**CALL FOR PARTICIPATION**
**in the**
**IERS SITE SURVEY AND CO-LOCATION PILOT PROJECT (SSCPP)**

## Background

The development of multi-technique International Terrestrial Reference Frames has focussed attention on the need to accurately measure and express the local terrestrial connection between each of the complementary space geodetic observation systems, such as GPS, SLR, VLBI and DORIS, at co-located geodetic observatories. Somewhat complicating this endeavour has been the difficulty of defining and measuring the relationship between the measurement reference points for each of the techniques, since in the general case the reference points are unable to be directly observed.

A workshop devoted to "*site co-location survey objectives, methods and issues*", organized by the International Earth Rotation and Reference Systems Service (IERS) took place in Matera, Italy in October, 2003. Following this meeting the IERS Directing Board made the decision to establish a working group devoted to the issues of site surveys and co-location. The IERS Working Group 2 on Site Survey and Co-location has now been formed and operates jointly with the International Association of Geodesy (IAG) Sub-Commission 1.2 – WG 2 (SC1.2-WG2).

The Working Group (WG) will evaluate the approaches used currently for site survey, including observational techniques, network design, classical adjustment, geometrical modelling and/or direct measurement techniques for invariant point determination, reference frame alignment, software implementation and SINEX generation. This WG will investigate all aspects of terrestrial site survey relevant to multi-technique combinations and set standards and provide leadership in this endeavour. More information on the working group can be found at http://www.iers.org/iers/about/wg/wg2/.

A notable outcome of the Matera meeting was the realisation that to date little comparison between the various groups undertaking site survey has been undertaken and the techniques, observational and analysis approaches vary considerably between groups. The WG will coordinate a Site Survey and Co-location Pilot Project (**SSCPP**) with the intention of developing future recommended IERS standards for site survey and co-location. The major goal of the **SSCPP** will be to study and develop optimum strategies for rigorous site survey.

## Definitions

***Raw terrestrial data;*** observations (in electronic format) made during terrestrial surveys but before data reduction of any type (including observation corrections for collimation, atmosphere etc.).

***Reduced terrestrial data (or Terrestrial data reduced to surface);*** observations made during terrestrial surveys after initial data reduction (including observation correction for collimation, atmosphere etc.) but before classical geodetic adjustment.

***Adjusted terrestrial results;*** results of classical geodetic adjustment in the form of coordinate parameter estimates, and their associated variance-covariance matrix (typically in SINEX format).

***Indirect IVP determination;*** the determination of the invariant point (IVP) of an observing system from observations made during rotational sequences together with some geometrical model; opposite to techniques that directly mark and position the IVP.

**IERS Working Group 2 - Site Survey and Co-location Pilot Project**

The **SSCPP** will interest all those groups currently undertaking terrestrial surveys at observatories with co-located techniques; those with the intention to do so in the near future; those who have an interest or responsibility to do so; and those groups able to undertake quality control and assessment of local ties in multi-technique combinations.

The **SSCPP** will broadly address the following technical issues:

- observational techniques;
- survey network design and monumentation;
- classical geodetic adjustment;
- indirect geometrical modelling and/or direct measurement techniques for invariant point determination;
- reference point definition and access;
- local to global reference frame alignment;
- structural and network deformation modelling; and
- SINEX generation.

**Call for Participation**

On behalf of the IERS the *IERS WG2 on Site Survey and Co-location* solicits participation in the following components necessary to perform the work envisaged in the IERS Site Survey and Co-location Pilot Project (**SSCPP**):

The **SSCPP** will seek participation in a test campaign (or campaigns) together with a series of analysis comparisons. This participation may be in any one or more of the following forms:

1) Those groups undertaking terrestrial surveys at observatories with co-located techniques who are able to make their raw, reduced and/or adjusted data sets available for comparison of approaches (includes both existing and planned data sets);

2) Those groups undertaking the geometrical analysis for indirect invariant point determination who are able to make their analysis available (including geometrical models, additional parameter estimates, residuals, etc…);

3) Those groups prepared to undertake comparison of terrestrial survey results (i.e. comparison of survey approach and invariant point modelling) and terrestrial connection analysis (i.e. comparison of terrestrial survey results with inter-technique results); and

4) Those global combination analysis centres able to evaluate new terrestrial SINEX submissions (resulting from the **SSCPP** activities) for quality control and assessment.

