

Declassified E.O. 12356 Section 3.3/NND No.

785017

ACC

10000/135/246

RADAR
JULY 19

10000/135/246

RADAR NAVIGATIONAL AIDS, POLICY
JULY 1946 - MAR. 1947

S. S. S.

M1

Ref 1A.

I don't think that the Italians will gain anything by waiting for the Radio Exhibition.

"Geo" as you state is so well liked that it will take a long time to find a more satisfactory and suitable substitute.

The coverage our study in was time was excellent even though we were limited in the choice of position for stations: in fact there it would be even better.

"Geo" is interchangeable with "Loran"; in fact we can use both systems. In "Loran" also we have an international basis?

M2.

8. 7. 46

S.S.S.

Ref M1. It is agreed that "Geo" is a very accurate reliable system & I personally know of nothing better, that is not to say, of course, that new systems at present under development which may be ready in the very near future may not be better, which is more important from the Italian point of view, cheaper. Yes, Loran is intended to be used internationally, but nothing is known of equipment being installed in Italy.

S.S.S.

11-7-46

to take a long time to find a more satisfactory and reliable substitute.

The coverage over Italy in was time was excellent even although we were limited in the choice of position for stations; in peacetime it would be even better.

"Ge" is interchangeable with "Koran"; in Italy we covered both systems. Is "Koran" also like an international basis?

M2.

S50.

Ref M1. It is agreed that "Ge" is a very accurate reliable system & I personally know of nothing better, that is not to say, of course, that new systems at present under development which may be ready in the very near future may not be better. What is more important from the Italian point of view, cheaper. As, Koran is intended to be used internationally, but nothing is known of equipment being installed in Italy.

S50 - "ny" 11/10.

M3.

Ref encls 8B it would appear that, as a result of contacts made between de Vincenti & the British Delegation in Paris in May - Sept 1946, M.C.A. are taking the matter up with the Italian Govt. thro the Foreign Office. I shall request the I.A.H. to keep us informed of developments. M.C.A. a liaison (the manufacturer) are of course the interested parties in Britain. (W. H. H. 31-1-47.) See encls. 1A, 3A, 4A, 5A, 6A, 7A.

W. H. H.

11-7-46.

Airdi has

Sup 2

Ref Dir 3 & 8B

I enjoyed a

SSO - my 11/2 short para in our next Monthly Report, together

with any further developments.

RHS

11/2

5.

AIRI

Ref M4 Please B.F. min file to yourself

on 1/3/47

mymanan 11/2

Dir. Sup.

SSO

AIRI

6.

tentatively

Ref note on encls. 8A. Originally the S.A.F. had decided

against 'GEE' owing to the cost of installation - the

decision of P.I.C.A.O. not to use it. It would appear

that the British Govt. are determined to use 'GEE', at

least in Europe, & in view of this fact the S.A.F. are holding

a conference on 6th March in order to make a final

decision.

And s/c

2/3/47

1.

CFO:

Ref M6.

Thanks. Could you let us know

what the 1947 divide on 6th March

SP3.

Chickman
air 2

(QA)

139/4/47

Air Vice Marshal I. Brodie,
Air Forces Sub-Commission,
Allied Commission,
Rome.

With the compliments of Mr. H.A. Hankey.

British Embassy,
Rome.

January 23rd 1947.

S. Signo

Understand from you that the I.A.F. had
decided against C.E.E. as P.I.C.A.O. were not
using it in Europe.

but we know as soon as possible what the Italian
position are to this letter.

very 24/1

No. 37

(139/4/47)

NOTE VERBALE.

The British Embassy presents its compliments to the Ministry of Foreign Affairs and has the honour to invite reference to the offer of free ground and airborne radar equipment made by the British Delegation to the head of the Italian Delegation at the Paris Conference of the P.I.C.A.O. in April/May 1946.

2. Under instructions from His Majesty's Principal Secretary of State for Foreign Affairs, the Embassy is now glad to confirm to the Ministry that His Majesty's Government in the United Kingdom offer the Italian Government, without charge, two "Gee chains," each consisting of four stations. The only conditions attached to this offer are that the Italian Government shall operate and maintain these stations for at least three years. The Technical Appendix attached to this Note as Enclosure I, sets out exactly what equipment and services His Majesty's Government will provide, and which services should be provided by the Italian Government. A rough indication is given of the cost in pounds sterling of the services to which the Italian Government would be committed. If the Italian Government desired to accept this offer, it would be appreciated if in reply the Ministry would be so good as to indicate:-

(a) The name, address and telephone number of the Department or Officer with whom contact may be made to discuss details.

(b) Whether it is desired to send English-speaking radio mechanics and operators to the United Kingdom to be trained as instructors.

Any enquiries with regard to this offer should be addressed to:-

The Ministry of Civil Aviation,
(C.A. Tels. 11),
Cornwall House,
Waterloo Bridge Road,
London, S.W.1.

which is the department responsible for co-ordinating and implementing this scheme, and which will be glad to communicate directly with the department of the Italian Government concerned as soon as acceptance of the offer has been received.

