ITRF Transition for IERS Rapid Service / Prediction Center (RS/PC)

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RS/PC Production Director: Sharyl Byram

RS/PC Lead Scientist / Presentation: Maria Davis

Why is this Important?

- The ITRF is a critical geodetic product required to **maintain highly accurate Precise Point Positioning**
- The ITRF, IERS C04, IERS Finals, GNSS, SLR, VLBI, etc are **all intertwined**
  - **Errors** in any data-sets **can propagate** throughout the inter-dependent products
- A disproportionate amount of **resources** are utilized at the RS/PC **to identify errors** at each transition
- Set procedures and evaluation **standards** will **increase public trust**, **promote consistency**, and provide a **predictable schedule** for resource planning
- **A robust transition and evaluation process results in better IERS products!**

Current Transition Process

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1. $ITRF_{New}$ is generated and released to public
2. Each technique/AC aligns to $ITRF_{New}$
   - IGS *(Does not reprocess historical data)*
   - IVS ACs / IVS Combination Center
   - ILRS A AC
   a. RS/PC aligns each AC w.r.t. $C04_{Current}$ as they transition
3. $C04_{Current}$ aligns to $ITRF_{New}$ as $C04_{New}$
4. Finals aligns to $C04_{New}$
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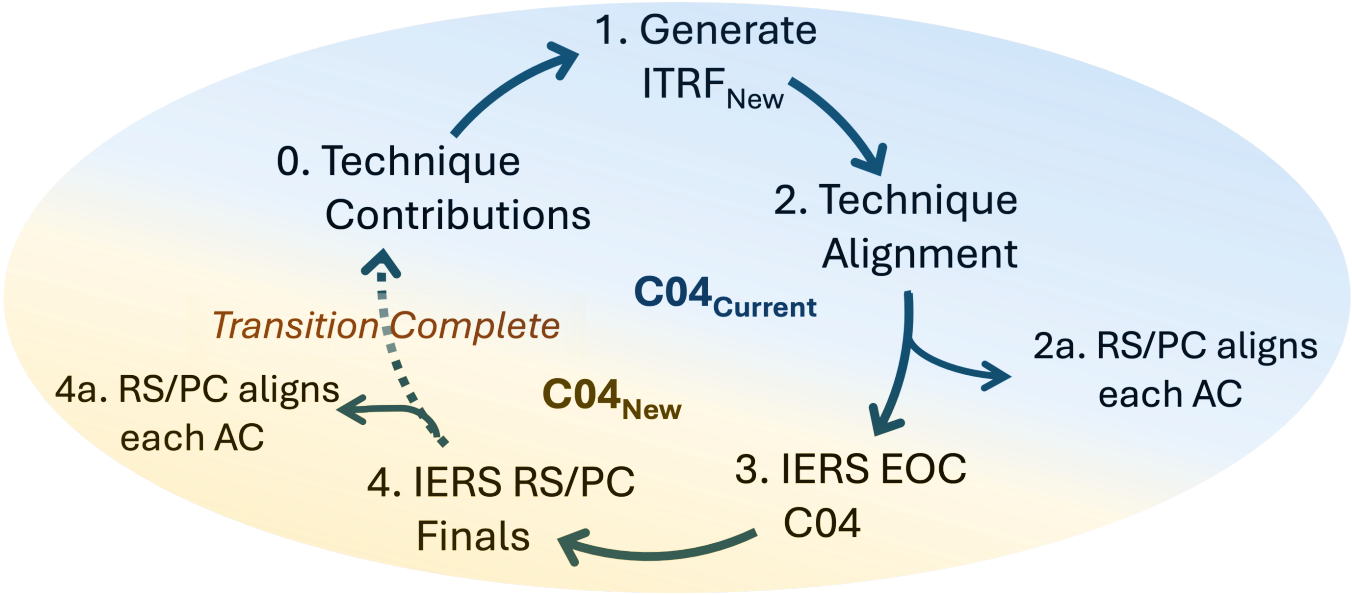

- Process can take <u>up to 6 months</u> to adopt from AC to RS/PC alignment
  - Process needs to be streamlined, with each adopting-entity adhering to assigned deadlines

