SACLANTCEN Memorandum SM – 170

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SACLANT ASW
RESEARCH CENTRE
MEMORANDUM

A DIRECTORY OF EUROPEAN, MIDDLE EASTERN, AND N. AFRICAN COASTAL GROUND CONTROL POINTS FOR MAPPING SATELLITE IMAGES

by

Brian WANNAMAKER and Elvio NACINI

15 MARCH 1984

NORTH
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NORTH ATLANTIC TREATY ORGANIZATION

SACLANT ASW Research Centre
Viale San Bartolomeo 400, I-19026 San Bartolomeo (SP), Italy.

tel: national 0187 560940
international + 39 187 560940
telex: 271148 SACENT I

A DIRECTORY OF EUROPEAN, MIDDLE EASTERN, AND N. AFRICAN COASTAL GROUND CONTROL POINTS FOR MAPPING SATELLITE IMAGES

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15 March 1984

This memorandum has been prepared within the SACLANTCEN Underwater Research Division as part of Project 01.

O.F. HASTRUP
Division Chief

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A DIRECTORY OF EUROPEAN, MIDDLE EASTERN, AND N. AFRICAN COASTAL GROUND CONTROL POINTS FOR MAPPING SATELLITE IMAGES

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ABSTRACT

Environmental data collected by satellite are now in extensive use. If the attitude and position of data-measuring satellites are accurately known, the measured data may be mapped automatically. Otherwise, as is usual, mapping on a standard projection may be achieved by using 'ground control points'. For plotting oceanographic data from the eastern North Atlantic and the Mediterranean, SACLANTCEN has used the 392 European, Middle Eastern, and North African coastal ground control points whose positions and altitudes are listed in this document.

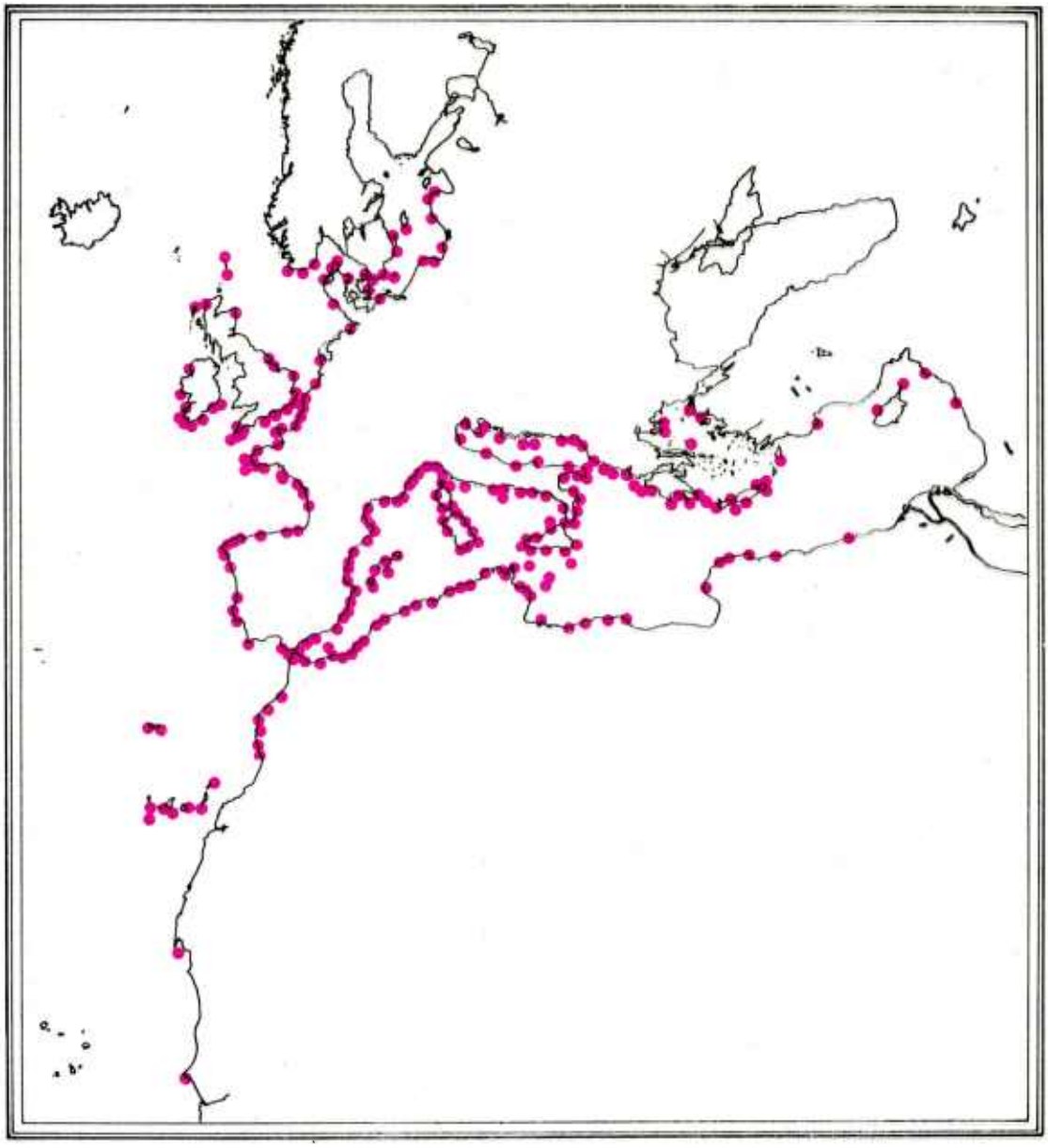

FIG. 1 POSITIONS OF GROUND CONTROL POINTS (GCP) LISTED IN THE DIRECTORY

INTRODUCTION

Orbiting satellites have been collecting environmental information about the surface of the earth for a number of years. These data are finding more and more widespread use in research, operational monitoring and prediction, ship routing, and so on. This is the result of a number of factors, including the increasing availability of the computing power necessary to handle the large data sets and increasing faith in the accuracy of the reported parameters. The measurements are made from truly remote platforms and proper corrections must be made for the effects of the intervening atmosphere and the variable emissivity of the surface, clouds, etc.

Another consideration for the quantitative use of the data is the location on the earth's surface of each measurement. The position of a feature noted in satellite imagery must be expressible in latitude, longitude, or similar ground-based units in order to direct ground investigations. In dynamical fields such as oceanography or meteorology it is necessary to quantify the motion from one image to a later image. It is not possible to do this to sufficient accuracy with the raw satellite data.

Satellites operate in elliptical (not circular) orbits, with the centre of mass of the earth at one focus. The earth itself is not spherical but spheroidal, being larger around the equator than around the poles. The mass of the earth is not evenly distributed within this spheroid and the uneven mass distribution affects the satellite orbit. The satellite orbital plane precesses and the perigee point moves around the orbital plane with respect to the earth's equator. Near-polar orbiting satellites with visible sensors are generally placed in sun-synchronous orbits to minimize the change in sun angle at the ground at different times. Any motion of the satellite about its centre of mass will affect the direction vector of the sensors. For all these reasons the images of different points on the earth are produced from varying views.

The data must therefore be calibrated spatially. If the attitude and position of the satellite is controlled or measured to sufficient accuracy this can be done automatically and, conceptually at least, in real time.

Otherwise the data may be constrained to fit at certain positions, usually referred to as ground control points (GCP's). This may be done in various ways. For example, an operator using an interactive algorithm with a video monitor marks the position of accurately known positions on the ground as seen in the satellite image. The algorithm then determines a model of the relationship between the GCP's and the corresponding line and pixel coordinates in the imagery. If the GCP's are known as X, Y locations on a map projection, the image may then be transformed directly to the map projection. This works quite well when the GCP's are uniformly distributed over the imagery but is usually poor at extrapolation. It must be repeated for different projections and when the reference scale or centre is changed.

Another method is to use the GCP positions in latitude and longitude together with the geometrical relationships of the signal path to estimate

the motion of the spacecraft. This information can then be used to map the data to various map projections or to lay a grid on the raw data.

Whichever method is used, the positions of the GCP's must be known to a sufficient accuracy. This is the purpose of the present directory, which supplies a list of GCP's that may be used to geographically map eastern North Atlantic, European, and Mediterranean data collected by satellite. The points selected are coastal ones, since these offer the best contrast step in meteorological satellite imagery (Fig. 1).

Chapter 1 deals with the related topic of timing bias, Ch. 2 discusses the data sources and error estimates, and Ch. 3 is the directory itself in which each GCP is associated with a local-area map indicating its precise position. In using the directory the user will also find it useful to have detailed nautical charts of his own area of interest. The mathematical examples given in this document use the characteristics of the TIROS-N/ NOAA-J series of satellites.

1 TIMING ERROR

In general, raw data of near-polar orbiting satellites have only time in milliseconds as a defining value. That is, data are supplied sequentially at so many samples per second and a time value is explicitly given at known intervals, but no geographical information is expressly given in the data stream.

If the time of the ascending node (when the satellite crosses over the equator from south to north), the average orbital motion of the satellite, and the geometrical relationship between the sensor and the satellite are known, then the time of a sample can be converted to the geographical location at which the sample was taken. This ignores any wobble in the spacecraft's motion and refraction in the atmosphere, but is sufficient for some uses and a useful initial stage for some types of further positional calibration.

However, the satellite itself has no way to determine equator-crossing time. This value will be known only from orbit predictions that vary in quality, or from measurements that are not widely available. Another uncertainty may arise from the possible bias between the clock time reported by the satellite and that used in the orbit predictions. With a satellite over-the-ground speed of about 7 km/s this bias may have a sizeable effect on the estimation of position.

This uncertainty may be removed by using the known position of a single GCP and the equations of spherical geometry. Assuming a circular orbit (which is reasonable for this stage) and using spherical geometry, the time after ascending node at which a position at latitude θ directly under the satellite should be sampled is

$$t = \frac{T}{360} \arcsin[\sin \theta(t)/\sin I], \qquad \text{(Eq. 1)}$$

where T is the orbital period and I is the orbit inclination, which is the angle between the plane of the equator and the plane of the orbit measured clockwise from the equator, being less than 90° for polar retrograde orbits.