2. Under instructions from His Majesty's Principal Secretary of State for Foreign Affairs, the Embassy is now glad to confirm to the Ministry that His Majesty's Government in the United Kingdom offer the Italian Government, without charge, two "Gee chains," each consisting of four stations. The only conditions attached to this offer are that the Italian Government shall operate and maintain these stations for at least three years. The Technical Appendix attached to this Note as Enclosure I, sets out exactly what equipment and services His Majesty's Government will provide, and which services should be provided by the Italian Government. A rough indication is given of the cost in pounds sterling of the services to which the Italian Government would be committed. If the Italian Government desires to accept this offer, it would be appreciated if in reply the Ministry would be so good as to indicate:-

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Any enquiries with regard to this offer should be addressed to:-

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(G.A. Tele. Li.),
Cornwall House,
Waterloo Bridge Road,
London, S.W.1.

405

which is the department responsible for co-ordinating and implementing this scheme, and which will be glad to communicate directly with the department of the Italian Government concerned as soon as acceptance of the offer has been received.

3. The Embassy are also instructed to confirm that His Majesty's Government would be glad to equip with Airborne Gee equipment up to five aircraft for each operating company in Italy. The purpose of this offer is to facilitate the installation of Gee in the European Area for Air Traffic Control purposes and as a medium range navigational aid. If the Italian Government would like to accept this offer, it is suggested that the notice attached as Enclosure II, hereto should be transmitted

/to the

Min 34

JkM
3/11

1/11/2

12 Jan 1947
(FEBRUARY)

HOWE MEMORANDUM

to the headquarters of the Italian/British
European Airways Air operating company, and to any
other Italian Air operating company.

A detailed air route memorandum was
sent to the Italian Air operating company, and to any
other Italian Air operating company, on January 23rd 1947.
The memorandum was sent to the Italian Air operating company,
and to any other Italian Air operating company, on January 23rd 1947.
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202

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and to any other Italian Air operating company, on January 23rd 1947.

-1-

FROM: AIR MINISTRY ROME
TO: AIR FORCE SUB-COMMISSION A/C. ROME
DATE: SEPTEMBER 25TH 1946
REF: 02023/Tel/3333COLL.

ASSIGNMENT OF TWO GEE CHAINS TO THE ITALIAN GOVERNMENT
BY THE ENGLISH GOVERNMENT

Reference to the offer made by the English Delegation to the Italian Delegation during the Paris Conference P.I.C.A.O. (May 1946), and to successive contacts made with this Air Force Sub-Commission and with Rear Admiral Hiraui concerning the same subject.

We are in a condition to state that the Italian Government highly appreciates the English Government's offer but it cannot yet face the problem of the GEE chains installation without first examining seriously the following problems:

- the possibility, in relation to the balance, to face the expenses needed for the installation, the maintenance and the carrying out of the service, all of which are rather expensive;

- the possibility of adopting a system rather than another, as the navigation systems realized during the war, when it is to be borne in mind that the relative technique is still in its evolution period;

- the possibility to assume obligations when the future of the Air Force is still indefinite.

However, in order to allow the Technical Body in charge, to study out the means for the definite acceptance of the offer, we kindly ask you to point out to the English Government the following points:

- 1) Geographical Study - We wish to have a geographic chart of the GEE chain stations in Italy, taking care to exploit as much as possible accessible mountains and where there already exists possibility of living, or rather where there are Aeronautic plants already.
Indicative chart is hereby attached.
- 2) Material Property.- We wish to know in what manner the assignment of the GEE Chains is going to be carried out, (as for use, as exclusive property, etc.)

This copy for information only.

Copy taken to London by de Vincenti

*when attending PICSO Conference Sept. 1946.
He will give it to British representative there for action.*

*Alm.
28-9-46*

-2-

- 3) Practical Ground Stations Plant
We wish to know if and at what percentage the English Government intends to divide the expenses of first installation, which having to be carried out on high mountain, are very expensive; besides in some places the construction of houses, roads, the transport of electric power is requested.
- 4) Technical Maintenance and Assistance
We wish to know what stock of spare parts will be furnished with the stations in consideration of their average yearly usage. If the maintenance and the repairs can be done by Italian technicians or if they have to be done by English technicians which will be the financial burden for the Italian Government.
- 5) Technical Improvements
It is known that the GLE system is in its evolutionary period, therefore we wish to know if the English Government is willing to carry out, free of charge, those changes and improvements, which may eventually be realized after the assignment, to the stations functioning in Italy.
- 6) Board Apparatus
Considering that at present there are no Air Navigation Companies in Italy, in charge of Air Services, we would like to know the number of board apparatus the English Government intends to hand over to the Italian Government, and that will successively be assigned to the said COYS. at the time of their establishment and according to the proper ideas.
- 7) Points 2,3,4,5, concern board apparatus also.
- 8) Italian Navy
Since the exploitation of the GLE system, limited only to the Italian Civil Air Force is not good business for the Italian Government, in consideration of the limited aircraft number to be foreseen in comparison with the high cost of the yearly GLE chains service, we intend to inform the Navy Ministry of the matter, so that Italian ships may be also able to exploit the GLE system to the extent consented by the system's range, and in consideration of the probable future development of the system that should culminate in the "GIORAN".

In case the Italian Navy should agree with our ideas, we would like to know if the English Government is willing to let us have another GLE chain to be arranged on the Italian islands, and a certain number of ship apparatus; all this is asked always in accordance with the points just mentioned.