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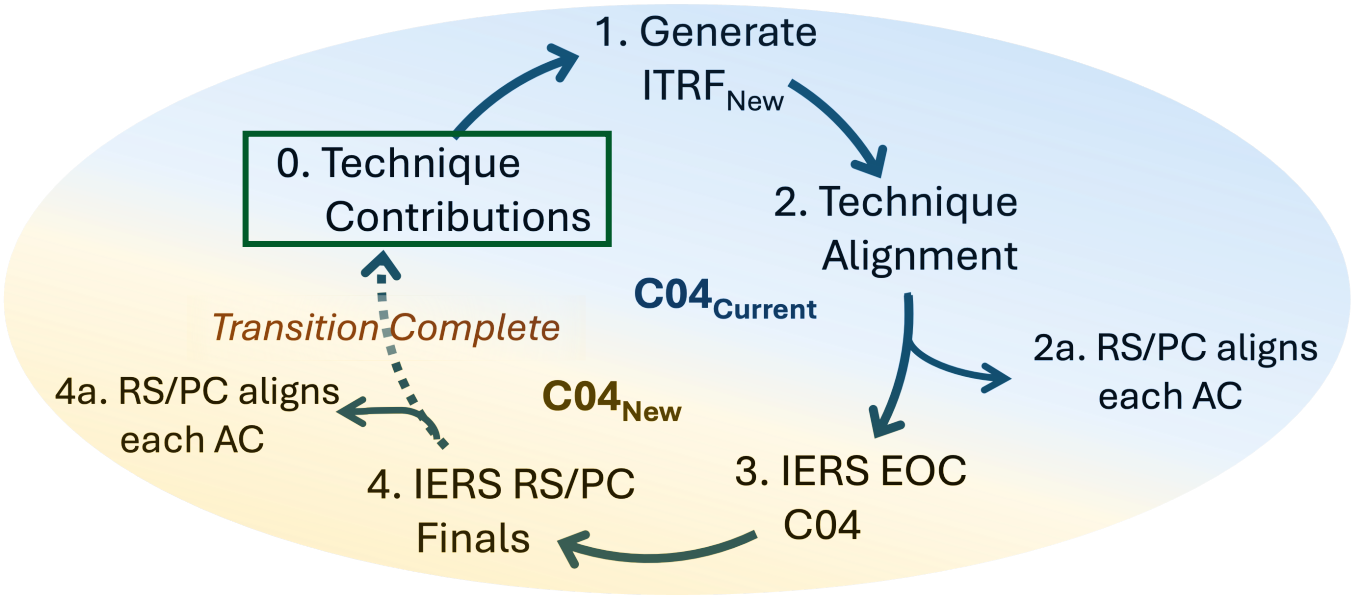

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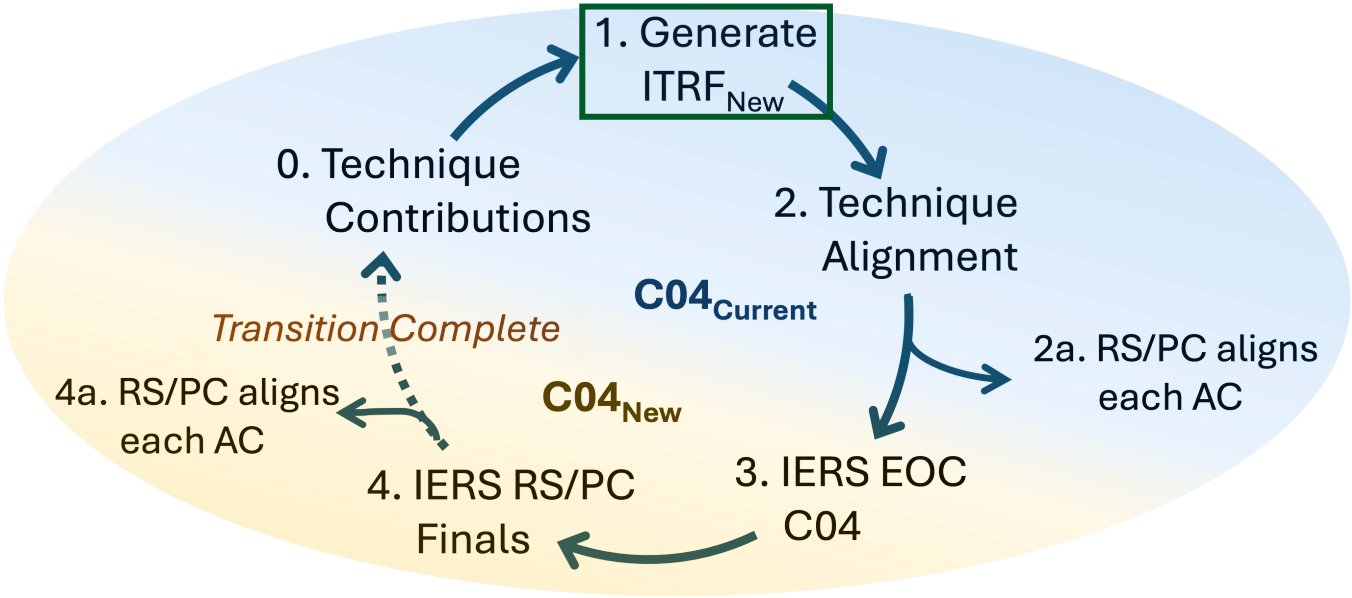

