objectives of the WG
- first initiatives
- AOB

present:

Salih Alcaç, Berkay Bahadur, Tomasz Hadas, Pan Li, Lotfi Massarweh, Nacer Naciri, Sermet Ogutcu, Yuanxin Pan, Marcus Wareyka-Glaner, Guorui Xiao, Ding Yi, Qiyuan Zhang

Welcome

- thank you for joining the WG
- it's great to have you here
- the WG lives through its members

Organizational Matters

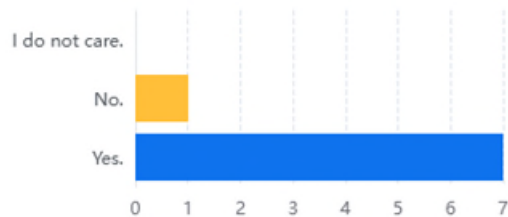
- Google Drive folder
 - everything goes there
 - suitable for everyone or alternative?
- how much communication over e-mail?
- other channel(s) of communication?
- regular meetings: how often?

survey during the meeting, results on the next slide

Organizational Matters

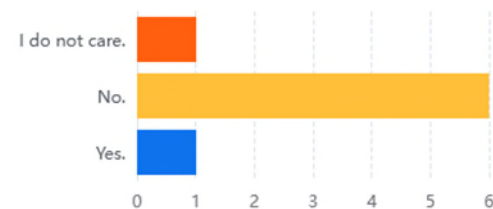
1. Google Drive is fine for me. (Single choice)

(8/8) 100% answered



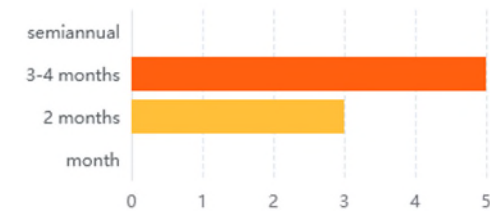
3. I want another channel of communication (in addition to email, e.g. more informal). (Single choice)

(8/8) 100% answered



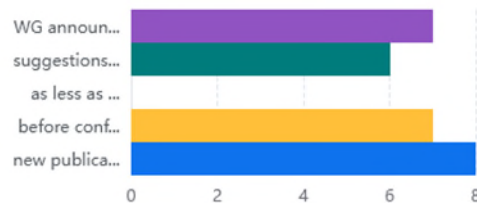
4. I want a regular WG meeting every ... (Single choice)

(8/8) 100% answered



2. email communication regarding ... (Multiple choice)

(8/8) 100% answered



Options	Responses
new publications	(8/8) 100%
before conferences (e.g., social events)	(7/8) 88%
as less as possible	(0/8) 0%
suggestions (e.g., interesting PPP or other projects)	(6/8) 75%
WG announcements (e.g., next meeting)	(7/8) 88%

We will use Google Drive. If something does not work for you, contact Marcus.

People are interested in getting email notifications → please feel free to use the WG and the e-mail distribution list to distribute information

We will only use email as channel of communication.

Regular WG meetings will be held every 3-4 months.

Description

Global Navigation Satellite Systems (GNSS) enable a worldwide positioning and navigation service independent of time, location, and weather. Nowadays, multiple GNSS transmit various signals on 3+ frequencies, enabling innovative developments and techniques. Over the past decades, the principle of Precise Point Positioning (PPP) has proven itself as a substantial GNSS positioning method. PPP is an absolute positioning method using complex observation models and relying on precise satellite orbits, clocks, and biases. Various analysis centers and agencies publicly provide such satellite products in real-time and post-processing with slightly different computation strategies. This circumstance provides some challenges for the PPP user because consistency is essential. Nowadays, multiple PPP software packages, mostly publicly available, offer innovative approaches to PPP. Discussing and linking these advantages should benefit the whole PPP community. Typically, PPP achieves accuracies similar to relative positioning methods like Real-Time Kinematic (RTK) and offers several benefits in comparison (e.g., global corrections). However, the convergence time of PPP is still an issue limiting its application in real-time and time-critical applications. The convergence time must be reduced to way below one minute ('instantaneous convergence') to make PPP completely competitive with relative positioning methods. PPP with integer ambiguity fixing (PPP-AR) has proven to effectively reduce or even eliminate the convergence time. In particular, approaches besides the ionosphere-free linear combination based on 2+ frequencies are currently heavily investigated. Fully utilizing all current GNSS constellations and their signals on 3+ frequencies for PPP and ambiguity resolution is an ongoing topic.

Objectives

From the WG description. Shortly presented.

- discuss methods effective for reducing the convergence time of PPP
- give a recommendation for defining PPP convergence and coordinate accuracy
- create an overview and comparison of satellite products and software packages enabling PPP-AR
- define test cases to compare different PPP algorithms and software packages
- to disseminate the major findings through journal papers and conference proceedings

First Initiatives

- publication/paper: overview of PPP software and satellite products (?)
 - lot of knowledge and know-how in this WG
 - introduction/description of available PPP software
 - test: common test case + definition of convergence and accuracy

Summary of the discussion on the next slide.

- ... *Future initiative: Make a PPP workshop for experts and interested people. Potentially, in the 4th/last year of this WG*

First Initiatives

Positive feedback on doing an overview publication exploiting the know-how and knowledge of this WG.

Include PPP software, satellite products, and several PPP topics in a general sense

→ review paper covering a wide area.

→ Marcus will disseminate a document where everyone can enter possible contributions.

Second (more scientific) publication to demonstrate/compare the performance of several PPP software.

Defined test cases and several datasets (e.g., low-cost).

Introduce common benchmarks (e.g., definition of convergence and accuracy).

AOB

- conference table (Google Drive)
 - enter your attendences
 - add your contributions
 - check what they others are doing

- next meeting: after the summer (?)

Please use the conference table:

<https://docs.google.com/spreadsheets/d/12FEeUHDWXHfqoDVbRzeQsK5UHCqcZVPRRiQSXiSKuRs/edit#gid=0>

We might have social events at conferences with enough attendance from this WG.

Next meeting will be in 3-4 months (September/October).

Thanks for taking part and have nice summer!