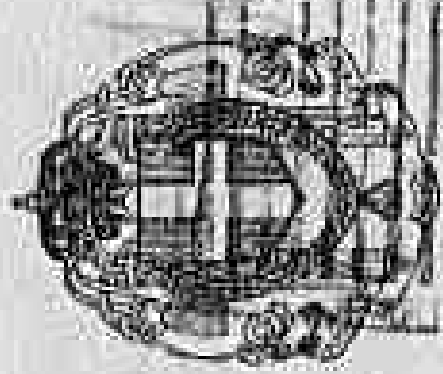
THE MINISTER

Translated by Eva ROSATI

Mod 128 L

25 / 9 / 46

Roma 7/7 1946



Ministero dell'Aeronautica

COMANDO SUPERIORE AERONAUTICA

E DELL'ARMATA DEL Volo

E DELL'ARMATA DEL Volo

Prot. N. 02033/1946 Allegato 3333 CE

Proposta al P.M. del

OGGETTO: Cessione al Governo Italiano di due catene GEE

da parte del Governo Inglese.

e, per conoscenza:

ALLO STATO MAGGIORE DELL'AERONAUTICA MILITARE = S E D E =

Si fa riferimento all'offerta che la Delegazione Inglese ha fatto alla Delegazione Italiana durante la Conferenza P.I.C.A.C. di Parigi (Maggio 1946), ed ai successivi contatti presi in merito con codesta Air-Force Sub Commission e con il Rear Admiral Hiraal.

Si è in condizione di poter affermare che il Governo Italiano gradisce quanto mai l'offerta del Governo Inglese; ma non può ancora affrontare il problema dell'impiego delle catene GEE senza prima aver esaminato a fondo le seguenti questioni:

- la possibilità, in relazione al bilancio, di affrontare le spese occorrenti per l'installazione, la manutenzione e l'esercizio, tutte alquanto onerose;
- la possibilità di impiegare un sistema di navigazione piuttosto che un altro, di quelli realizzati in tempo di guerra, quando è da ritenere che la tecnica relativa è ancora in evoluzione;
- la possibilità di prendere impegni quando non è ancora definito il futuro dell'Aeronautica.

Ad ogni modo nell'intento di permettere all'Ente tecnico competente di fare gli opportuni studi per la definitiva accettazione dell'offerta, si prega voler cortesemente interessare il Governo Inglese sui seguenti punti:

- 1°) Studio Geografico - Si desidera avere uno studio geografico della ubicazione delle stazioni della catena GEE in Italia, con l'accortezza di sfruttare per quanto possibile

Si prega inoltre per ogni lettera un sollecitamente indicare nella risposta al V.le. l'indirizzo la Direzione a cui si ripresenta

ISTITUTO GEOGRAFICO DELLO STATO

402

Prot. N. 020334 del 3/3/33

Risposta al P.M. del

(Tramite Ufficio Collegamento)

OGGETTO: Cessione al Governo Italiano di due catene GEE

da parte del Governo Inglese.

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1°) Studio Geografico - Si desidera avere uno studio geografico della ubicazione delle stazioni della catena GEE in Italia, con l'accortezza di sfruttare per quanto possibile montagne accessibili e dove già esiste possibilità di vita o meglio ove sono già installazioni Aeronautiche. Si allega carta indicativa.

2°) Proprietà del materiale. - Si desidera sapere sotto quale forma si intende effettuare la cessione delle suddette



WISCONSIN WOLF FOUNDATION

E-MAIL ASSISTENZA DEL VOLTO

SECRETARIA *Allegati*

Prot. 940

O GGETTO

patane caw (in use, in proprietà esclusiva, ecc.)

30) Impianto pretico delle stazioni a terra - Si desidera sapere se e in quale percentuale il Governo Inglese intende concorrere alle spese di primo impianto, che dovranno farsi effettuare in alta montagna sono quanto mai onerose, richiedendo in alcuni posti la costruzione di strade, di case, il trasporto di energia elettrica, ecc.

4°) Manutenzione ed assistenza tecnica - Si desidera sapere quale scorta di parti di ricambio sarà fornita con le stazioni in base alla loro usura media annuale. Se la manutenzione e le riparazioni potranno essere fatte da tecnici italiani o se dovendo essere fatte da tecnici inglesi quale sarà l'aggravio per il Governo Italiano.

50) Perfezionamenti tecnici - E' noto che il sistema GTE è in evoluzione, si desidera sapere se il Governo Inglese è disposto ad apportare gratis alle stazioni funzionanti in Italia, quelle modifiche e perfezionamenti che eventualmente venissero realizzati in epoca successiva alla cessazione.

6°) Impianti di bordo - Considerato che al momento attuale non esistono in Italia Compagnie di Navigazione Aerea che gestiscono Servizi aerei si desidera sapere il numero di apparecchi di bordo che il Governo Inglese intende cedere una volta tanto al Governo Italiano che successivamente li assegnerà alle Compagnie suddette alla loro costituzione e secondo propri criteri.

10) Anche per gli impianti di bordo valgono i punti 2-3-4-5-.

