ITRF2004 Strategy

- Requested Input data
- Status of submissions
- Strategy for Combination
- Datum Specifications
  - Origin (Geocenter)
  - Scale
  - Orientation
  - Time evolution (NNRC)
- Evaluation & Validation

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Current ITRF Status

- **ITRF2000: ~ 4 years old**
  - **Origin: mean of 5 SLR Solutions**
  - **Scale : mean of 5 SLR & 3 VLBI Solutions**
  - **Orientation: alignment to ITRF97 at 1997.0**
  - **NNRC: alignment to NNR-NUVEL-1A**
- **New GPS & DORIS stations since 2000**
- **Longer histories ==> Improve velocities**
- **Methods for time series combination recently developed**

ITRF2004

- **For 1st time, use Time Series of Station Positions** :
  - **Daily (VLBI)**
  - **Weekly (GPS, SLR & DORIS)**
- **and Earth Orientation Parameters**:

  Polar Motion (x_p, y_p)

  Universal Time (UT1) (Only from VLBI)

  Length of Day (LOD)

- **3 ITRF CC: NRCan, DGFI, IGN**
- **Useful in IERS CPP for specialized studies, products & validation**

ITRF2004: Requested Data
(See the Call)

- Official single-technique combined solutions from the Technique Centers
- Individual Analysis Center solutions
- Solutions combining various techniques at the observation level

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- Solutions with removable constraints
- Loosely constrained solutions
- Solutions with TRF minimum/inner constraints
- Free normal equations

ITRF2004: Input Data

(Status April 20)

- **Combined set of Time Series per Technique:**
  - **VLBI 1984 – 2005 (First solution ready)**
  - **SLR 1993 – 2005 (Under way)**
  - **GPS 1996 - 2005 (Ready)**

- **Individual Solutions**
  - **DORIS 1993 – 2005 (3 ready, others …)**
  - **VLBI, SLR, GPS: some AC submissions**
- **No multi-technique solutions at obs. level submitted**

- **Co-location tie vectors**

ITRF2004: Main Results
(See the Call)

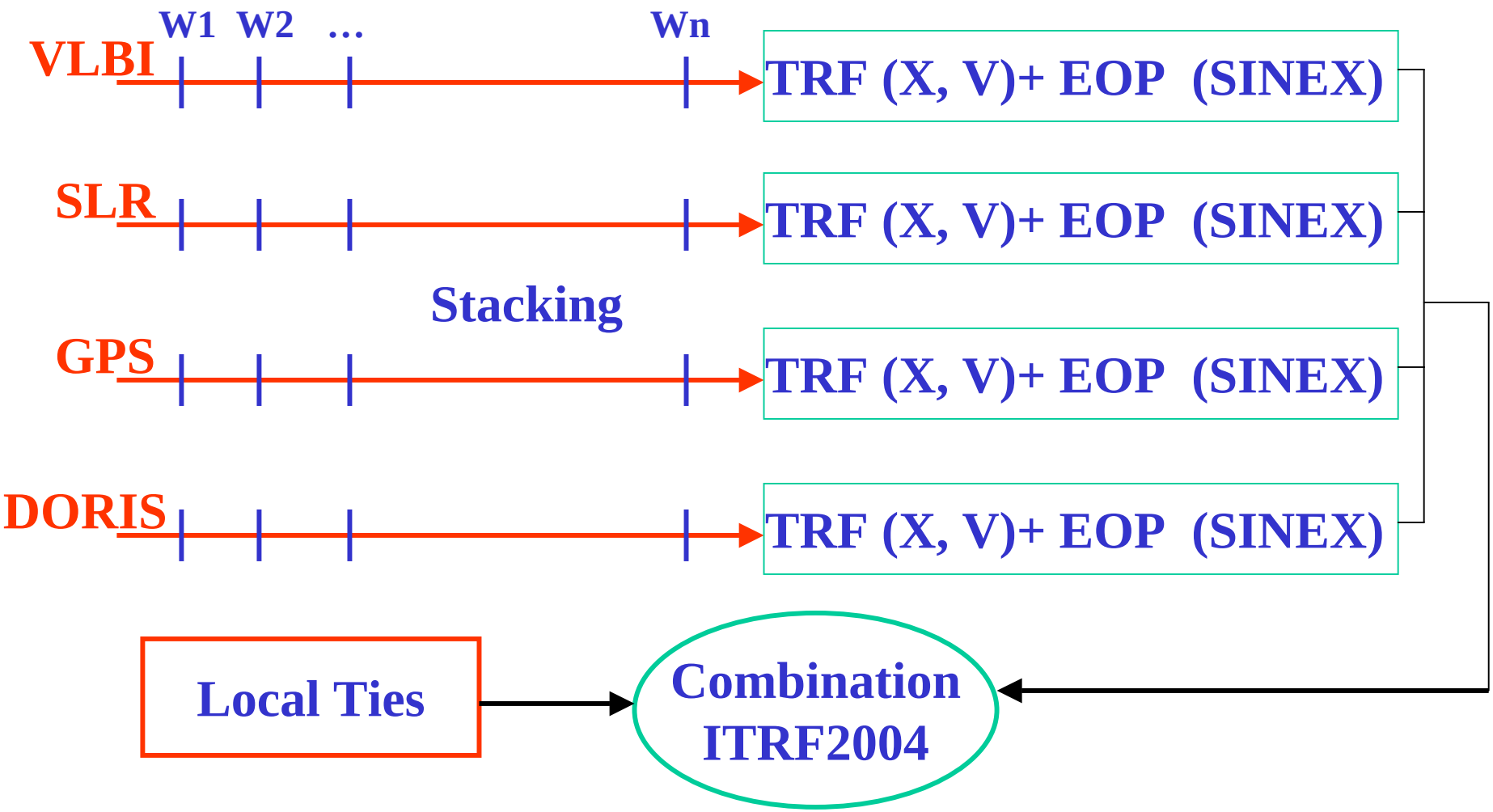
- **Global Solution of Station Pos & Vel**
- **Fully consistent EOP's: PM, PMrate,UT1, LOD (over ~ 10 years)**