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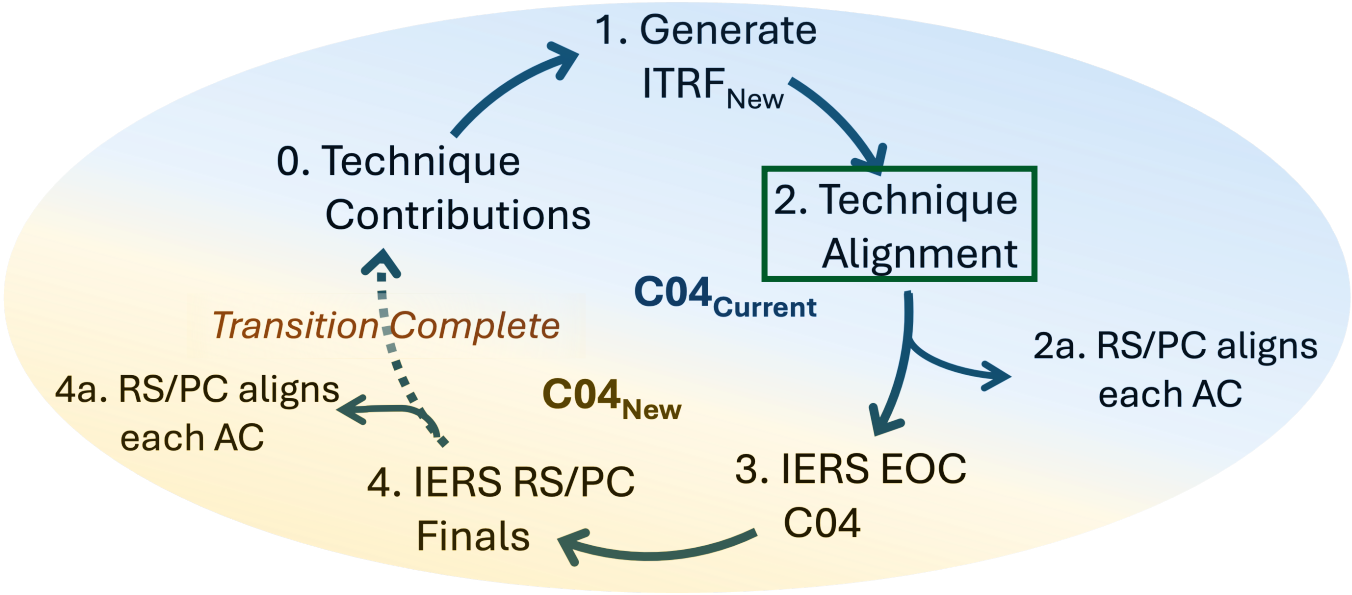