This also assumes an imaging instrument scanning vertically downward. It is best to use a GCP as near to the centre of the scan as possible (or the average of two equally spaced from the centre) because the scan is tilted to an east-west line by an angle G, such that

$$\cos G = \cos I/\cos \theta\ (t). \qquad \text{(Eq. 2)}$$

At a 43° latitude sub-satellite point for example, a scan line of NOAA-7 samples a point about 5° latitude lower at one end then the other. NOAA-7 scans at 6 lines/second; thus if the estimated position is on line 200, say, and the true position is on line 212, the discrepancy is 2 seconds ± 1/6 second.

Once the time correction has been done there may still be a difference between the estimated position and the true position along the scan line, i.e.

in pixels. This may be due to an error in the spacecraft attitude, in roll, or in the prediction of the longitude of the equator crossing. This error is usually small, because the longitude step per orbit is stable.

If the longitude $\lambda(t)$ and time (t) at the centre of a scanline are known accurately, the true ascending node longitude can be found from spherical geometry as

$$\lambda_{AN} = \lambda(t) - \arctan(\cos I \cdot \tan\tau) - \frac{\tau t}{SD} \quad , \qquad \text{(Eq. 3)}$$

where τ is the arc length along the orbit and SD is the length of the sidereal day (86164 seconds).

Generally, however, the satellite track does not cross GCP's and a longitude must be estimated from a chart.

Because of the tilt of the orbit and the shape of the earth the longitude correction can be complex. In many cases a correction by trial and error will be sufficient, leaving the remaining discrepancy to be accounted for in the subsequent fitting routines.

2 DATA SOURCES AND ERROR ESTIMATES

Designation of a position on a satellite image by a human operator or by automatic digital correlation against a map segment is facilitated if the point is characterized by strong constrast and unique shape. For high-resolution sensors, such as the Landsat multi-spectral scanner or the Seasat synthetic aperture radar, such man-made features as highway intersections and airport runways may be used. This is generally not possible with sensor resolutions on the order of 1 km or larger. For meteorological-scale satellites the greatest image contrast with fixed features are found at land/sea boundaries. The sea reflects much less of the sun's energy than land (except in sun-glint regions) and the thermal contrast is also often high.

Because of the work of many national hydrographic offices the European coastline is very accurately known. The directory given in Ch. 3 has taken data from the compiled information of three of these, those of France, Italy, and the United Kingdom, as indicated in the last column. Most of the positions are those of lighthouses, which are generally identified by means of a national or international geodetic grid.

The most accurate positions were given to the third decimal place in both latitude and longitude. Assuming that this represents an accuracy of ± 0.0005 minutes, this is equivalent to ± 0.0005 n.mi or ± 0.9 m in the north-south direction.

As is usual in mapping practice, the positions are given in geodetic latitude. The earth is not a sphere but an irregular oblate spheroid, i.e. it is slightly flattened at the poles. This is approximated by a regular spheroid, which is an ellipse of equatorial radius 'r' and eccentricity 'e' rotated about the poles. For the International Spheroid (Hayford's 1910) (see Fig. 2), r = 6378388 m, and e^2 = 0.0067227002.

The geocentric latitude is the angle θ' between a vector from the centre of the earth to a position P on the surface and the equatorial plane. The geodetic latitude θ is the angle between a vector through P, normal to the surface of the ellipsoid at P, and the equatorial plane.

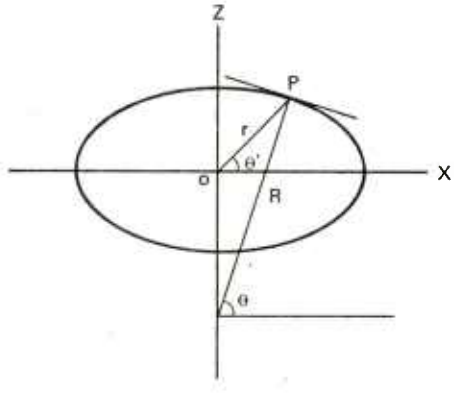

FIG. 2 INTERNATIONAL SPHEROID (Hayford, 1910).

The relationship between the two latitudes is

$$\tan \theta' = (1 - e^2) \tan \theta$$

The two angles are coincident at 0° and 90°. Between these extremes the geocentric value is smaller by a maximum of about 0.2° at 45° latitude.

The directory lists 392 GCP's lying within the area defined by 14°N, 61°N, 18°W and 35°E. A satellite image of say 512 × 512 or 1024 × 1024 points will generally have many more GCP's available than are necessary for accurate mapping in cloud-free conditions. Such conditions however are rare. The practice at SACLANTCEN is to scan this master directory during the transfer of a set of satellite images from an orbital pass to disc files so as to create a library of GCP's that should lie within the area of the image. A subset of this directory acts as a master list for Automatic Picture Transmission images. Since these data have lower resolution, many of the smaller GCP's would be difficult to locate in this imagery data.

The directory also lists the altitude above sea level of the GCP's. These allow corrections to be made for the displacement of the position of mountain tops when viewed from an angle. This correction is usually less than one raw data pixel for NOAA-7.

3 DIRECTORY OF GROUND CONTROL POINTS

The following pages list the 392 selected ground control points, together with their longitude, latitude, and altitude (in metres above sea level). The small map alongside each position is to aid the user in finding the GCP on his own charts.

The final column in the listing provides information on the sources of the data, using the following codes:

Position Data

		Refs.
I	Italian data from Istituto Idrografico della Marina (in degrees, minutes, thousands of minutes)	<1>
*I	Italian data from the List of Lights (in degrees, minutes)	<2>
F	French data from EPSHOM (in degrees, minutes, thousands of minutes)	<3>
*F	French data from the List of Lights (in degrees, minutes, hundreds of minutes)	<4>
U	UK data from the List of Lights (in degrees, minutes, tens of minutes)	<5>
Z	Data read from nautical charts (in degrees, minutes, tens of minutes)	

Altitude Data

		Refs.
1	Italian data from the List of Lights (= listed altitude minus listed height of construction)	<2>
2	Italian data from the List of Lights (= listed altitude minus estimated height of construction)	<2>
3	Altitude not known.	
4	UK data from the List of Lights (= listed altitude minus listed height of construction)	<5>
5	UK data from the List of Lights (= listed altitude minus estimated height of construction)	<5>

The listing starts at Gibraltar and follows the European, Middle East, and N. African coasts of the Mediterranean back to Gibraltar. It then follows the African Atlantic coast as far south as Cap Vert, Senegal. Subsequently it follows the European Atlantic coast from Gibraltar to Cap Gris Nez, France, from where it circles the coasts of Ireland and the United Kingdom before returning to Walcheren in The Netherlands. It then continues along the coasts of the North Sea and Baltic back to the Norwegian coast as far north as Obrestad. Subheadings divide the positions by nationality, some nations (e.g. France) having two separate lists because of the division of their coastlines.

REFERENCES

1. Personal Communication. Istituto Idrografico della Marina, Genova, Italy.

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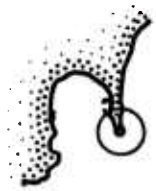
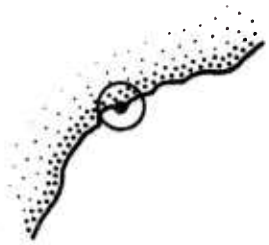
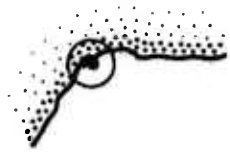
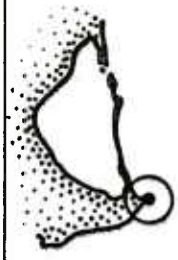
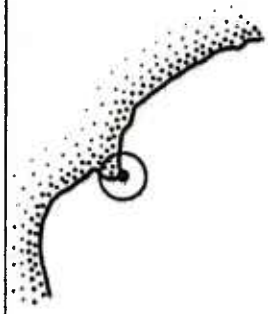
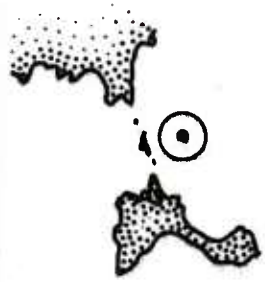
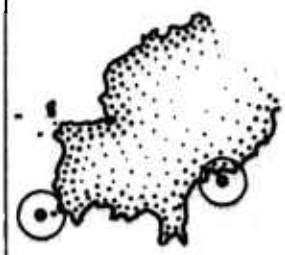
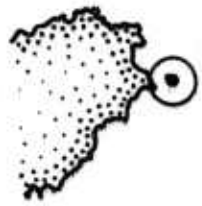
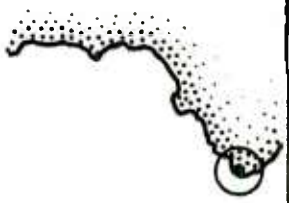
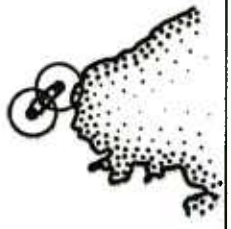
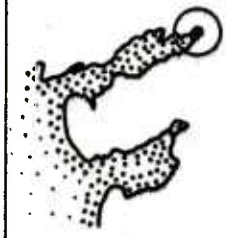
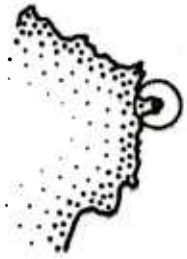
4. ETABLISSEMENT PRINCIPAL DU SERVICE HYROGRAPHIQUE ET OCEANOGRAPHIQUE DE LA MARINE. Livres des Feux et Signaux de Brume, série D: tome A, tome B. Brest, France, EPSHOM, 1978.