30) Marina Italiana - Poichè lo sfruttamento del sistema GEE limitato all'Aviazione Civile Italiana non costituisce per

MINISTERO DELL'AERONAUTICA
DIREZIONE GENERALE
E DELL'AMMINISTRAZIONE DEL Volo

Prot. N. 2
SEGRETERIA

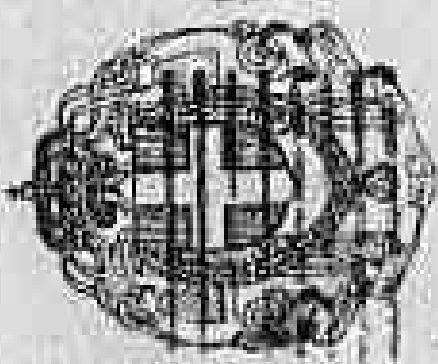
Proposta al P.N. 2 del

OGGETTO

Il P.N. 2, per la fornitura di apparecchiature radio e telegrafiche, è stato approvato dal Consiglio di Amministrazione della S.p.A. di Roma, in data 15/10/50.

catena GEE (in uso, in proprietà esclusiva, ecc.)

- 3°) Impianto pratico delle stazioni a terra - Si desidera sapere se e in quale percentuale il Governo Inglese intende concorrere alle spese di primo impianto, che dovendosi effettuare in alta montagna sono quanto mai onerose, richiedendo in alcuni posti la costruzione di strade, di case, il trasporto di energia elettrica, ecc.
- 4°) Manutenzione ed assistenza tecnica - Si desidera sapere quale scorta di parti di ricambio sarà fornita con le stazioni in base alla loro usura media annuale. Se la manutenzione e le riparazioni potranno essere fatte da tecnici italiani o se dovendo essere fatte da tecnici inglesi quale sarà l'aggravio per il Governo Italiano.
- 5°) Perfezionamenti tecnici - E' noto che il sistema GEE è in evoluzione, si desidera sapere se il Governo Inglese è disposto ad apportare gratis alle stazioni funzionanti in Italia, quelle modifiche e perfezionamenti che eventualmente venissero realizzati in epoca successiva alla cessazione.
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- 7°) Anche per gli impianti di bordo valgono i punti 2-3-4-5-.
- 8°) Marina Italiana - Poiché lo sfruttamento del sistema GEE limitato all'Aviazione Civile Italiana non costituisce per il Governo Italiano un buon affare, dato il numero limitato di aerei da prevedersi in confronto dell'alto costo di eser-



Ministero dell'Aeronautica

COMITATO SUPERIORE AERONAUTICA
MINISTERO DELL'AERONAUTICA

UFFICIO DELLE TECNOLOGIE

E DELL'ASSISTENZA DEL VOLO

SEGRETERIA *Allegato*

Prot. N.°

Numero 19 *A*

Al

Disposta al f. N.° del

OGGETTO

cizio annuale delle catene GEE, si ha intenzione di inter-
ressare in merito anche il Ministero della Marina, perchè,
nei limiti consentiti dalla portata del sistema, anche le
navi italiane sfruttino il sistema GEE in considerazione
del probabile sviluppo futuro del sistema che dovrebbe
culminare nel "G L O R A H".

Qualora la Marina Italiana entrasse nel suddetto
ordine di idee si desidera sapere se il Governo Inglese
è disposto a cedere, sempre secondo i punti più sopra ri-
cordati, un'altra catena GEE da sistemare sulle isole ita-
liane ed un certo numero di apparati di bordo da montarsi
sulle navi. -