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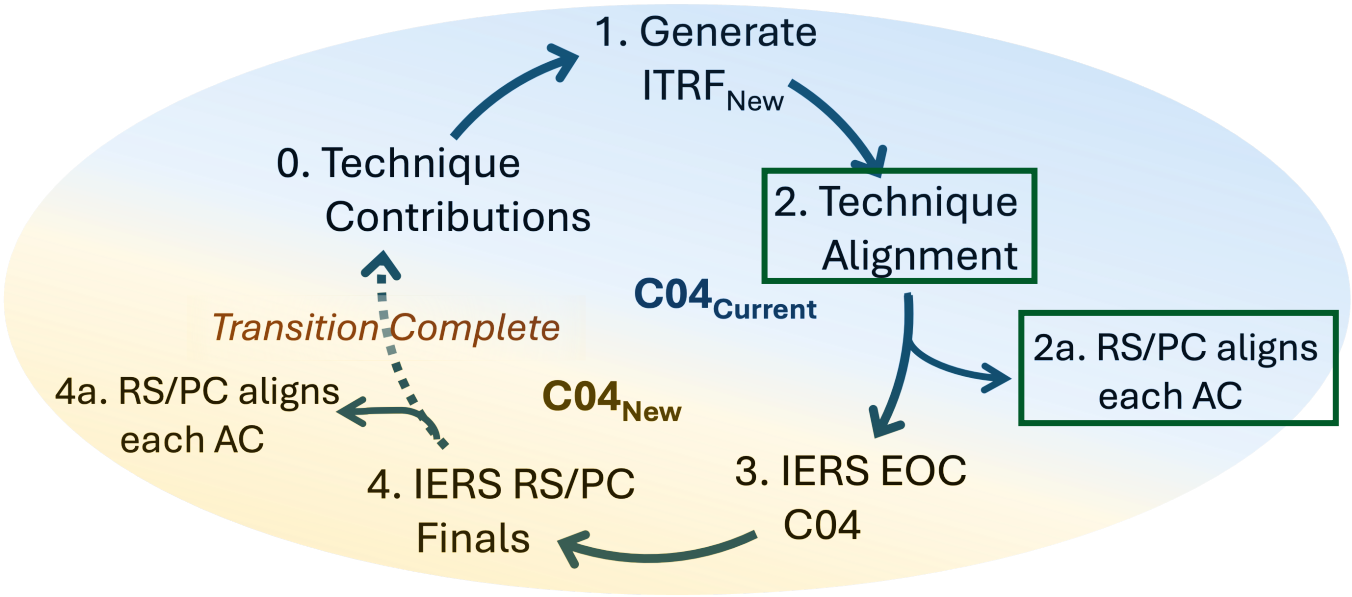

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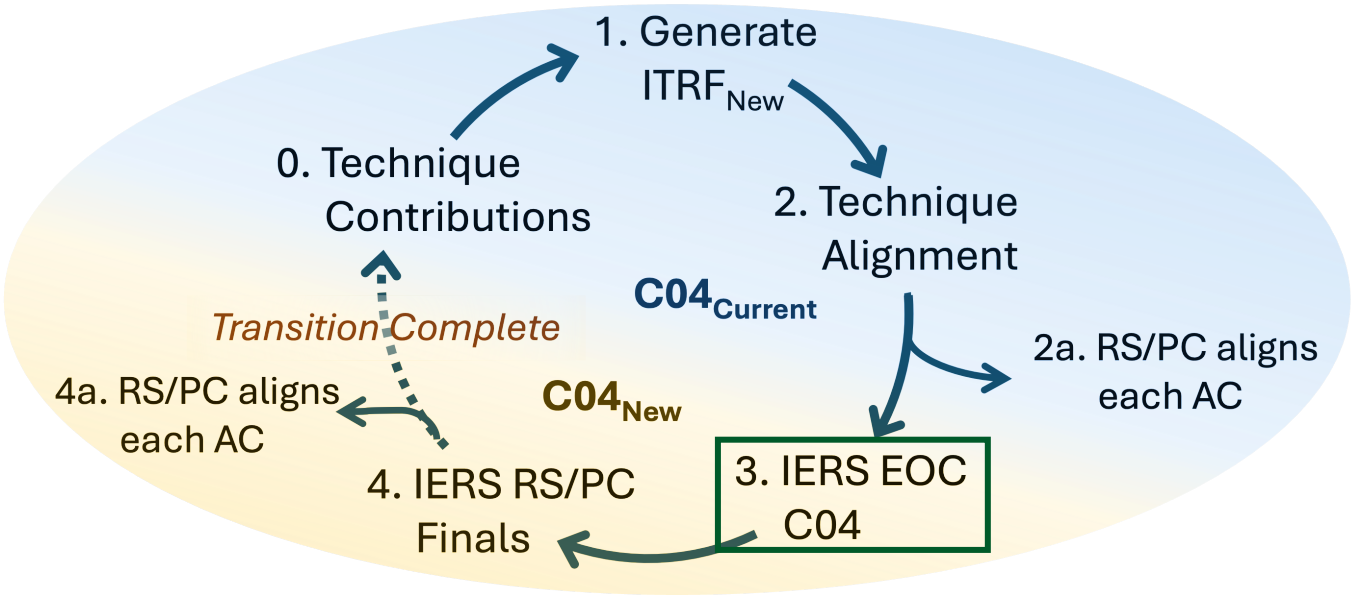