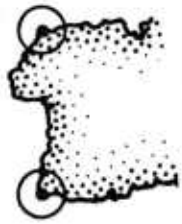
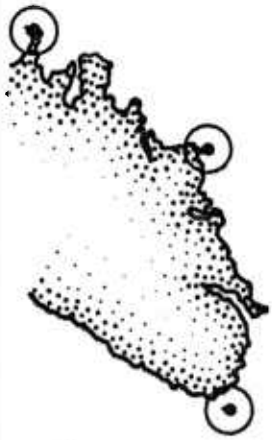
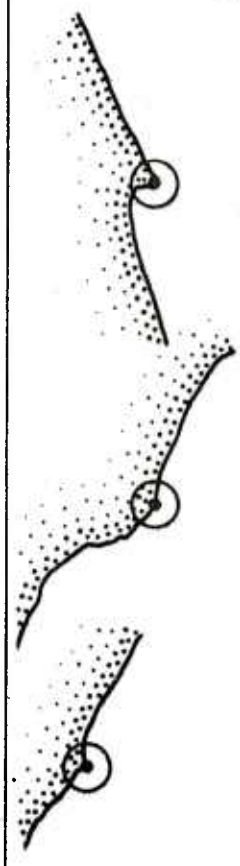
5. MINISTRY OF DEFENCE, HYDROGRAPHIC DEPARTMENT. Admiralty List of Lights and Fog Signals. Taunton, U.K., Hydrographer of the Navy.
Vol. A British Isles and North Coast of France, 1983.
Vol. B Southern and Eastern Sides of the North Sea, 1983.
Vol. C Baltic Sea, 1983.
Vol. D Eastern Side of Atlantic Ocean, 1980.
Vol. E Mediterranean Black and Red Seas, 1982.

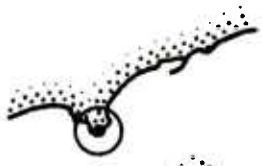
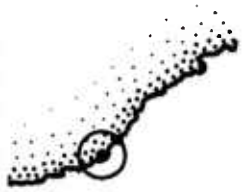
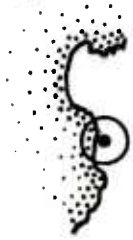
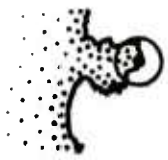
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
GIBRALTAR		-5.343	36.112	30.0	U-4
S P A I N					
PTA DE LA DONCELLA		-5.153	36.418	10.0	U-4
PTA DE CALABURRAS		-4.642	36.508	21.0	U-4
MALAGA		-4.416	36.710	5.0	U-4
PTA DE MONA		-3.733	36.717		U-3
C. DE GATA		-2.192	36.723	36.0	U-4

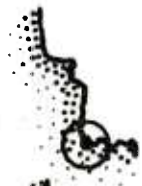
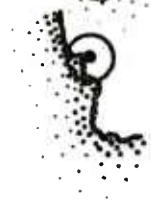
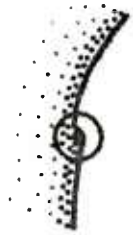
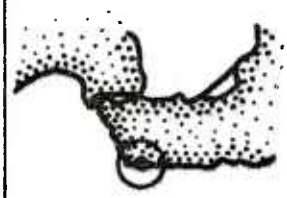
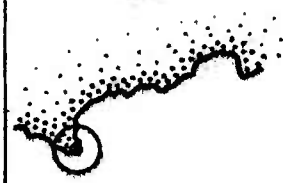
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
ROLDAN		-1.905	36.943	204.0	U-4
C. TINOSO		-1.107	37.537	136.0	U-4
I. ESCOMBRERA		-0.968	37.560	57.0	U-4
C. DE PALOS		-0.688	37.635	30.0	U-4
C. DE LAS HUERTAS		-0.405	38.352	29.0	U-4
C. DE LA NAO		0.235	38.730	102.0	U-4

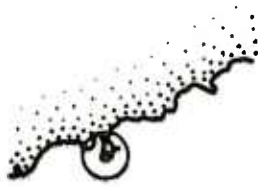
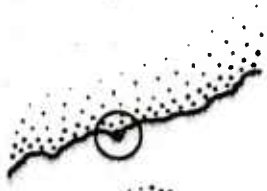
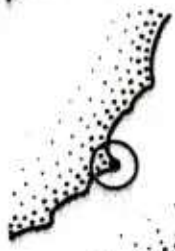
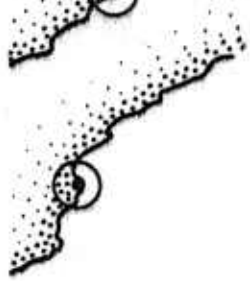
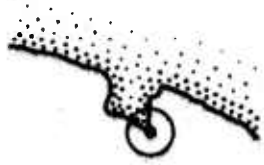
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. DE SAN ANTONIO		0.197	38.802	158.0	U-4
(BALEARIC I.)					
C. BERBERIA		1.388	38.640	59.0	U-4
C. FORMENTERA		1.583	38.662	120.0	U-4
I. ESPARDELL		1.477	38.802	5.0	U-4
I. TE VEDRA		1.188	38.862	18.0	U-4
I. GROSSA		1.453	38.903	16.0	U-4
I. TOGOMAGO		1.652	39.032	63.0	U-4

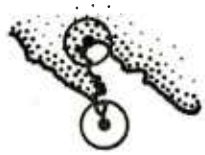
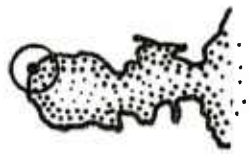
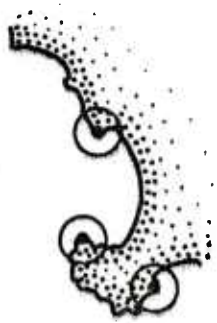
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. DE SALINAS		3.053	39.263	7.0	U-4
C. LEBECHE		2.920	39.162	66.0	U-4
PTA ANCIOLA		2.923	39.130	96.0	U-4
C. BLANCO		2.788	39.365	84.0	U-4
C. TRAMONTANA		2.338	39.598	54.0	U-4
C. LLEBETTX		2.305	39.575	115.0	U-4
C. DE FORMENTOR		3.212	39.960	188.0	U-4
C. PERA		3.477	39.715	58.0	U-4

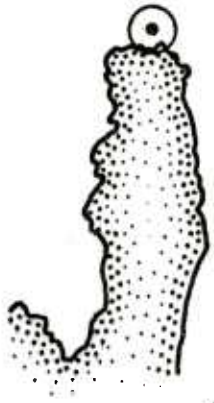
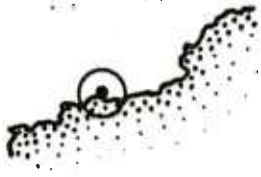
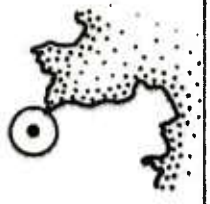
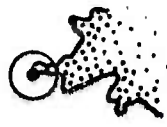
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
PTA NATI		3.823	40.050	29.0	U-4
C. DARTUCH		3.823	39.922	10.0	U-4
C. CABALLERIA		4.092	40.088	80.0	U-4
C. FAVARITX		4.263	39.995	19.0	U-4
I. DEL AIRE		4.292	39.798	16.0	U-4
C. CULLERA		0.217	39.185	12.0	U-4
C. DE OROPESA		0.150	40.083	11.0	U-4
PENISCOLA		0.408	40.358	45.0	U-4

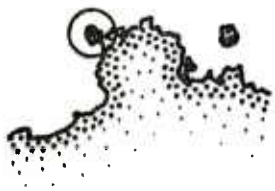
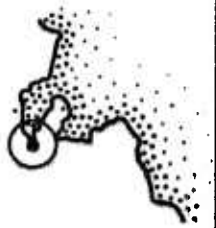
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. DE SALOU		1.173	41.057	32.0	U-4
PTA DEL LLOBREGAT		2.152	41.327	1.0	U-4
C. DE TOSSA		2.933	41.715	49.0	U-4
C. SAN SEBASTIAN		3.202	41.895	155.0	U-4
MEDA GRANDE		3.220	42.047	76.0	U-4
PTA DE LA PONSELLA		3.182	42.243	13.0	U-4
PTA DE CALA NAUS		3.285	42.268	26.0	U-4
C. CREUS		3.315	42.317	76.0	U-4

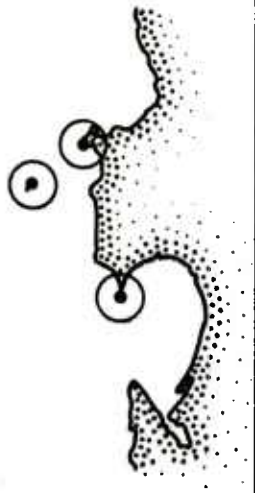
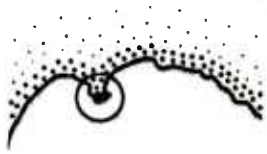
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
PTA DE LA SERNELLA		3.187	42.348	10.0	U-5
F R A N C E					
C. BEAR		3.138	42.517	57.0	F-1
C. LEUCATE		3.057	42.912	49.0	F-1
C. D'ADGE		3.503	43.264	4.0	F-1
I. BRESCOU		3.502	43.263	8.0	U-4
C. COURONNE		5.054	43.327	5.0	F-1
I. DE PORQUEROLLES		6.207	42.995	64.0	F-1
C. BENAT		6.364	43.090	48.0	F-1

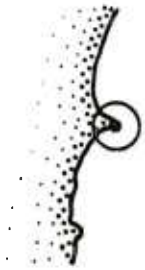
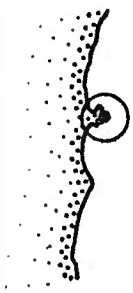
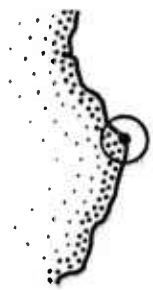
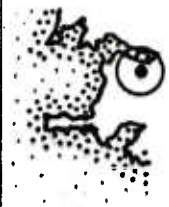
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
I. DE LEVANT		6.511	43.048	63.0	F-1
LA GAROUPE		7.133	43.563	75.0	U-4
C. FERRAT		7.328	43.676	37.0	F-1
I T A L Y					
C. DELL'ARMA		7.833	43.818	35.5	I-1
C. MELE		8.173	43.873	69.0	I-1
C. VADO		8.454	44.259	2.0	I-1
PTA DI PORTOFINO		9.219	44.300	28.0	I-1