IL MINISTRO

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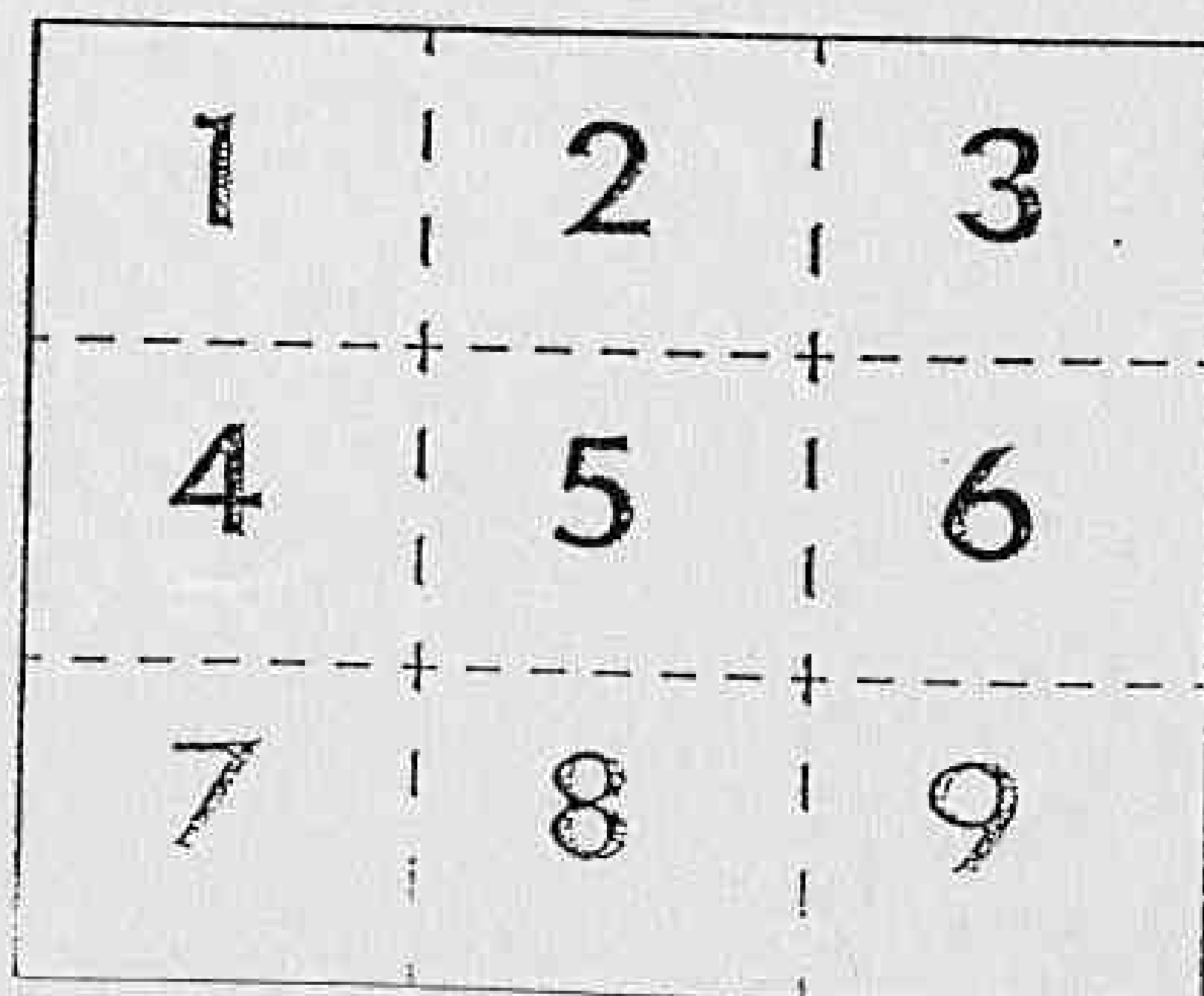
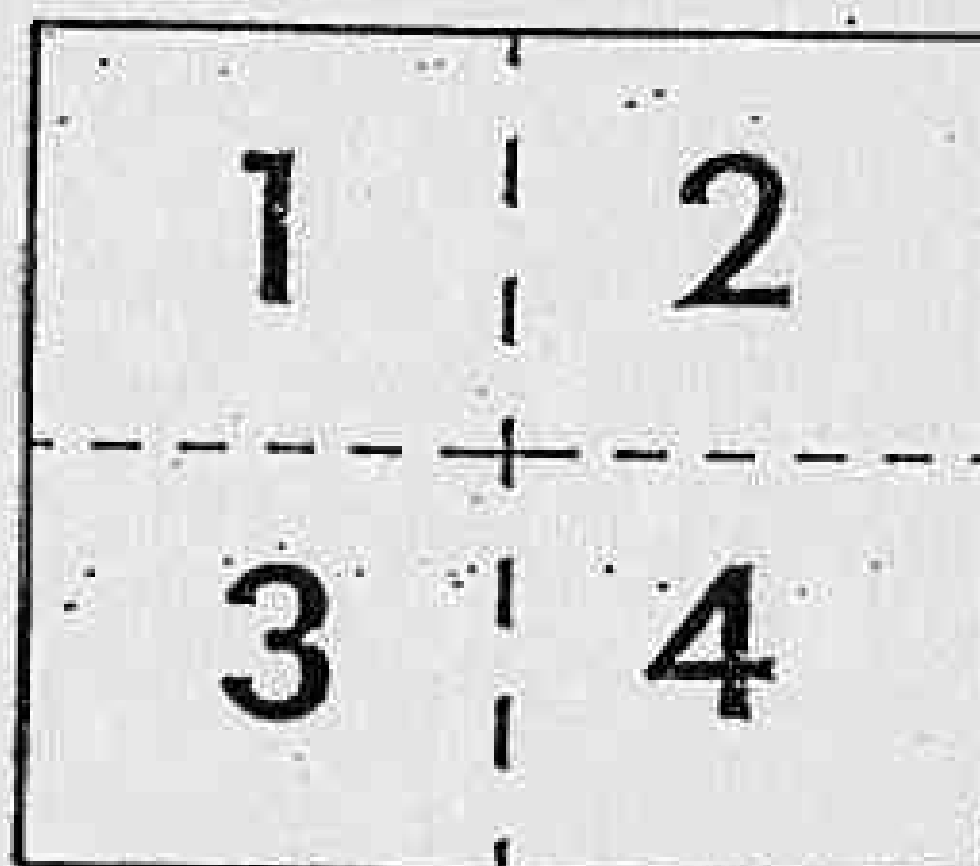
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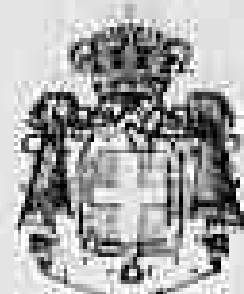
*Il presente documento è riservato alla segretezza
e non deve essere divulgato senza autorizzazione*

ISTITUTO POLIGRAFICO DELLO STATO

MAPS AND CHARTS TOO LARGE TO FILM
ON ONE EXPOSURE ARE FILMED CLOCKWISE
BEGINNING IN THE UPPER LEFT CORNER,
LEFT TO RIGHT, AND TOP TO BOTTOM.