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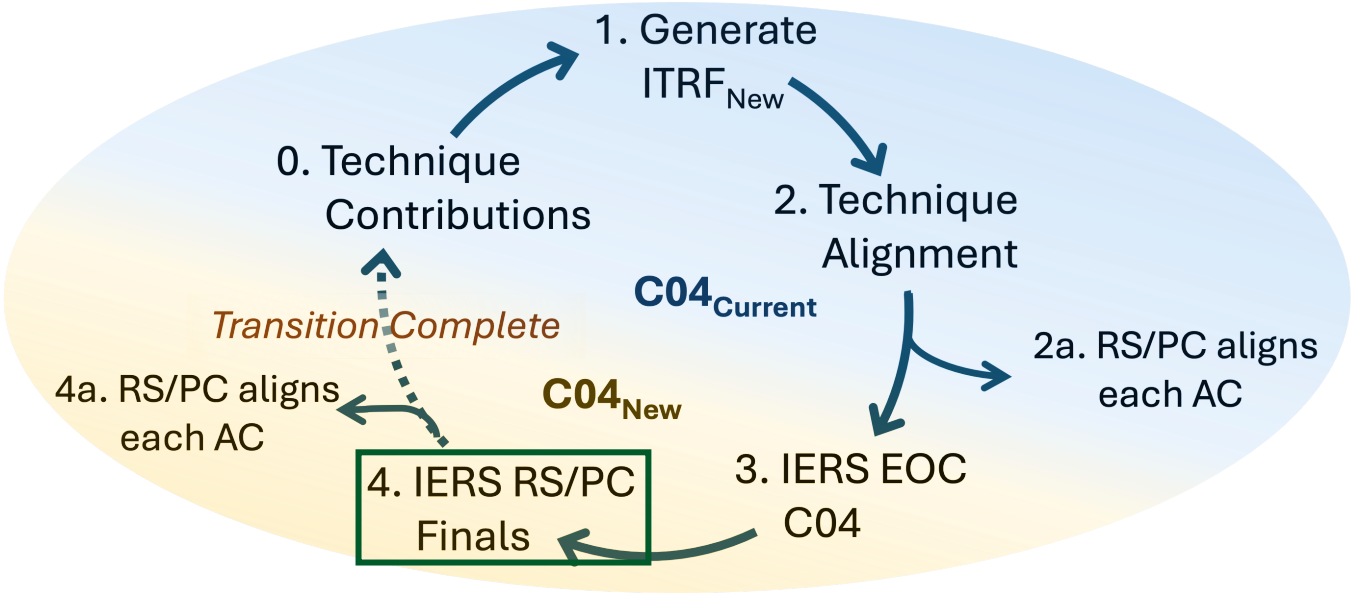

