ANNEX C

(to Recommendation E.506)

DESCRIPTION OF A TOP DOWN PROCEDURE

Let

X_T be the traffic forecast on an aggregated level,

X_i be the traffic forecast to country i,

$\hat{\sigma}_T$ the estimated standard deviation of the aggregated forecast,

$\hat{\sigma}_i$ the estimated standard deviation of the forecast to country i.

Usually

$$X_T \sum_i X_i, \tag{C—1}$$

so that it is necessary to find a correction

$$[X`_i] \text{ of } [X_i] \text{ and } [X`_T] \text{ of } [X_T]$$

by minimizing the expression

$$Q = \alpha_0 (X_T - X_T`)^2 + \sum_i \alpha_i (X_i - X_i`)^2 \tag{C—2}$$

subject to

$$X_T` = i\, X_i` \tag{C—3}$$

where α and $[\alpha_i]$ are chosen to be

$$\alpha_0 = \frac{1}{\hat{\sigma}_T^2} \text{ and } \alpha_i = \frac{1}{\hat{\sigma}_i^2} \quad i = 1, 2, \ldots \tag{C—4}$$

The solution of the optimization problem gives the values $[X`_i]$:

$$X_i` = X_i - \hat{\sigma}_T^2 \frac{\sum_i^i X_i - X_T}{\sum_i \hat{\sigma} + \hat{\sigma}} \tag{C—5}$$

A closer inspection of the data base may result in other expressions for the coefficients $[\alpha_i]$, $i = 0, 1, \ldots$ On some occasions, it will also be reasonable to use other criteria for finding the corrected forecasting values $[X`_i]$. This is shown in the top down example in Annex D.

If, on the other hand, the variance of the top forecast X_T is fairly small, the following procedure may be chosen:

The corrections $[X_i]$ are found by minimizing the expression

$$Q` = \sum_i \alpha_i (X_i - X_i`)^2 \qquad \text{(C—6)}$$

subject to

$$X_T = \sum_i X_i` \qquad \text{(C—7)}$$

If α_i, $i = 1, 2, \ldots$ is chosen to be the inverse of the estimated variances, the solution of the optimization problem is given by

$$X_i` = X_i - \hat{\sigma}_i^2 \frac{\sum X_i - X_T}{\sum \hat{\sigma}_i^2} \qquad \text{(C—8)}$$