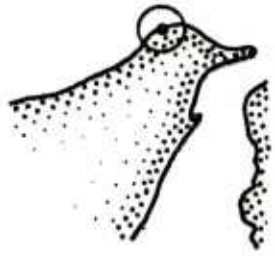
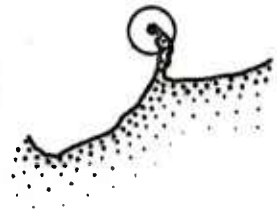
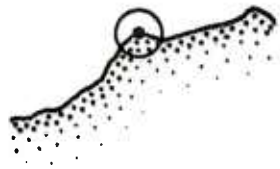
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
LA SPEZIA		9.842	44.110	2.0	I-1
I. DEL TINO		9.852	44.027	93.0	I-1
PTA PARATELLA GORG.		9.900	43.433	100.0	*I-1
CALA SCIROCCO "		9.900	43.418	40.0	*I-1
PTA FERRAIONE CAP.		9.847	43.050	18.0	*I-1
PTA TRATTOIO "		9.797	43.022	146.5	*I-1
PTA POLVERAIA ELBA		10.111	42.795	42.0	I-1
C. FOCARDO ELBA		10.410	42.755	25.5	I-1
TALAMONE		11.135	42.552	12.0	I-1
PTA LIVIDONIA		11.105	42.447	35.0	I-1
FORTE LA ROCCA		11.213	42.389	72.5	I-1
PTA FENAIO GIGLIO		10.882	42.392	29.5	*I-1
PTA CAPEL ROSSO GI.		10.921	42.322	70.0	I-1

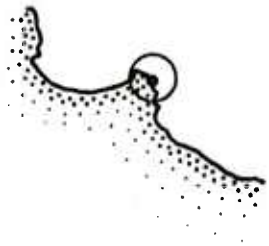
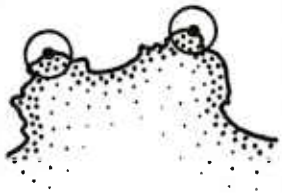
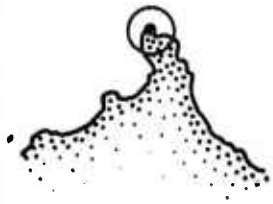
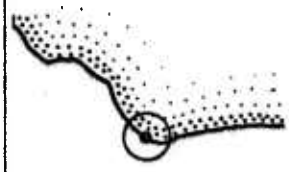
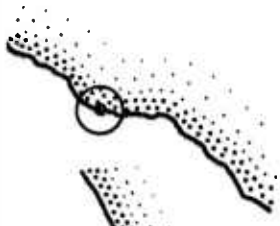
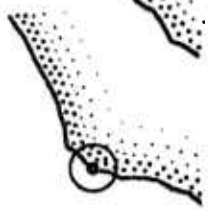
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
PTA ROSSA GIANNUTRI		11.109	42.240	52.0	I-1
F R A N C E					
I. DE LA GIRAGLIA (CORSE)		9.406	43.028	63.0	F-1
I. ROUSSE		8.933	42.646	53.0	F-1
PTE REVELLATA		8.725	42.591	81.0	F-1
I. DE GARGALO		8.533	42.372	29.0	*F-1
I. SANGUINAIRES		8.595	41.880	82.0	F-1
C. DI MURO		8.662	41.741	47.0	F-1

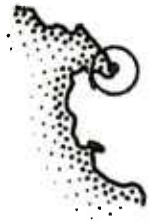
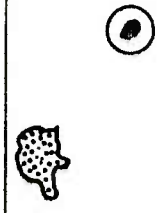
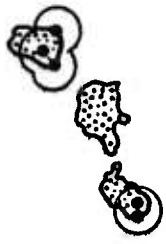
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
PTE SENETOSE		8.795	41.560	41.0	F-1
C. DE FENO		9.973	41.393	12.0	F-1
C. PERTUSATO		9.185	41.368	84.0	F-1
PTE DE LA CHIAPPA		9.366	41.596	48.0	F-1
I T A L Y					
C. TESTA (SARDINIA)		9.145	41.245	43.5	I-1
PTA SCORNO		8.320	41.120	44.5	I-1
C. CACCIA		8.164	40.561	162.0	I-1

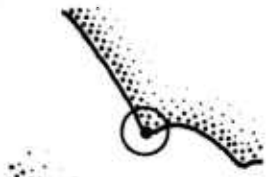
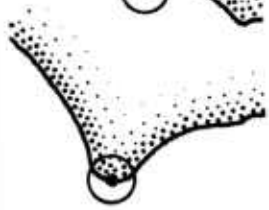
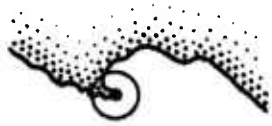
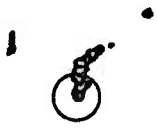
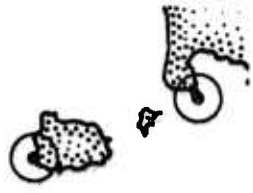
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. MANNU		8.379	40.036	48.0	I-1
I. MAL DI VENTRE		8.305	39.994	18.0	I-1
C. SAN MARCO		8.435	39.861	42.0	I-1
C. SANDALO		8.225	39.148	104.0	I-1
C. SPARTIVENTO		8.846	38.879	62.0	I-1
C. PULA		9.021	38.985	31.5	I-1
C. ST. ELIA		9.148	39.185	49.0	I-1

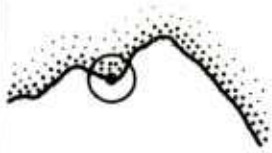
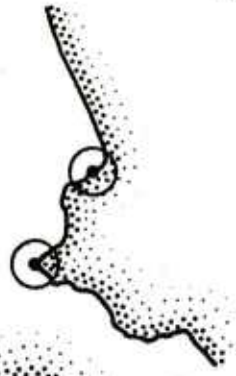
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. CARBONARA		9.515	39.104	115.0	I-1
I. DEI CAVOLI		9.545	39.090	36.5	I-1
C. FERRATO		9.634	39.303	40.5	I-1
C. BELLAVISTA		9.714	39.913	145.5	I-1
C. COMINO		9.829	40.529	6.0	I-1
I. TAVOLARA		9.737	40.927	65.0	I-1
C. FIGARELLO		9.645	40.980	64.0	I-1

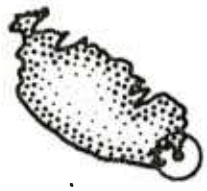
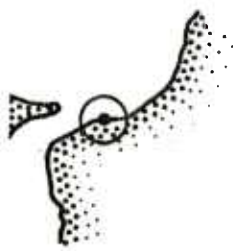
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. FERRO		9.524	41.156	34.0	I-1
C. PELORO (SICILY)		15.663	38.269	0.0	I-1
C. RASOCOLMO		15.520	38.297	72.0	I-1
C. MILAZZO		15.231	38.272	79.5	I-1
C. D'ORLANDO		14.747	38.166	16.5	I-1
C. CEFALU'		14.030	38.041	54.0	I-1

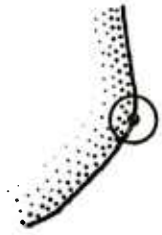
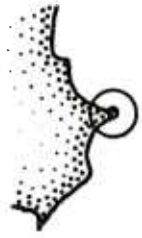
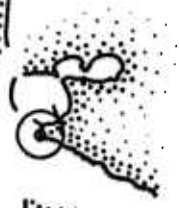
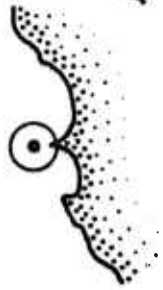
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. ZAFFERANO		13.538	38.113	23.0	I-1
C. GALLO		13.317	38.217	33.0	*I-1
PTA RAISI		13.103	38.187		I-3
C. SAN VITO		12.734	38.189	5.0	I-1
C. GROSSO LEVANZO		12.347	38.021	56.5	I-1
PTA SOTTILE FAVIGN.		12.273	37.936	5.0	I-1
PTA DI MARSALA "		12.366	37.908	6.0	I-1
C. GRANITOLA		12.663	37.570	2.0	I-1
C. ROSSELLO		13.451	37.296	81.5	I-1
C. SCALAMBRI		14.495	36.788	3.0	I-1

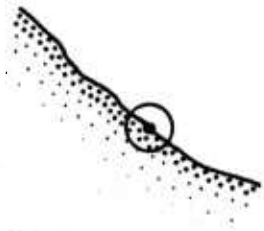
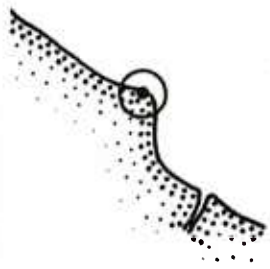
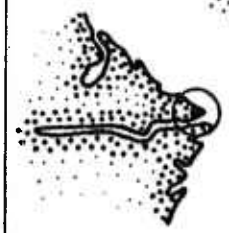
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. PASSERO		15.152	36.690	20.0	I-1
C. MURRO DI PORCO		15.336	37.004	14.0	I-1
C. SANTA CROCE		15.257	37.244	12.0	I-1
C. MOLINI		15.177	37.578	21.5	I-1
I. PANAREA		15.064	38.640	421.0	I-6
C. FARO SALINA		14.867	38.538	43.5	*I-1
M. FOSSA FELCI SAL.		14.846	38.558	962.0	I-6
PTA LINGUA SALINA		14.867	38.533	1.5	*I-1
M. ARIA VULCANO		14.992	38.384	500.0	I-6
PTA DEI PORCI VUL.		14.992	38.367	4.0	U-4