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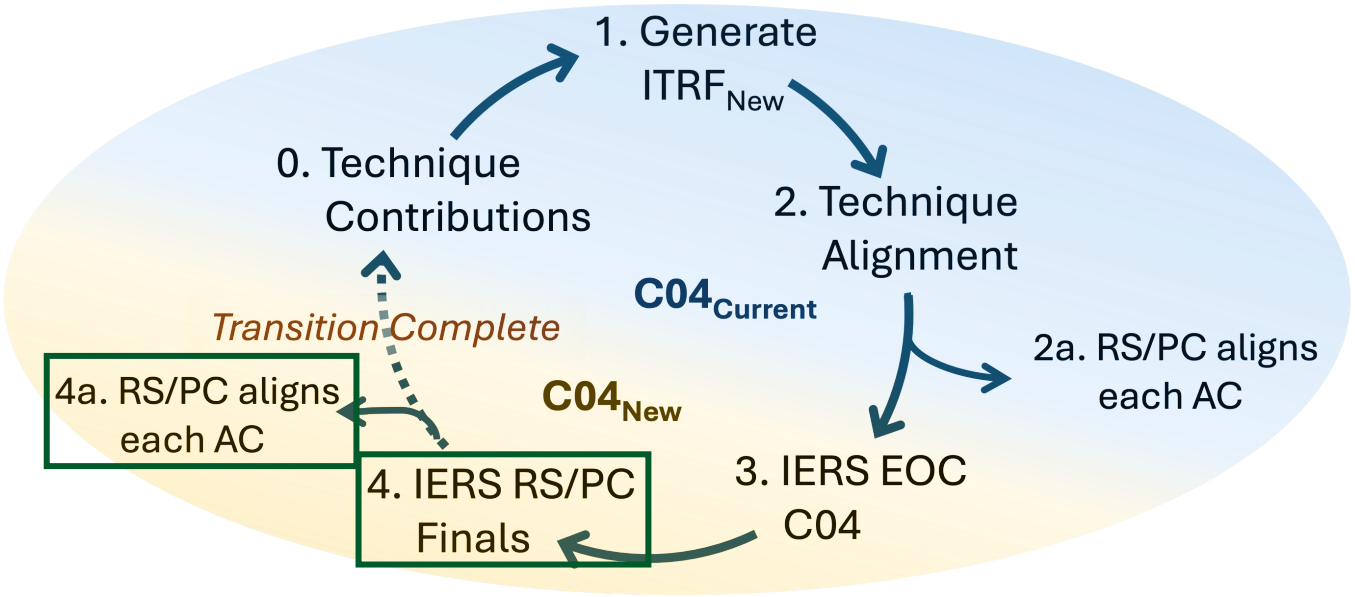

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Consistency Concerns

Issue

1. No formal evaluation process for new ITRF, C04, and Finals prior to public release
2. Burden of identifying any issues/errors is currently on the RS/PC
3. No historical IGS data reprocessing aligned to $ITRF_{New}$ requires multiple alignments
4. C04 replaces polar motion with $ITRF_{Updated}$ (reduces diversity in EOP reference series)

Proposed Solution

- **Standardized vetting process for reference series** needs to be put in place
  - Includes evaluation criteria
- Evaluation process developed for **equitable distribution of labor** with IERS stakeholders
- An i**nternally released series providing 6-12 months of data** aligned to $ITRF_{New}$ would significantly improve transition process
- C04 uses $ITRF_{Updated}$ to re-align polar motion

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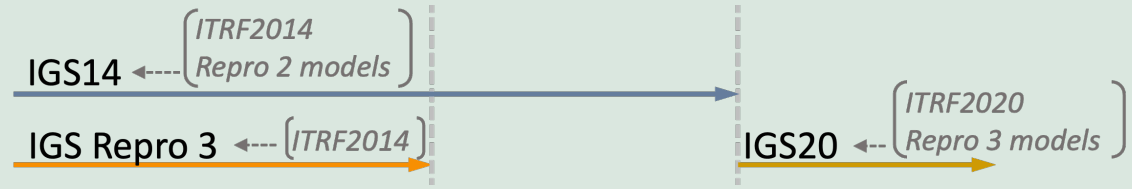

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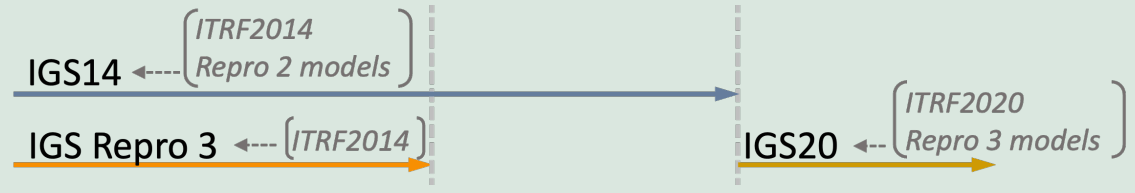