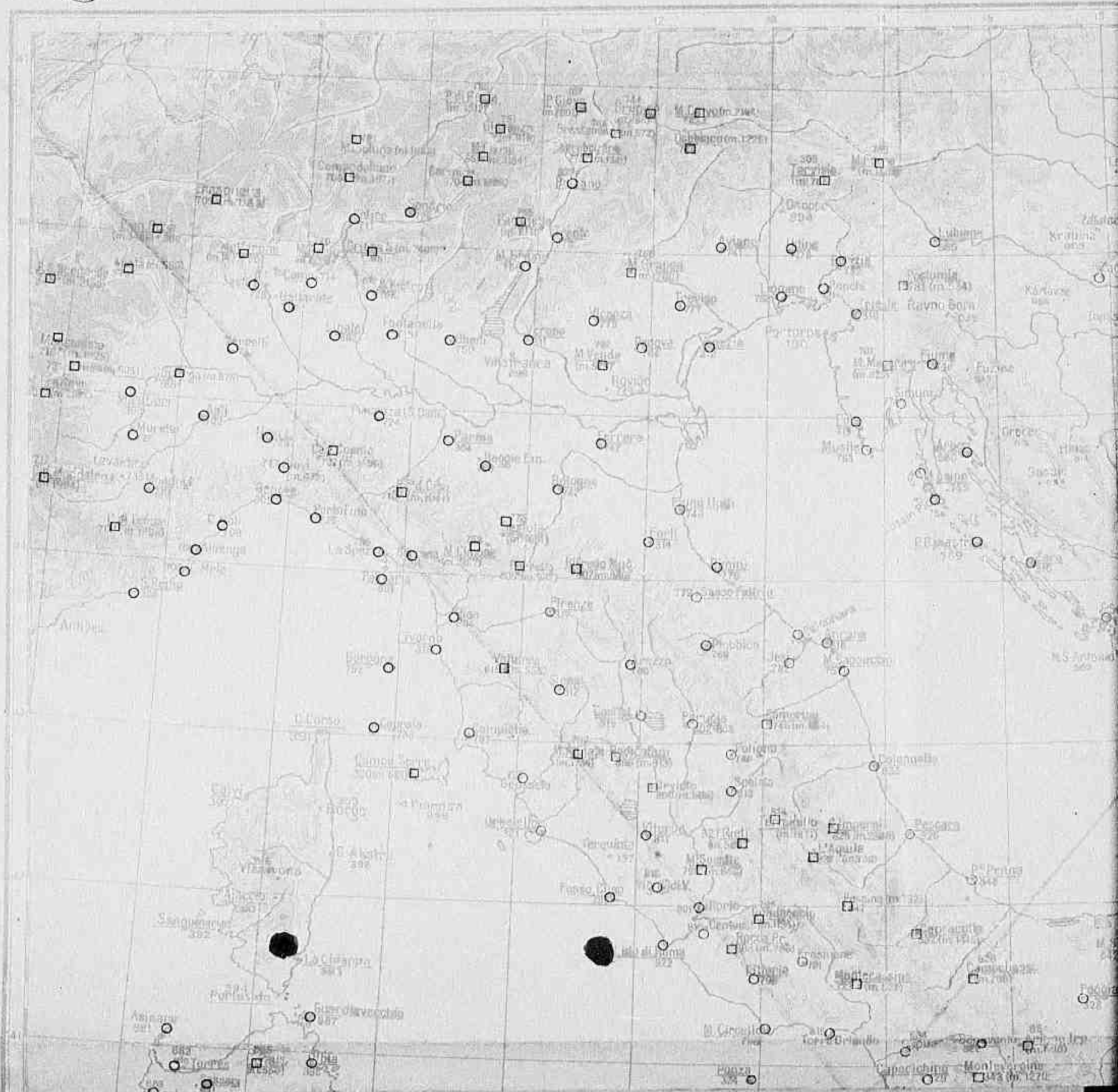
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MINISTERO DELL'AERONAUTICA

