Participants:

Invitees:
K. Fancher, C. Ma, D. MacMillan, A. Niell, D. Smith, C. Watson

Excused:

Site Survey Standards
Guidelines for surveyors
During the meeting the necessity of defining the guidelines regarding local tie practice has been pointed out several times. This would assure a minimum standard in tie vector measurements with the aim of estimating eccentricities to the highest precision achievable. Several methods nowadays exist and different groups claim to possess the know-how for optimal tie vector computation. Nowadays only a few tie vector surveying methods have been compared and proved to be consistent. As a matter of fact, tie vectors are submitted to ITRF Combination Centres adopting a variety of non homogeneous methods which largely depend on the know-how of the local crews carrying out the local surveying operations. The issue must be discussed in the next Vienna meeting in order to agree on common surveying methods which may be routinely adopted as conventional IERS reference procedures for tie vector computation. Specific guidelines must be described, supplied and circulated in a document which should be used as quick reference manual. Operatively, the WG must identify a sub-group of WG members experts on tie surveying technical issues for the compilation of a reference manual.

Tie Vector Estimation
Software
Exchange of tie vector estimation software has to be promoted among the local tie groups and existing software must be made readily available. A validation phase must precede the former step and has to be supported.

Site Surveys activities
Critical co-location sites
ITRF2008 residuals will provide verification of critical co-locations in need of urgent actions such as re-measurements/re-computation of the tie vector. Specific action will be taken accordingly to support new local tie measurements or re-analyse data with existing software.

Coordination and Research
Who does what?
The role of local agencies and their surveyors must be harmonised with IERS standards and combination requirements.
Technique Services are crucial to endorse documentation eventually produced by this WG and must be actively involved in the finalisation of conventional IERS reference procedures related to tie vector estimation.

**Output format**
Software should allow to save and to output the full tie vector information (components and full variance-covariance matrix) in the native topocentric frame. Also, when available, information on local geoid undulation should be provided. These aspects are crucial to align topocentric and local geodetic frames and to carry out a thorough investigation on combination residuals.

**Alignment**
Local to global frame tie vectors alignment remains an aspect which needs deep and further investigation.

**Terminology**
As research progresses, the lack of a univocal reference terminology on local tie issues is evident. Definitions are needed on specific procedures, items and quantities which relate to tie vector surveying, estimation and alignment. Particularly, the definition of space geodetic instrument reference point is ambiguous (e.g. stochastic, conventional, electronic). This part can be treated and included in the reference manual.

**PCV & technique-dependent biases**
As the knowledge of gravitational deformations of VLBI telescopes improves, a new lexicon on phenomena and quantities must be clearly set. PCV files similar to GPS might be needed in the future for VLBI in order to account for gravitational deformation of VLBI telescopes. This task can be fulfilled liaising with IVS and other services. Finally range biases in SLR and their signature in the misclosure between terrestrial and space geodetic results must be investigated in the near future.
It is agreed that these corrections are responsibility of the technique services and cannot be relied upon tie surveying and computation procedures, i.e. the tie aims at connecting conventional-to-conventional reference points.