

## APPENDIX I

### S.H.A.E.F. OPERATION MEMORANDUM

#### SUPREME HEADQUARTERS ALLIED EXPEDITIONARY FORCE

OPERATION MEMORANDUM  
NUMBER 28

25 April, 1944.

#### Artillery and Engineer Survey

##### 1. *Object*

The object of this Memorandum is to ensure that Artillery and Engineer Survey units shall:—

- (a) Adopt a common procedure for the initiation of grids covering a limited area.
- (b) Record their results in a manner that will ensure co-ordination of effort in the case of mixed or adjacent U.S. and British forces.
- (c) Be informed as to the situation in the theatre with regard to the national basic triangulation data available and its degree of reliability.

##### 2. *Technical Survey Data and Methods*

- (a) It is neither desirable nor necessary to insist on a standardization of Field Surveying Methods as between U.S. and British units, which must vary according to methods of training and circumstances.
- (b) Information on the basic triangulation data and grid zones in France, Belgium, Holland, and Western Germany, with special reference to Artillery and Engineer Survey co-operation is given in Annexure "A."
- (c) Fuller particulars regarding the Geodesy and Basic Survey data on the Continent can be obtained from this Headquarters.

##### 3. *Policy*

Army Groups will ensure that all Artillery Survey Units down to and including Survey Regiments (Br.) and Observation Battalions (U.S.), and all Engineer Survey units shall:—

- (a) Use the method and nomenclature prescribed in Annexure "A" when it is necessary to initiate grids covering a limited area.
- (b) Record all survey data in the manner specified in Annexure "B."

##### 4. *Cross References*

The following S.H.A.E.F. OPERATION MEMORANDA refer:—

- (a) No. 3. CO-ORDINATION BRITISH AND U.S. FIELD ARTILLERY, and the Field Artillery Notebook.
- (b) No. 9. MAP CO-ORDINATES.

By command of General EISENHOWER.

(Sgd.) W. B. SMITH,  
Lieutenant-General, U.S. Army,  
Chief of Staff.

**Notes on the Basic Triangulation Data and Grid Zones in France, Belgium, Holland, and Western Germany with Special Reference to Artillery and Engineer Survey Co-operation**

1. *Old French Triangulation*

The original triangulation of France consisted of a primary network of good quality, which was broken down to secondary and tertiary points of less accuracy, principally as a basis for the old 1/80,000 map.

2. *New French Triangulation*

The new triangulation, commenced in 1870, covers only a limited area of North Eastern and Eastern France.

3. *Basic Triangulation Data*

(a) Trig lists have been prepared from the best available French records covering the most likely operational areas in France, Belgium, Holland, and Western Germany, and will be issued by this Headquarters to Army Groups.

(b) Those lists in France which are based on the records of the New Triangulation are believed to be reliable, and the co-ordinate values can normally be used direct except where a cautionary note has been inscribed on the list.

(c) Those lists in France which are based on the records of the Old Triangulation are unreliable and should not be issued to Survey units for general use. Quite apart from the possibility of gross errors which may exist due to the destruction or rebuilding of structures on which stations are located, the list values may give a possible displacement of about 10 metres from true positions owing to the method of recording the old French data.

(d) The trig. lists covering Belgium, Holland, and Western Germany are believed to be generally reliable.

(e) The attached index diagram\* shows the approximate areas covered by the above-quoted reliable and unreliable trig. lists.

4. *Grid Zones in Western Europe*

On British military maps of Western Europe the following different grid zones will be found:—

English Channel

English Coastal Area	British Cassini
N.W. France Coastal Area	Lambert Zone I
N.E. France Coastal Area	Nord de Guerre

France

N. East	Nord de Guerre
N. West	Lambert Zone I
Central	Lambert Zone II
South	Lambert Zone III

\* This diagram is not included.