The WG acknowledges that, due to logistical and financial constraints, there may be only a few groups who are able to travel to and observe at observatories outside their immediate area of interest and responsibility, so direct comparison of survey results from independent surveys may be limited. This should not however impede the comparison of approaches from the starting point of the raw, reduced or adjusted terrestrial results made available from previous or new surveys.

**Proposal Instructions**

The IERS has no financial resources to support this Pilot Project. Proposers must provide their own financial resources to support their proposal. Proposed contributions mentioned above can be submitted at any time, to:

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Central Bureau of the IERS
Bundesamt für Kartographie und Geodäsie
Richard-Strauss-Allee 11
D-60598 Frankfurt am Main, Germany
phone: ++49-69-6333-273
fax: ++49-69-6333-425
e-mail: richter@iers.org

with a copy to:

John Dawson
Geoscience Australia
Cnr Jerrrabomberra Ave
And Hindmarsh Drive
GPO Box 378
Canberra ACT 2601 Australia
phone: +61-2-6249-9028
fax: +61-2-6249-9929
e-mail: John.Dawson@ga.gov.au

A proposal form to be filled in by the participating institution is attached to this Call for Participation or may be downloaded from the web pages of the IERS Central Bureau (http://www.iers.org/iers/).

**SSCPP Schedule**

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|---|---|
| November, 2004: | Dissemination of this Call for Participation; |
| 17 December, 2004: | Deadline for responses to Call for Participation; |
| April, 2005: | Review of the **SSCPP** (at the EGU meeting in Vienna); |
| August, 2005: | Evaluation of the **SSCPP** and discussions regarding standards and future directions (at the IAG General Assembly, Cairns). |

**Proposal Review and Coordination**

The IERS Working Group 2 on Site Survey and Co-location (IERS WG2) will review and coordinate participation.

Unfortunately there is no universally accepted format for the exchange of raw/reduced survey data, as such data exchange procedures will be developed on a case by case basis in consultation with those groups involved in data exchange. Station coordinate parameter estimates shall be exchanged in SINEX format.

New survey and analysis activity should be scheduled so as to be completed before the August 2005 **SSCPP** evaluation.

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Please send the completed form by mail or fax to:


Bernd Richter
Central Bureau of the IERS
Bundesamt für Kartographie und Geodäsie
Richard-Strauss-Allee 11
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with a copy to:


John Dawson
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fax: +61-2-6249-9929
e-mail: John.Dawson@ga.gov.au


**Participating Organization/Institution/Service:**

Name (person of contact):

Organization/institute/service:

Mailing address:

Phone:

Fax:

Email:

Cooperating organizations / institutes:

Staff members that will contribute to the **SSCPP**:

**Contribution to (see Call for Participation):**

1) Those groups undertaking terrestrial surveys at observatories with co-located techniques who are able to make their raw, reduced and/or adjusted data sets available for comparison of approaches (includes both existing and planned data sets):

- Surveys to be made available (ie. date or planned date and location):

- Survey equipment, expertise and capability to perform the proposed task:

- Electronic data format(s):

- Additional comments (if required):

2) Those groups undertaking the geometrical analysis for indirect invariant point determination who are able to make their analysis available (including geometrical models, additional parameter estimates, residuals, etc…):

- Surveys to be made available (ie. date or planned date and location):

- Expertise and capability to perform the proposed task:

- Description of approach:

- Data format(s):

- Additional comments (if required):

3) Those groups prepared to undertake comparison of terrestrial survey results (i.e. comparison of survey approach and invariant point modelling) and terrestrial connection analysis (i.e. comparison of terrestrial survey results with inter-technique results):

- Expertise and capability to perform the proposed task:

- Additional comments (if required):

4) Those global combination analysis centres able to evaluate new terrestrial SINEX submissions (resulting from the **SSCPP** activities) for quality control and assessment:

- Expertise and capability to perform the proposed task:

- Additional comments (if required):