Proposed Transition Procedure Outline

1. **IERS creates a process that *outlines the transition procedure*** for each of the primary stakeholders (Reference Series Centers) under the IERS umbrella.
   a. i.e., ITRF, C04, and Finals
   b. Other reference series may participate upon appeal to IERS Directing Board

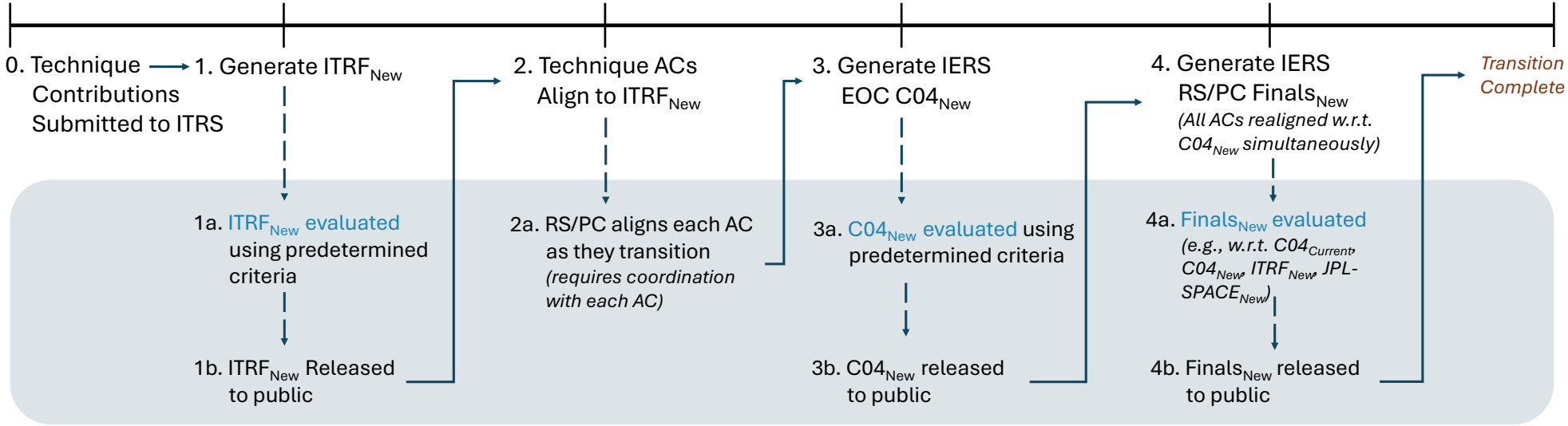
2. **A *communication procedure is established*** that identifies if/when:
   a. the IERS Directing Board, stakeholders, and larger community are each notified of transition progress
   b. an error has been identified in a reference series

3. **A *standardized evaluation methodology* is established** to identify any errors in the respective EOP products.
   a. Each of the primary stakeholders are subject to this evaluation process prior to publication
   b. Evaluation results must be presented to Directing Board (or Analysis Coordinator) prior to publication
   c. Methodology evolves as experience and understanding increases