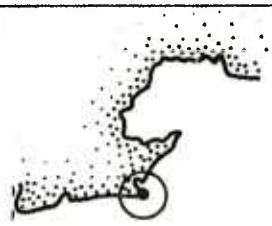
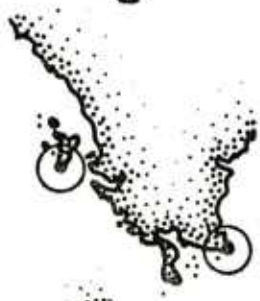
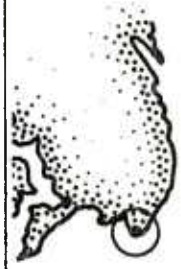
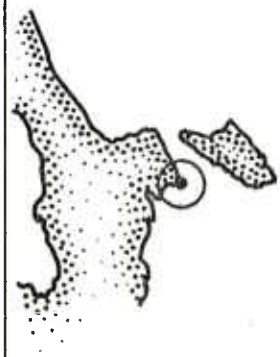
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. D'ANZIO		12.623	41.447	16.0	I-1
C. CIRCEO		13.069	41.233	20.0	I-1
PTA DELLO STENDARDO		13.590	41.212	14.0	I-1
PTA GUARDIA PONZA		12.955	40.873	95.0	*I-1
I. VENTOTENE		13.440	40.795	5.0	*I-1
C. MISENO		14.090	40.779	68.0	I-1
PTA IMPERATORE ISC.		13.854	40.712	150.5	I-1
PTA CAMPANELLA		14.326	40.570	47.0	I-1
PTA CARENA CAPRI		14.200	40.537	45.0	I-1

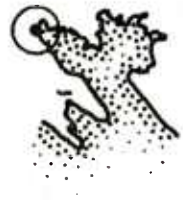
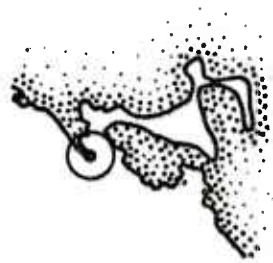
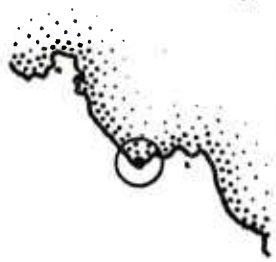
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. D'ORSO		14.682	40.634	61.5	I-1
FARO PTA FORTINO		14.988	40.356	32.5	I-1
PTA LICOSA		14.901	40.252	2.5	I-1
C. PALINURO		15.274	40.025	192.0	I-1
C. SCALEA		15.789	39.820	85.0	I-1
C. SUVERO		16.158	38.953	28.0	I-1
C. VATICANO		15.829	38.620	100.0	I-1

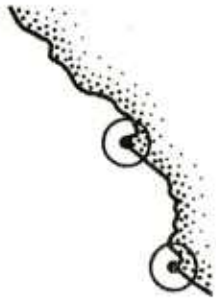
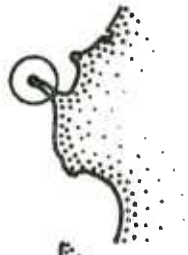
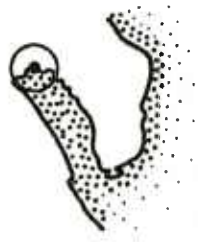
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
PTA SPADILLO PANT.		12.013	36.825	29.0	I-1
PTA LIMARSI "		12.037	36.740	29.0	I-1
C. PONENTE LAMPED.		12.517	35.517	104.0	*I-1
C. GRECALE "		12.633	35.517	63.0	*I-1
PTA B. TUCCIO LIN.		12.883	35.867	15.0	*I-1
M. VULCANO LINOSA		12.870	35.860	195.0	I-6
PTA A. BIANCA LIN.		12.850	35.850	3.0	*I-1
M A L T A					
COLL. GORDAN GOZZO		14.218	36.073	158.0	U-4
PTA IRQIQA COMINO		14.325	36.005	3.0	U-5
PTA DELIMARA MALTA		14.560	35.823	22.0	U-4
I T A L Y					
C. SCILLA		15.715	38.257	66.0	I-1

		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. SPARTIVENTO		16.061	37.927	48.0	I-1
PTA STILO		16.578	38.449	38.5	I-1
C. RIZZUTO		17.100	38.901	19.5	I-1
C. COLONNE		17.205	39.027	18.5	I-1
PTA ALICE		17.154	39.400	3.5	I-1
C. SAN VITO		17.204	40.413	3.0	I-1
I. SAN ANDREA		17.946	40.048	2.0	I-1

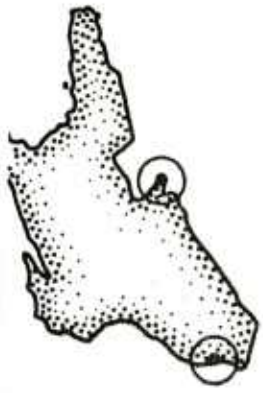
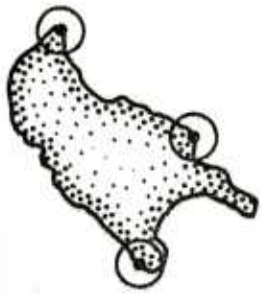
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. S.MARIA DI LEUCA		18.369	39.797	53.5	I-1
C. D'OTRANTO		18.520	40.108	28.0	I-1
TORRE CANNE		17.470	40.843	3.0	I-1
VIESTE		16.185	41.890	12.5	I-1
PTA DELLA PENNA		14.715	42.172	14.5	I-1
A. COLLE CAPPUCCINI		13.517	43.623	103.0	I-4
PTA DELLA MAESTRA		12.530	44.970	2.0	I-1

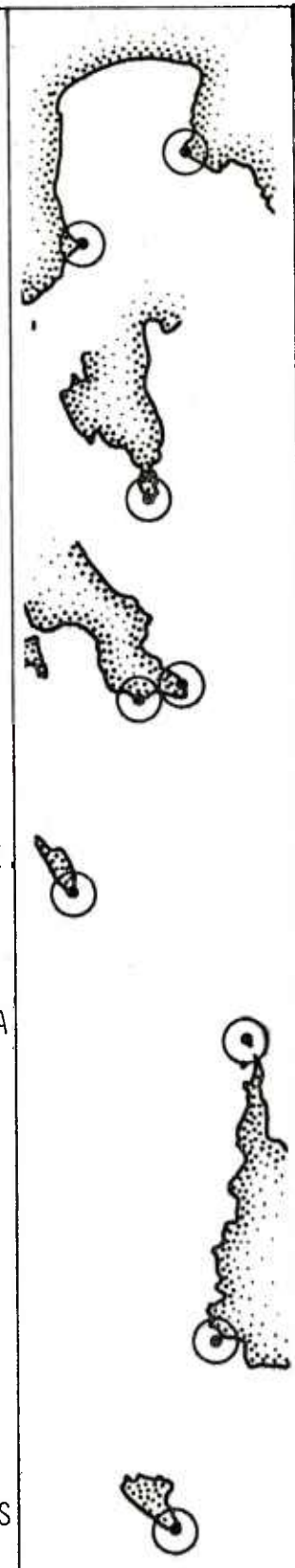
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
PTA DEL TAGLIAMENTO		13.099	45.637	1.0	I-1
YUGOSLAVIA					
RT. SAVUDRIJA		13.492	45.490	7.0	U-4
VELI P. PINIDA BRI.		13.755	44.887	5.0	U-4
RT. MARLERA		14.003	44.803	12.0	U-4
RT. CRNA		14.147	44.957	8.0	U-4
RT. TAREJ CRES		14.492	44.955	3.0	U-4
TENKA PUNTA KRK		14.537	45.228	2.0	U-4

		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
RT. SORINJ RAB		14.683	44.845	3.0	U-4
RT. VELI RAT DUGI OTOK		14.823	44.150	0.0	U-4
R.T. STUPISCE VIS.		16.072	43.007	10.0	U-4
RT. VELO DANCE KOR.		16.643	42.925	6.0	U-4
RT. OSTRI		18.537	42.393	60.0	U-4
RT. PLATAMON		18.783	42.268	22.0	U-4

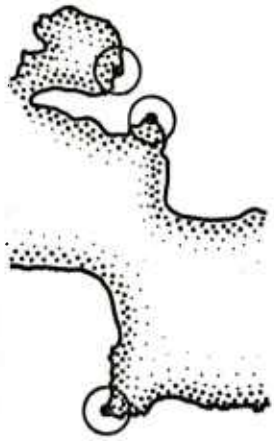
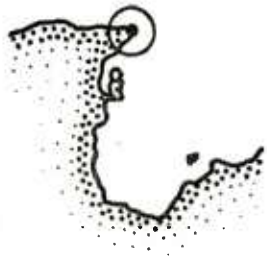
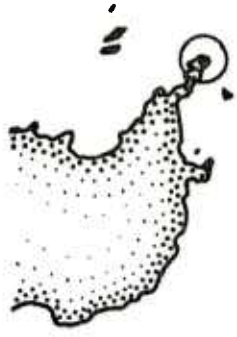
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
RT. VOLOVICA		19.075	42.088	23.0	U-4
RT. MENDRA		19.150	41.953	27.0	U-4
A L B A N I A					
KEP I RODONIT		19.447	41.588	34.0	U-4
KEP I PALIT		19.393	41.413	29.0	U-4
KEP I LAGIT		19.438	41.147	2.0	U-4
KEP I KARLOVECIT		19.325	40.437	13.0	U-4
G R E E C E					
A. KASTRI OTHONI		19.430	39.865	93.0	U-4

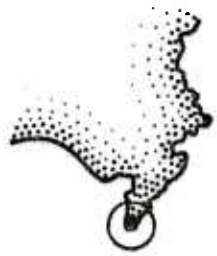
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
A. ARILLA KERKIRA		19.658	39.712	25.0	U-1
A. LEVKIMMIS "		20.073	39.462	5.0	U-5
VRAKHOI LAGOUDHIA		19.905	39.418	15.0	U-1
A. LAKKA PAXOI		20.125	39.240	55.0	U-4
A. MITIKAS		20.702	38.998	6.0	U-1
YIRAPETRA LEVKAS		20.720	38.847	11.0	U-4
N. SESOULA		20.540	38.697	33.0	U-5
DHOUKATON LEVKAS		20.543	38.565	55.0	U-4