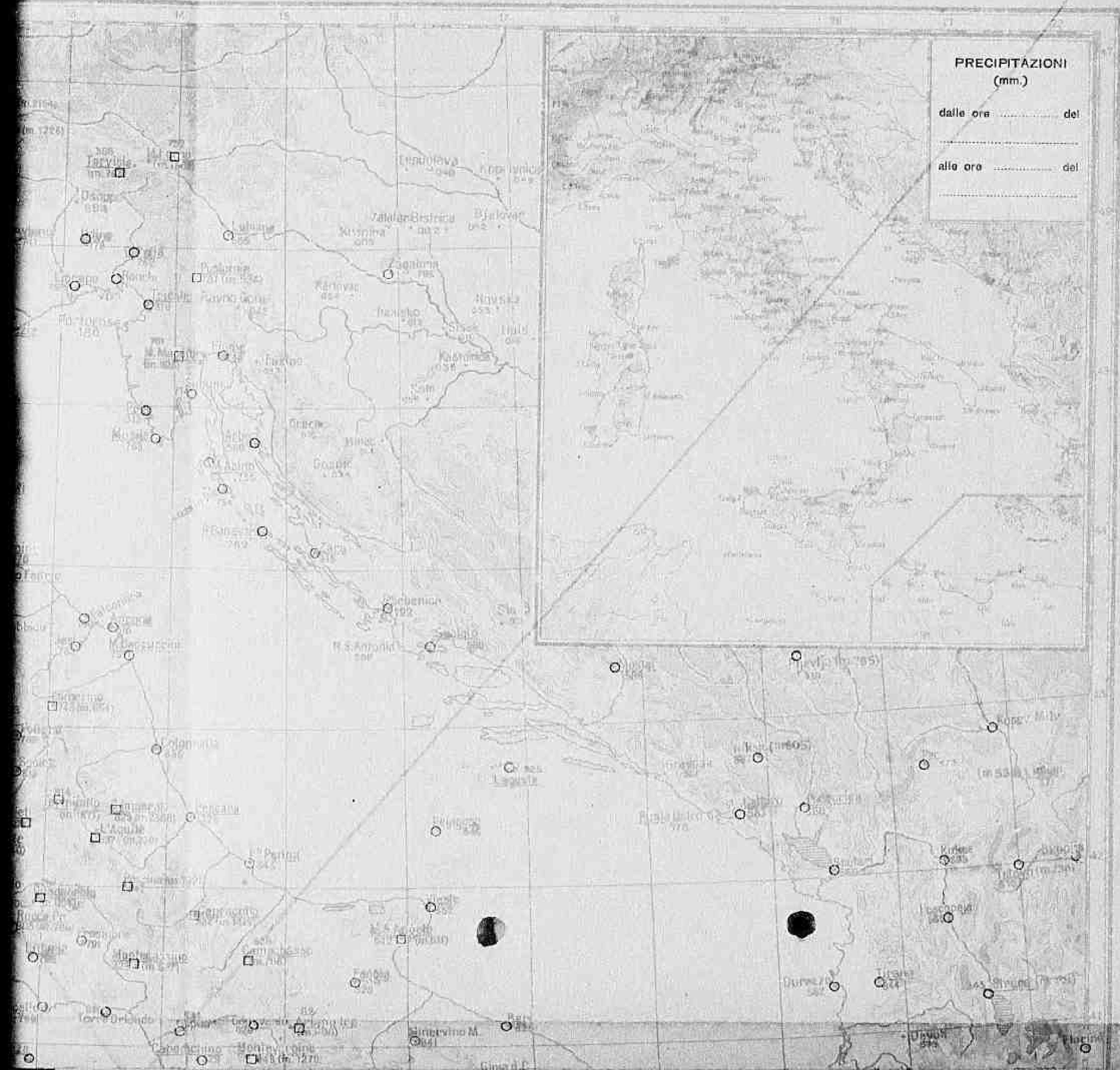
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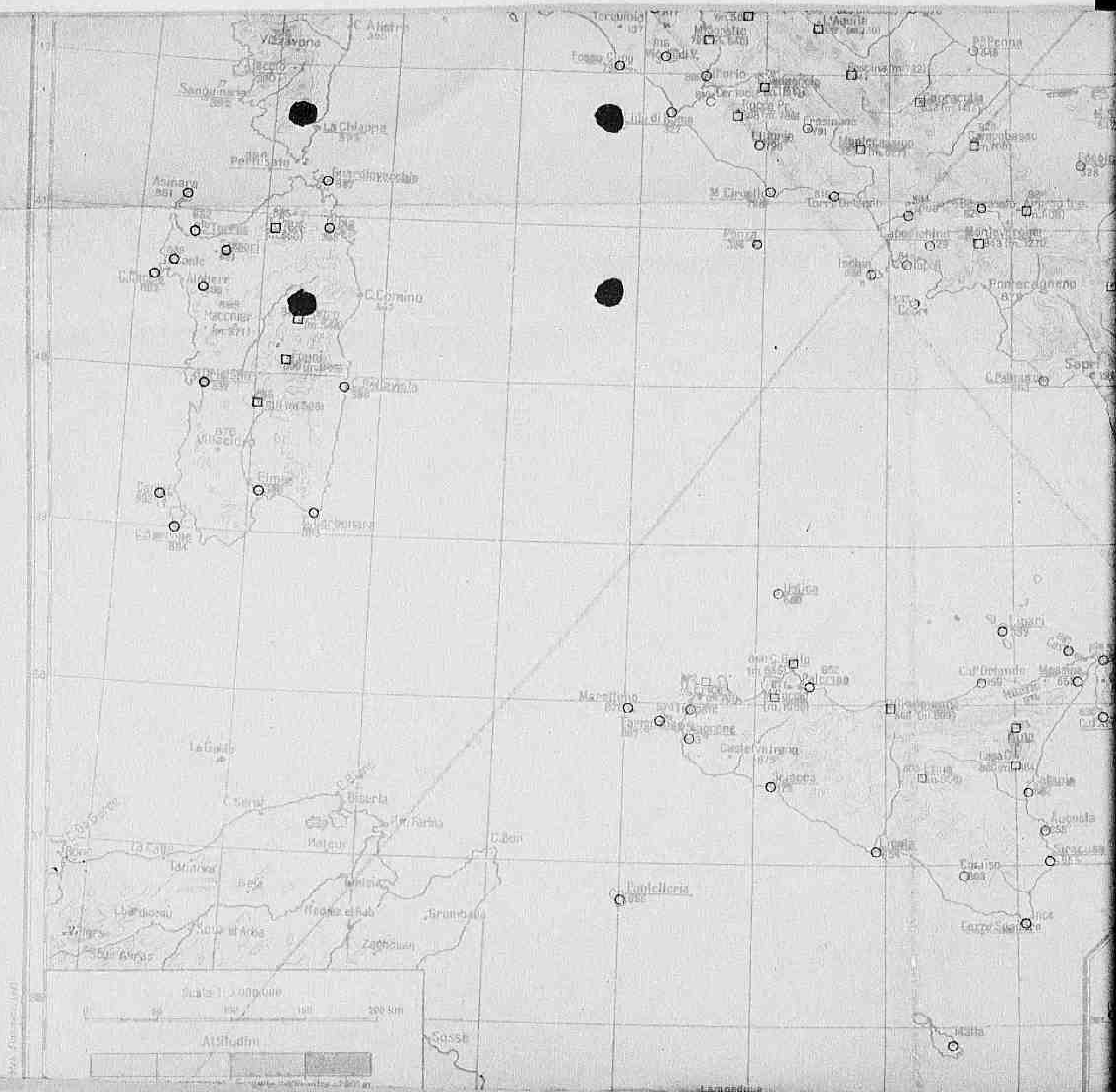


