

- the discrepancies are normally distributed about a zero mean
- the standard deviations in the X and Y coordinate directions are equal
- sufficient check points are used to accurately estimate the variances

To compute the “circular map accuracy standard” (CMAS) which corresponds to the 90% circular map error defined in the NMAS [ACIC, 1962, p.26, p. 41]:

CMAS = $2.146\sigma_x$
 MODEL VIRGINIA
 MAP ACCURACY STANDARDS

or:

CMAS = $2.146\sigma_y$
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Given these relationships and assumptions, the limiting rms errors correspond approximately to the CMAS of 1/47th of an inch for all errors and related scales indicated in Table 1. For the metric cases indicated in Table 2, the CMAS is 0.54 mm for rms errors and corresponding scales. It is emphasized that for the Commonwealth of Virginia Standard, spatial accuracies are stated and evaluated at full or ground scale. The measures in terms of equivalent CMAS are only approximate and are offered only to provide a comparison to the national Map Accuracy Standard of SMAS of 1/30th inch at map scale.

A4. Check Survey

Both the vertical and horizontal (planimetric) check surveys are designed based on the National standards of accuracy and field specifications for control surveys established by the Federal Geodetic Control Committee (FGCC). These standards and specifications [FGCC, 1984] are intended to establish procedures which produce accuracies in terms of relative errors. For horizontal surveys, the proportional accuracies for the various orders and classes of survey are stated in Table 2.1 of the FGCC document and for elevation accuracy in Table 2.2. These tables along with their explanations are reproduced below. From FGCC [1984]:

2.1 HORIZONTAL CONTROL NETWORK STANDARDS

When a horizontal control is classified with a particular order and class, NGS certifies that the geodetic latitude and longitude of that control point bear a relation of specific accuracy to the coordinates of all other points in the horizontal control network. This relationship is expressed as a distance accuracy, 1:a. A distance accuracy is the ratio of relative positional error of a pair of control points to the horizontal separation of those points.

Table 2.1
Distance Accuracy Standards

Classification	Minimum distance accuracy
First-order	1: 100.000