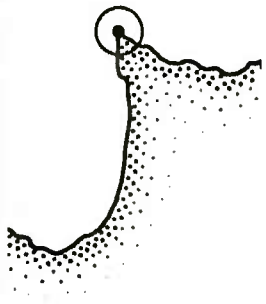
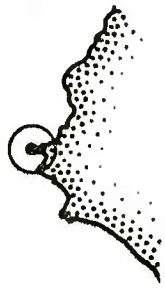
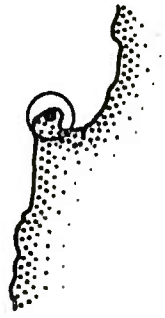
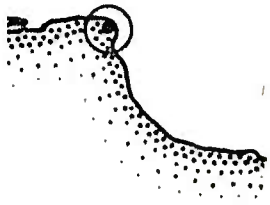
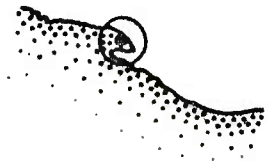
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
A. DHIKHALIA KEFA.		20.677	38.282	13.0	U-1
A. KATELIOS "		20.743	38.063	75.0	U-1
A. YEROGOMBOS "		20.340	38.182	36.0	U-4
N. VARDHIANOI		20.427	38.135	4.0	U-4
SKINARI ZAKINTHOS		20.708	37.933	57.0	U-4
A. KRIONERI "		20.905	37.807	13.0	U-5
A. KERI "		20.822	37.653	183.0	U-4
A. KATAKOLON		21.315	37.637	36.0	U-4
DHIO ADHELFLA SAP.		21.695	36.740	102.0	U-4

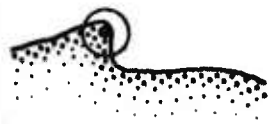
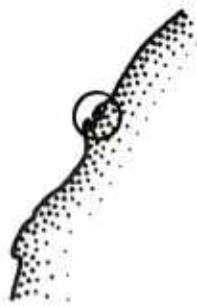
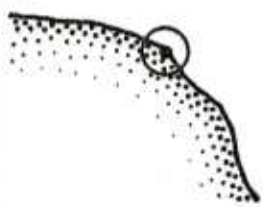
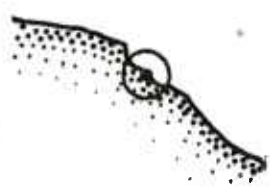


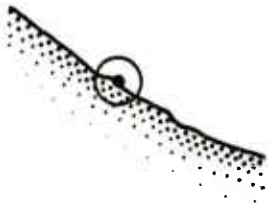
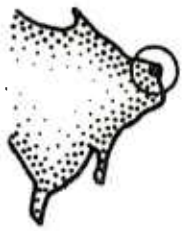
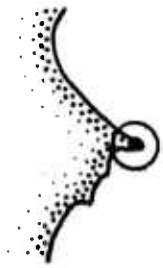
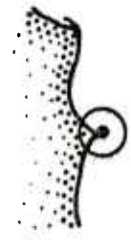
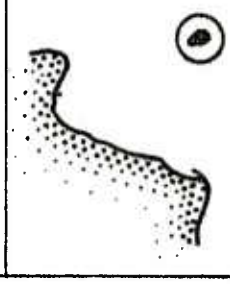
	LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
A. KITRIES	22.123	36.913	20.0	U-4
A. LIVADHIES	21.965	36.795	10.0	U-5
A. TAINARON	22.480	36.387	25.0	U-4
A. MALEAS	23.202	36.452	25.0	U-4
A. ZOVOLLO	23.130	36.430	8.0	U-5
A. APLOITARES ANDI	23.323	35.825	30.0	U-5
N. GRAMVOUSA AGRIA	23.577	35.648	98.0	U-5
N. ELEFONISI	23.525	35.270	28.0	U-4
A. TRIPITI GAVDHOS	24.123	34.805	31.0	U-1

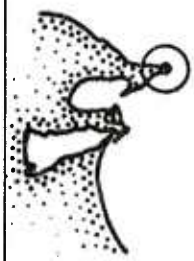
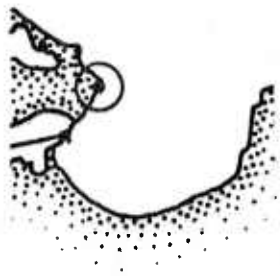
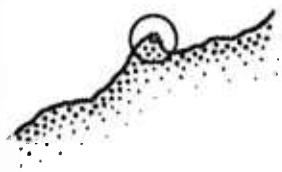
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
KHERS AKROTIRI KRITI		24.195	35.532	165.0	U-5
A. DHREPANO KRITI		24.238	35.473	53.0	U-4
A. LITHINON KRITI		24.732	34.923	29.0	U-1
A. AY IOANNIS "		25.773	35.342	40.0	U-1
A. SIDHEROS KRITI		26.312	35.317	35.0	U-4
N. KOUFONIDION		26.143	34.935	63.0	U-5
A. LITHARI SKIROS		24.678	38.775	84.0	U-4

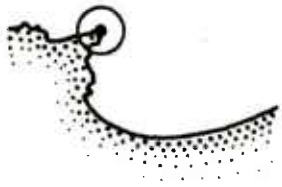
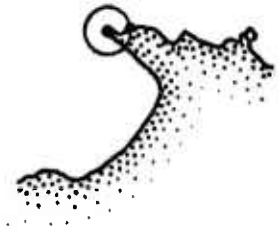
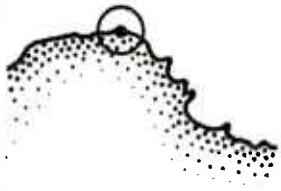
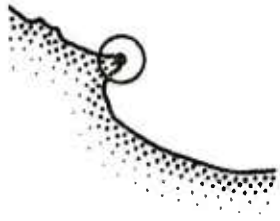
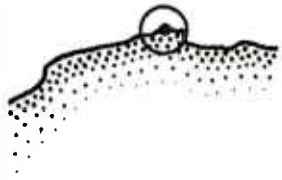
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
A. PSEVDHOKAVOS		23.993	39.950	35.0	U-5
A. AKRATHOS		24.398	40.143	37.0	U-5
T U R K E Y					
ILYASBABA BURNU		26.175	40.045	25.0	U-4
BABA BURNU		26.067	39.483	22.0	U-4
G R E E C E					
A. PRASSO NISI ROD.		27.762	35.873	51.0	U-4
T U R K E Y					
GELIDONYA BURNU		30.422	36.218	218.0	U-4
C Y P R U S					
KLIDHES		34.607	35.708	10.0	U-4

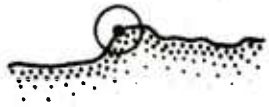
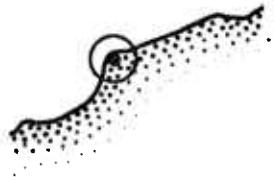
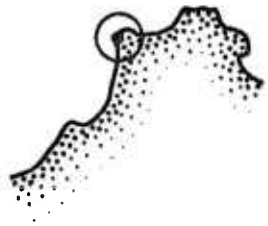
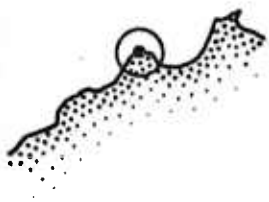
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. KORMAKITI		32.920	35.400	8.0	U-4
SYRIA					
RA'S IBN HANI		35.715	35.587	4.0	U-5
ISRAEL					
RA'S HARKARMEL		34.968	32.828	159.0	U-4
EGYPT					
RA'S ALAM EL-RUM		27.340	31.360	42.0	U-4
LIBYA					
TUBRUQ		24.001	32.073	1.0	U-4

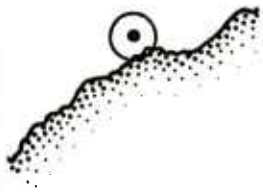
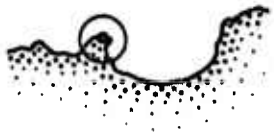
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
RA'S AT TIN		23.117	32.633	27.0	U-4
RA'S AL HILAL		22.178	32.923	10.0	U-4
RA'S AMIR		21.700	32.933	18.0	U-4
BENGASI		20.043	32.117	5.0	U-5
RA'S AL BARG		15.217	32.367	16.0	U-4
AL KHUMS		14.267	32.650	7.0	U-4

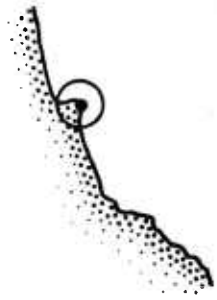
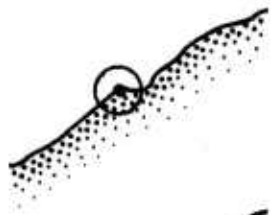
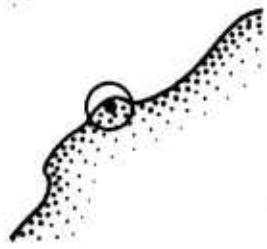
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
TARABULUS W. END HARBOUR		13.178	32.905	32.0	U-4
ZUWARAH		12.120	32.925	10.0	U-5
T U N I S I A					
RA'S TAGUERMESS		11.045	33.822	12.0	*F-1
RA'S KABUDIVAH		11.155	35.233	18.0	*F-1
RA'S IFRIQIYA		11.082	35.508	11.0	*F-1
JAZIRAT QUARAYYAT		11.033	35.798	4.0	*F-1

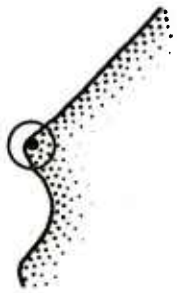
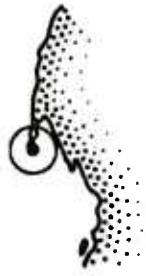
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
RA'S MUSTAFA		11.125	36.839	64.0	*F-1
C. BON		11.055	37.078	106.0	*F-1
RAS SIDI		10.283	37.183		Z-3
C. QARTAJANNAH		10.348	36.872	134.0	*F-1
C. SERRAT		9.210	37.232	186.0	*F-1