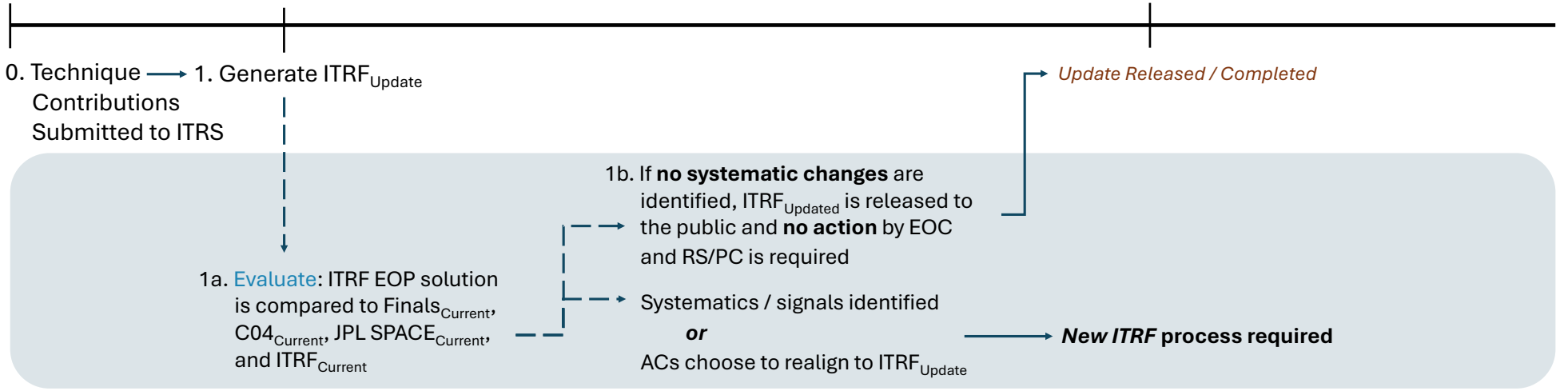
4. **A *reasonable and realistic timeline* is set** so each stakeholder can prepare resources as needed

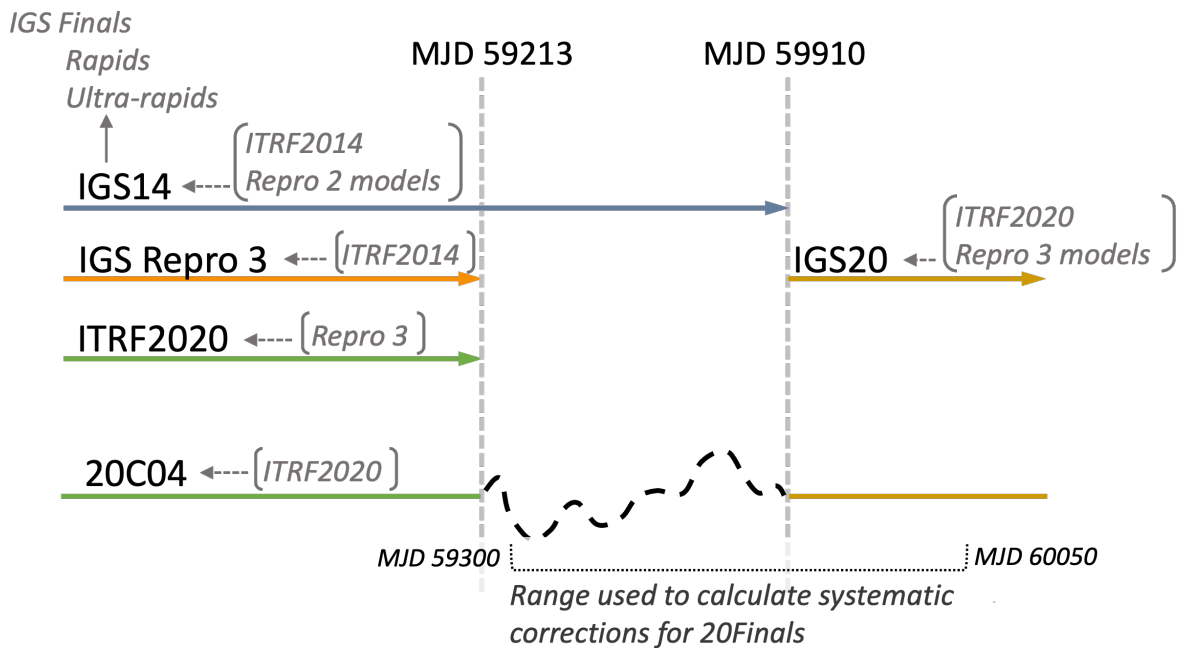
Proposed Procedure

a. New ITRF



b. Updated Annual ITRF




IGS Finals
Rapids
Ultra-rapids
MJD 59213
MJD 59910
ITRF2014
Repro 2 models
IGS14
IGS Repro 3
ITRF2014
ITRF2020
Repro 3 models
IGS20
ITRF2020
Repro 3
20C04
ITRF2020
MJD 59300
MJD 60050
Range used to calculate systematic corrections for 20Finals