

# IGS Task Force for the Format Standard of Product Combination Statistics

Apr. 28, 2026 (virtual)

## Participants

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## 1. Purpose

This meeting is the second meeting of the task force, aimed at reviewing progress since the kick-off meeting last December, with a focus on discussing the standard formats (YAML, SINEX) for product combination statistics and their specific contents, as well as clarifying the next steps in the work plan.

## 2. Point of Discussion

Presentation on the preparation work of the combination statistics by J. Geng:

- The detailed contents of the SINEX\_Comb statistics are categorized into header metadata (combination description including sampling intervals, reference frequencies, APC models, and AC-specific weighting/Helmert information, etc.), reference frame statistics (7-parameter Helmert transformations and ERP consistency), and satellite product statistics (orbit consistency with X/Y/Z offsets and STD; clock consistency with RMSE and bad epoch identification; and bias consistency across observable codes and frequencies).
- The task force identified the following open issue for further discussion: How to deal with the "repetition" within different combination processes, especially regarding the Helmert and ERP parameters derived from both reference frame and orbit combinations.

Discussions on the task force:

- **Thomas Herring** I agree with the principle of maintaining consistency; however, our research indicates that orbit-specific perturbations can introduce

rotational effects distinct from the terrestrial frame, so we should keep two separate sets of Helmert parameters for now to account for these independent errors.

**J.Geng:** I intend to consult with Paul to seek his perspective on this matter. In the interim, we shall maintain dual sets of Helmert parameters for both the orbits and the terrestrial reference frame.

- **Thomas Herring :** How should we handle the day boundary transition between GPS weeks? Is it your intention to maintain continuity by matching the first day of the new week with the final day of the preceding week?

**Michael J. Coleman:** We are moving away from using the GPS week as a primary file indicator and transitioning toward the Day of Year (DOY) format. Consequently, the week boundary will eventually become less relevant in our file-naming conventions.

**S. Banville:** I don't see an issue with maintaining day boundary statistics across weeks. The principle remains consistent: we evaluate the boundary relative to the previous day. Even at a week rollover, we simply reference the first day of the new week against the last day of the prior week. Ultimately, these are continuous daily values regardless of the week structure.

- **Loyer Sylvain:** I have an additional comment. Storing the transition statistics in the following day's file is perfectly acceptable. More importantly, I suggest we rename the "day boundary" keyword to simply "boundary." Although we currently work with daily resolutions, future products might involve different time scales—either longer or shorter than a day. By removing "day" from the name, we ensure the term remains applicable to any reference interval, not just daily ones.

**J.Geng:** This is good idea.

- **S. Banville:** I have a question regarding the generation of these consistency statistics. I assume you are not evaluating individual code biases, such as C1W, in isolation. Typically, consistency is assessed via Differential Code Bias (DCB) or Melbourne-Wübbena (MW) combinations. While we can

evaluate the agreement between Analysis Centers (ACs) for these combinations, we don't inherently have a standalone consistency value for a single OSB. How then do you derive these individual OSB statistics?

**J.Geng:**That is an excellent point. We follow the standard IGS procedures for DCB combinations. While the raw consistency metrics are tied to the differential process (e.g.,C1W-C2W), we have implemented a translation to map these differential statistics back onto individual Observable-Specific Biases (OSBs). This involves selecting a reference datum to decompose the combined statistics into their constituent OSB components. To ensure robustness, it may be advisable to retain both the combined and decomposed statistics for a more comprehensive validation.

- **Lotfi Massarweh:**Regarding the statistical algorithms mentioned in your presentation, is there a draft document currently available for review, or is that the next step in the process? I'm wondering if the algorithms will be finalized during our meeting in Chile, or if we should arrive prepared with our own proposals.

**J. Geng:**We have already prepared a preliminary document describing the format. I haven't presented it here yet as it is still being refined and some issues remain to be addressed. However, I will circulate a "Version 0.1" to the community before the workshop for your feedback and review.

### 3. Action Items

The following new action items were agreed and should be addressed before the next task force meeting:

- **260410 (B. Wang,Y. Zhang):** Specification for the Consolidated Product File and Accompanying YAML Format

### 4. Next meeting

The next meeting is scheduled to be held in person in Chile in June 2026. An invitation, including the finalized schedule and preparatory materials, will be circulated in due course before the event.