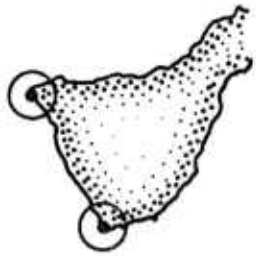
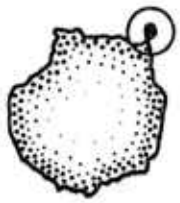
ALGERIA		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. DE GARDE		7.785	36.968	129.0	*F-1
C. DE FER		7.173	37.082	48.0	*F-1
C. BOURGAROUN		6.470	37.090	80.0	*F-1
C. CARBON		5.105	36.777	210.0	*F-1
C. BENNGUT		3.895	36.923	34.0	*F-1
C. CAXINE		2.957	36.813	31.0	*F-1

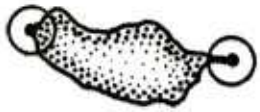
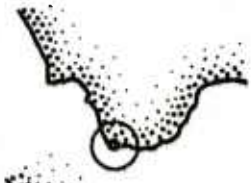
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. TENES		1.343	36.552	73.0	*F-1
PTA COLOMBI		0.942	36.445	31.0	*F-1
PTA DE L'AIGUILLE		-0.488	35.878	51.0	*F-1
C. FALCON		-0.798	35.772	77.0	*F-1
C. LINDLES		-0.933	35.735		Z-3
I. HABIBAS		-1.132	35.722	106.0	*F-1
C. FIGALO		1.200	35.577		Z-3

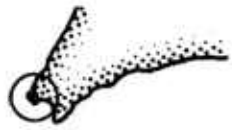
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
I. RACHGOUN		-1.478	35.327	67.0	*F-1
M O R O C C O					
C. DE AGUA		-2.422	35.147	34.0	U-4
C. TRES FORCAS		-2.963	35.438	94.0	U-4
S P A I N					
I. DE ALBORAN W.TIP		-3.033	35.933	15.0	Z-6
M O R O C C O					
MORRO NUEVO		-3.928	35.262	135.0	U-4
PTA PESCADORES		-4.678	35.217	34.0	U-4

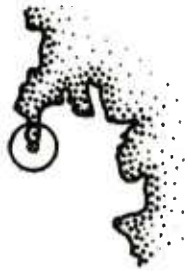
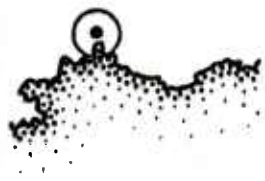
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. NEGRO		-5.273	35.687	122.0	U-4
S P A I N					
PTA ALMINA		-5.280	35.900	132.0	U-4
M O R O C C O					
PTA MALABATA		-5.747	35.818	61.0	U-4
C. SPARTEL		-5.928	35.796	71.0	Z-1
C. DE FEDALA		-7.400	33.718	9.0	U-4
C. DE MAZAGAN		-8.518	33.253	15.0	U-4

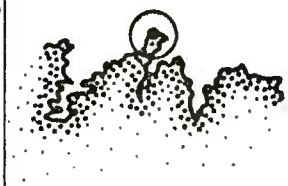
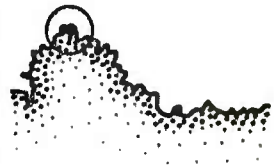
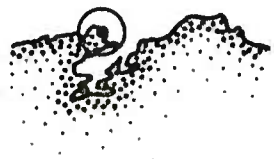
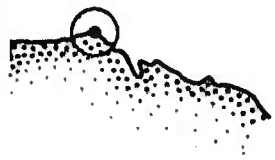
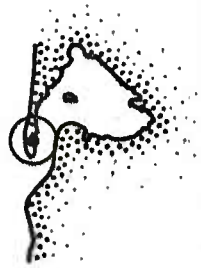
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. BEDDOUZA		-9.283	32.543	49.0	U-4
C. SAFI		-9.280	32.333	79.0	U-4
C. SIM		-9.833	31.397	89.0	U-4
C. GHIR		-9.888	30.627	45.0	U-4
MAURITANIE					
C. BLANC		-17.050	20.772	23.0	U-4

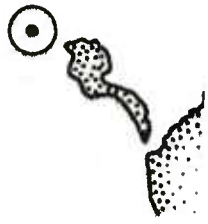
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
S E N E G A L					
C. VERT		-17.503	14.723	104.0	U-4
S P A I N					
(CANARY)					
PTA FUENCALIENTE		-17.842	28.453	18.0	U-4
PTA ORCHILLA		-18.145	27.705	106.0	U-4
PTA TENO		-16.922	28.340	40.0	U-4
PTA RASCA		-16.693	28.000	16.0	U-4
LA ISLETA		-15.417	28.173	238.0	U-4
PTA JANDIA		-14.505	28.063	12.0	U-4

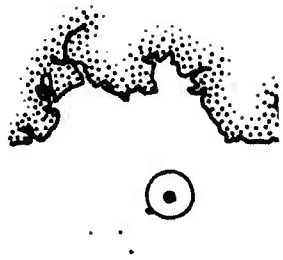
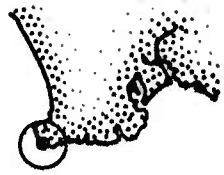
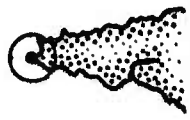
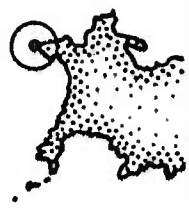
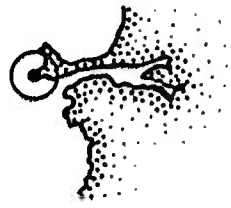
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
PTA DELGADA		-13.495	29.397	1.0	U-4
P O R T U G A L					
(MADEIRA I.)					
PTA DO PARGO		-17.262	32.812	297.0	U-4
PTA DE SAO LOURENCO		-16.657	32.728	93.0	U-4
S P A I N					
PTA TARIFA		-5.608	36.003	8.0	U-4
PTA CAMARINAL		-5.783	36.075		Z-3
C. TRAFALGAR		-6.350	36.185	15.0	U-4
N. TIP CADIZ PEN.		-6.315	36.530	1.0	U-4

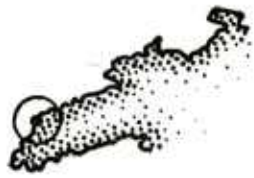
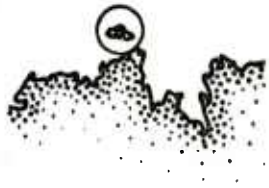
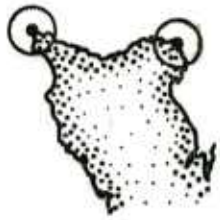
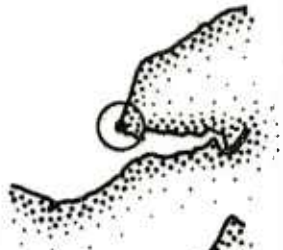
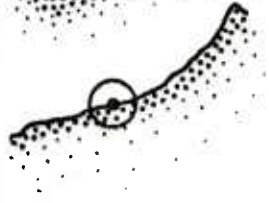
PORTUGAL		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. DE SAO VICENTE		-8.995	37.022	56.0	U-4
C. ESPICHEL		-9.332	38.413	132.0	U-4
PTA BUGIO		-9.298	38.658	11.0	U-4
C. RASO		-9.485	38.708	9.0	U-4
C. CARVOEIRO		-9.407	39.358	28.0	U-4
C. MONDEGO		-8.903	40.190	80.0	U-4

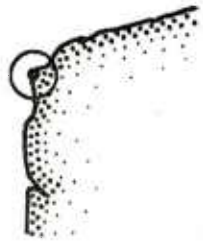
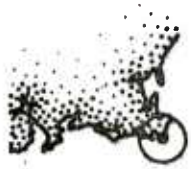
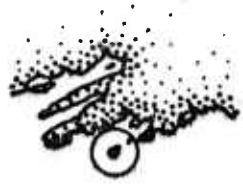
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
S P A I N					
C. SILLEIRO		-8.897	42.105	63.0	U-4
C. FINISTERRE		-9.272	42.882	124.0	U-4
C. TORINAMA		-9.298	43.053	51.0	U-4
C. VILLANO		-9.211	43.160	77.0	U-4
I. SISARGAS		-8.845	43.360	97.0	U-4

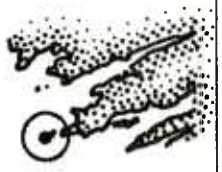
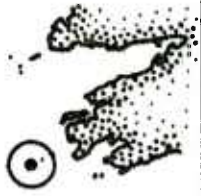
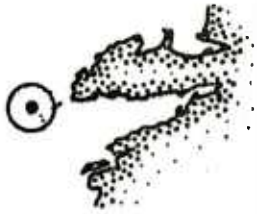
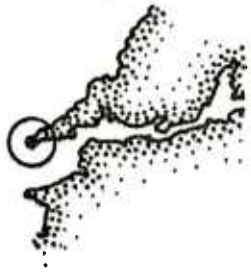
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. PRIORINO		-8.340	43.458	20.0	U-4
PTA ESTACA DE BARES		-7.685	43.787	89.0	U-4
C. DE PENAS		-5.848	43.655	98.0	U-4
C. MAYOR		-3.792	43.490	59.0	U-4
C. MACHICHACO		-2.753	43.453	100.0	U-4
F R A N C E					
C. FERRET		-1.250	44.645	5.0	U-4

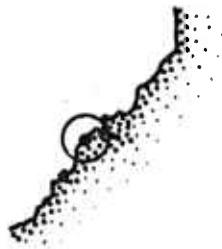
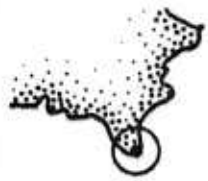
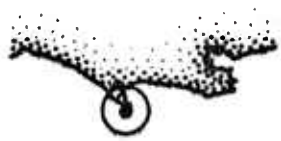
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
PTE DE LA GRAVE		-1.082	45.563	1.0	U-4
PTE CHASSIRON		-1.410	46.047	7.0	U-4
ILE DE RE		-1.587	46.236	6.0	U-4
ILE D'YEU		-2.382	46.718	21.0	U-4
I. HERBAUDIERE		-2.298	47.027	3.0	U-4
BELLE ISLE		-3.060	47.310	24.0	U-4
ILE DE GROIX		-3.510	47.648	35.0	U-4

