2) DATA ANALYSIS

The ITRF92 global combined solution is divided into two parts: a set of station coordinates at epoch 1988.0 and its associated velocity field. Both of them are estimated, using least square adjustment, by combination of individual terrestrial reference frames provided by the analysis centers participating in the IERS activities. These individual terrestrial reference frames are derived fromVLBI, LLR, GPS and SLR observations.

2.1) ITRF92 station coordinates

The ITRF92 station coordinates solution consists of a combined adjustement of station positions and transformation parameters for the epoch 1988.0.

The adjustment were performed using the SSCMIX software developped by IGN. The options used were:

- reduction of individual data sets at a common epoch(1988.0) using their respective motion models,

- least square estimation of station coordinates and 7 transformation parameters for each solution,

- local surveys used with a priori variances (see 1.4)

- station coordinates used with a priori variances (see 1.3)

It was decided that:

- origin should come from SLR

- scale should also come from SLR noting that the scales of most VLBI solutions are consistent with most of SLR ones,

- orientation should be such that no global rotation should exist with respect to ITRF91.

To insure that, a first global adjustment of all selected data was done, holding the LC92 transformation parameters fixed to zero. This solution was labelled ITRF92A.

Then ITRF92A was compared to ITRF91 in order to estimate corrections to rotation angles. This comparison has been done incorporating only one point per site. Table 2 gives the transformation parameters between ITRF92A and ITRF91. The global adjustment was finally repeated with LC92 translation and scale put to zero and rotation angles fixed to the values derived from the previous comparison.

Table 2 : Transformation parameters from ITRF91 to ITRF92A
(one point per site)

T1 m	T2 m	T3 m	D 10^{-8}	R1 0.001"	R2 0.001"	R3 0.001"
-1.1 ±0.2	-1.4 ±0.2	0.6 ±0.2	-0.14 ±0.02	-0.47 ±0.07	0.74 ±0.07	-1.41 ±0.05

2.2) ITRF92 velocity field

The ITRF92 velocity field has been obtained by combination of eight site velocity fields estimated by SLR and VLBI analysis centers. These eight velocity fields have been estimated together with eight SSCs among those incorporated in the ITRF92 station coordinates combined solution. The method for combining velocities is equivalent to and consistent with the method for combining SSCs into the ITRF92 station coordinates. In order to insure the condition of no-net-Rotation of the ITRS with respect to the crust, NNR-NUVEL1 was selected as the reference motion model as recommended by the IERS Standards (McCarthy, 1992). A velocity field was so constructed using NNR-NUVEL1 for those sites which are available in the eight estimated velocity fields. The temporal variation (or rate of change) of the translation and rotation parameters of the constructed NNR-NUVEL1 velocity field were fixed to zero in the global adjustement. The scale factor is assumed to be invariant with time and so the corresponding parameters are fixed to zero for all velocity fields.

NNR-NUVEL1 is a horizontal motion model. For the consistency of the three-dimensional we used it as three-dimensional model with zero vertical velocity and assumed an error of 3mm/year for the horizontal components and 1 cm/year for the vertical one. NNR-NUVEL1 velocities were deweighted in the combination (with 10 cm/year as a priori standard deviation) for sites whose motion may differ from NNR-NUVEL1, such as sites in California, Japan and the Mediterranean area. Consequently, the condition of no-net-rotation is practically applied to those sites which are located on the rigid part of the tectonic plates and whose motion are consistent with that predicted by NNR-NUVEL1.

3) RESULTS

3.1) Values

We have adjusted combined coordinates in the ITRF92 solution for epoch 1988.0. In total, 287 stations located in 152 sites (see Figure 21) have been independently adjusted. These coordinates are given in Table T5 under the label SSC(IERS) 93 C 03. They are also published in Table T-3 of the 1992 IERS Annual Report.

Table T6 lists the ITRF92 combined velocity field. These velocities should be used to refer the