Belgium  
Holland  
West Germany  
S. Germany

Nord de Guerre  
Nord de Guerre  
Nord de Guerre  
Nord de Guerre and Russian  
Grid 4

Denmark

N. European Zone III

5. *Boundaries between Grid Zones*

- (a) There is a definite junction line between grid zones. Marginal ticks of the adjacent grid zone are shown on large and medium scale maps in the vicinity of a grid zone junction. Lines may be drawn connecting the corresponding marginal ticks with each other (or with the grid to which they pertain if it appears on the sheet) so as to extend a grid into the adjacent grid zone.
- (b) For internal artillery work, where targets fall across the junction line from the position of the guns, target co-ordinates may be given on this extended grid. The decision as to which grid or grids shall be used in a particular operation will be made by the artillery commander concerned.
- (c) References obtained from such manuscript grid extensions will not be communicated to other Arms and Services and will not be supplied by other Arms and Services. (See S.H.A.E.F. Operation Memorandum No. 9.)

6. *Initiation of Grid Systems by Artillery and Engineer Survey Units*

- (a) In areas already covered by *reliable* trig data it should be possible, on most occasions, to survey gun areas direct on to such control. It may sometimes be necessary for Engineer Survey to supplement such existing control to provide extra points in or near selected gun areas to meet Artillery requirements.
- (b) In areas not sufficiently covered by reliable trig. data, it will often be necessary to carry out new surveys and to prepare new trig. lists. This work will normally be done by Engineer Survey units.
- (c) Engineer and Artillery Liaison will decide what survey action is necessary to deal with circumstances as they arise. Close co-operation between Engineer and Artillery Survey Staffs and units is essential.
- (d) The Director of Survey (Br.)/The Engineer (U.S.) at Formation Headquarters is responsible for advice as to the nature and reliability of the trig. control and maps available, and for the provision of Engineer Survey assistance where needed.
- (e) There will be many occasions when Gun Regiments/Artillery Battalions may have to initiate their own grids covering a limited area. Depending on their value these grids may subsequently be discarded or incorporated into grids later established over a wider area. The number of such grids in any one area will be kept as low as possible so as to reduce to a minimum the necessity of converting co-ordinates from one grid system to another.
- (f) All grids must be the closest possible approximation to the grid printed on the largest scale available map of the area. This is essential to ensure that co-ordinates of targets scaled from the map are in close sympathy with the co-ordinates of gun positions which may be fixed with reference to the grids initiated by units.

## 7. Grid Nomenclature

The following instructions are issued to obviate confusion and to ensure due utilization of data for later operations in the area:—

- (a) Grids will be specified by the general class of Unit or Formation served by them and will carry an indication of the area, the actual initiating Unit, and the date. The following are examples:—

Regimental Grid	}	114 Fd. Regt.
Winterbourne Area	}	3 Nov. 42
Divisional Grid	}	4 Svy. Regt. R.A.
Larkhill Area	}	10 Nov. 42
Corps Grid	}	9 Svy. Regt.
Larkhill Area	}	12 Nov. 42
Corps Grid	}	519 Fd. Svy. Coy. R.E.
Larkhill Area	}	14 Nov. 42
Army Grid	}	519 Fd. Svy. Coy. R.E.
Larkhill Area	}	16 Nov. 42

- (b) All trig lists and lists of co-ordinates will carry an indication as to the grid on which the co-ordinate values are based. Lists referring to Divisional or higher grids issued to flank or superior Formations will, in addition, carry a full description of the points fixed and a short statement of the elements of the grid, *e.g.*:—

Origin: Water Tower at ORCHES. Co-ordinates scaled from 1/25,000 map—58671234.

Initial Bearing: Origin to FISMES Church.  $76\frac{1}{2}$  degrees. Obtained by compass bearing corrected for individual error, variation and convergence.

Scale: Steel tape measure between points B/215 and C/512.

- (c) If likely to be of value later, lists of co-ordinates of points fixed by R.A. Survey Regiments/F.A. Observation Battalions and Engineer Survey units, having been checked, will be forwarded as soon as practicable to the Survey Directorate/The Engineer at Army Headquarters. The latter will evaluate and collate trig. data from Artillery and Engineer sources available to them, publishing in trig. lists the co-ordinates of points whose reliability warrants inclusion.