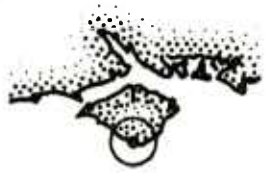
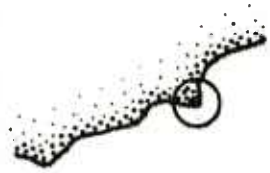
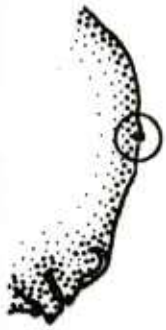
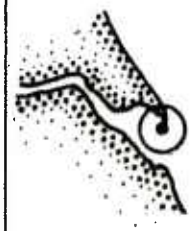
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
ILE DE GLENAN		-3.953	47.722	14.0	U-4
PTE DE PENMARCH		-4.373	47.798	1.0	U-4
PTE DE RAZ		-4.733	48.040		Z-3
ILE DE SEIN		-4.868	48.043	2.0	U-4
C. DE LA CHEVRE		-4.542	48.170		Z-3
PTE DU TOULINGUET		-4.630	48.280	37.0	U-4
LE CONQUET		-4.782	48.362		Z-3

		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
ILE MOLENE		-4.955	48.389		Z-3
ILE USHANT		-5.130	48.460	20.0	U-4
ILE DE BATZ		-4.027	48.747	29.0	U-4
C. FRECHEL		-2.317	48.683	55.0	U-4
C. LA HAGUE		-1.955	49.723	1.0	U-4
C. BARFLEUR		-1.260	49.670	1.0	U-4
C. LA HAVE		0.068	49.513	94.0	U-4
PTE D'AILLY		0.958	49.917	75.0	U-4

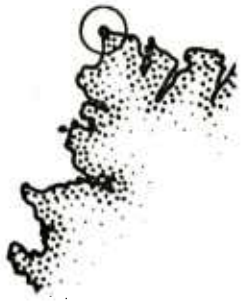
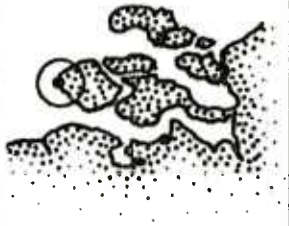
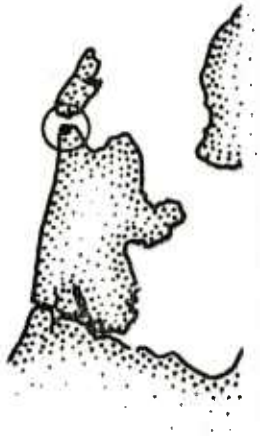
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
PTE TOUGUET		1.593	50.523	2.0	U-4
C. GRIS-NEZ		1.583	50.870	45.0	U-4
I R E L A N D					
CARNSORE		-6.358	52.170		Z-3
HOOK POINT		-6.928	52.122	11.0	U-4
KINSALE		-8.532	51.605	42.0	U-4
C. CLEAR		-9.517	51.417		Z-3

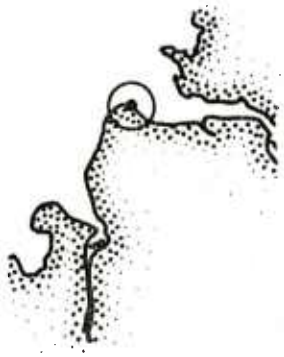
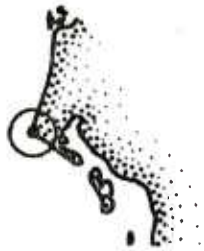
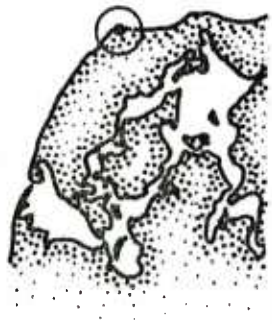
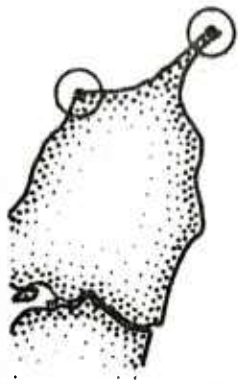
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
MIZEN HEAD		-9.817	51.450		Z-3
DURSEY HEAD		-10.233	51.578		Z-3
GR. SKELLIG		-10.542	51.770	41.0	U-4
INISHTEARAGHT		-10.663	52.075	67.0	U-4
LOOP HEAD		-9.932	52.562	61.0	U-4
SLYNE HEAD		-10.233	53.400	11.0	U-4

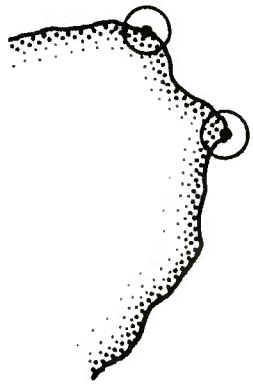
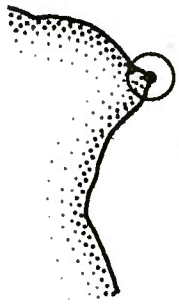
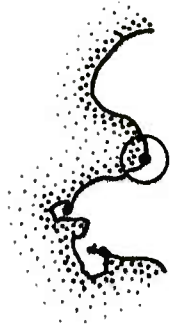
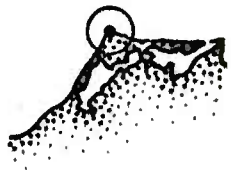
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
ARANMORE		-8.560	55.015	48.0	U-4
UNITED KINGDOM					
TREVOSE HEAD		-5.035	50.548	35.0	U-4
ST. MARY'S SCILLY ISLAND		-6.325	49.912	22.0	U-4
LIZARD PT.		-1.362	54.970	23.0	U-4
DODMAN PT.		-4.803	50.217		Z-3
BILL OF PORTLAND		-2.455	50.513	2.0	U-4

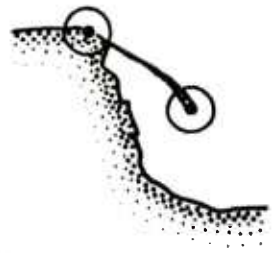
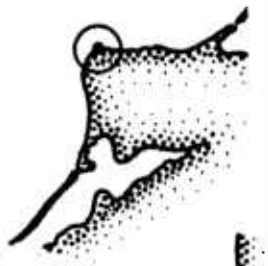
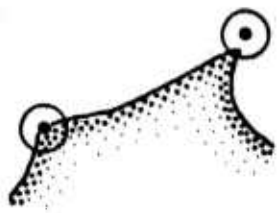
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
ST. CATHERINE'S PT.		-1.297	50.575	15.0	U-4
BEACHY HEAD		0.243	50.733	21.0	U-5
DUNGENES		0.978	50.913	3.0	U-4
N. FORELAND		1.447	51.375	31.0	U-4
LOWESTOFT		1.758	52.487	21.0	U-4
SPURN PT.		0.120	53.578	27.0	U-5

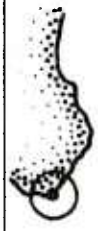
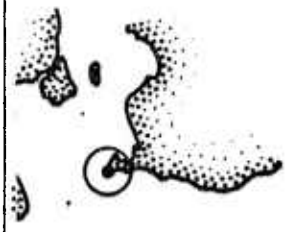
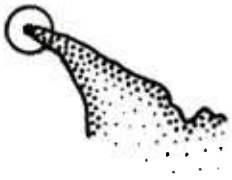
		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
FLAMBOROUGH HEAD		-0.008	54.012	38.0	U-4
RATTRAY HEAD		-1.815	57.610	18.0	U-5
SUMBURGH HEAD (SHETLAND I.)		-1.272	59.855	74.0	U-4
MUCKLE FLUGGA		-0.883	60.855	46.0	U-4

		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
C. WRATH		-5.000	58.625	102.0	U-4
BUTT OF LEWIS		-6.262	58.517	15.0	U-4
NETHERLANDS					
WALCHEREN		3.448	51.530	38.0	U-5
DEN HELDER REAR		4.787	52.957	2.0	U-4

		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
GERMANY (FED.)					
CUXHAVEN		8.710	53.873	1.0	U-4
D E N M A R K					
BLAAVANDS HUK		8.085	55.558	15.0	U-4
HANSTHOLM HAVN		8.592	57.125	5.0	U-4
SKAGEN		10.603	57.748	6.0	U-4
HIRTSHALS		9.95	57.585	22.0	U-4

		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
KNUDSHOVED GJERRILD		10.830	56.527	16.0	U-4
FORNAES		10.958	56.443	5.0	U-4
HELSINGOR		12.627	56.037	6.0	U-4
STEVNS KLINT		12.458	55.292	38.0	U-4
GERMANY (DEM.)					
DARSSER ORT		12.507	54.475	3.0	U-4

		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
POLAND					
ROZEWIE		18.340	54.830	65.0	U-4
HEL		18.815	54.602	31.0	U-4
U. S. S. R.					
MYS TARAN		19.982	54.960	25.0	U-4
AKMENRAGS		21.067	56.833	1.0	U-4
KOLKA		22.638	57.803	1.0	U-4
OVISI		21.725	57.568	1.0	U-4
SWEDEN					
FALLUDEN		18.395	56.997	2.0	U-4
HOBURG		18.155	56.922	36.0	U-4

		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
OLANDS NORRA UDDE		17.098	57.367	1.0	U-4
OLANDS SODRA UDDE		16.400	56.200	1.0	U-4
SANDHAMMAREN		14.197	55.383	2.0	U-4
D E N M A R K					
HAMMERODDE (BORNHOLM)		14.778	55.297	9.0	U-4
DUEODDE		15.078	54.992	1.0	U-4
S W E D E N					
FALSTERBO		12.820	55.383	1.0	U-4
KULLEN		12.457	56.302	78.0	U-4

		LONGITUDE +E, -W	LATITUDE N	ALT. (m)	REMARKS
HALLANDS VADERO		12.545	56.450	8.0	U-4
N O R W A Y					
HOMBORSUND		8.533	58.250	2.0	U-4
LISTA		6.568	58.110	5.0	U-4
OBRESTAD		5.567	58.653	1.0	U-5

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