  ==> to be used by EOP PC
- **Per-technique solutions of station positions and velocities and daily EOPs**
- **Residual time series per-technique**
- **Geocenter offset time series from satellite solutions (SLR, GPS, DORIS)**

ITRF2004: Strategy
(See the Call)

- Remove original constraints (if any) and apply minimum constraints equally to all solutions
- Use as they are the minimally constrained solutions
- Form Per-technique combinations (TRF + EOP)
- Identify and reject outliers and properly handle discontinuities, using break-wise approach
- Combine if necessary all solutions of a given technique into a unique solution
- Combine the per-technique combinations adding local ties in co-location sites. This global combination will constitute the ITRF2004 solution.
- Use Optimal Weighting (VC estimation)

ITRF2004 Derivation



ITRF2004 Derivation

- 3 preliminary solutions to be generated by the 3 ITRF CC following the same agreed strategy
  - One SINEX file (X, V & EOP's over ~10 years)
- Solutions to be available for intercomparison by ITRF PC, ITRF CC
- Identify & fix problems and possible discrepencies between CC solutions
- ITRF PC to deliver final ITRF2004 solution, target date ==> August 2005
- Set up a WG for validation

ITRF2004: Datum Specifications

- **Origin: Mean of SLR solutions**
  - **Evaluate geocenter solutions from GPS & DORIS**
- **Scale: Mean of VLBI & SLR**
  - **Evaluate Scale of GPS & DORIS**

  ==> Available solutions seem to be consistent with ITRF2000
- **Orientation: alignment to ITRF2000 at t_0**
- **NNRC: Alignment to, e.g.:**
  - **ITRF2000**
  - **APIKIM**
  - **Kreemer et al.**

  ==> Evaluation tests to be done

  ==> Seek of stability < 1mm/yr for NNRC realization

ITRF2004: Validation

- TC should play major role to
  - Test consistency with their routine products
  - Evaluate/quantify distortion
- Other contributions for validation: ?
  - EOP comparisons to IERS C04, Space2xxx
  - EOP evaluation in IERS CPP
  - Geophysical models: AAM, OAM
  - Geocenter evaluation
  - Conventions Advisory Board role ?
- ITRF2004 Validation Group

ITRF2004 Validation Group

- One representative per TC
- EOP Expert: Richard Gross
- Geophysics: Geoff Blewitt
- Analysis Coordinator
- Jim Ray: Chair

ITRF2004 Extension

- **EOP PC to consider using ITRF2004 EOP series to, e.g.**
  - **Re-calibrate C04**
  - **Maintain long-term consistency with ITRF2004**
  - **Combine satellite-based LOD with rigorous VLBI UT1/LOD ==> denser series**

- **ITRF2004 densification**
  - **Regional solutions : EUREF, NAREF, SIRGAS, etc.**