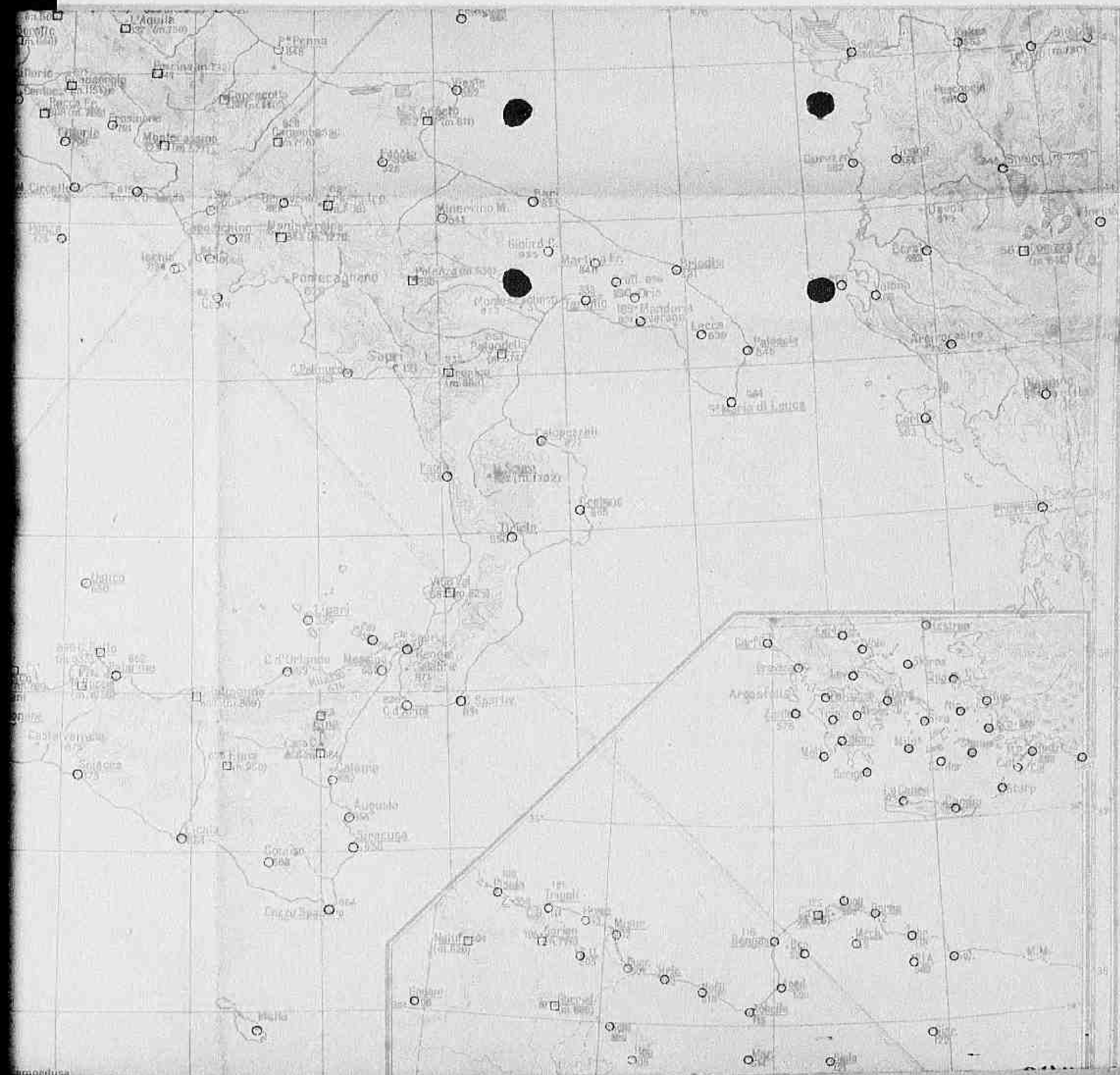
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Declassified E.O. 12356 Section 3.3/NND

No. 785017



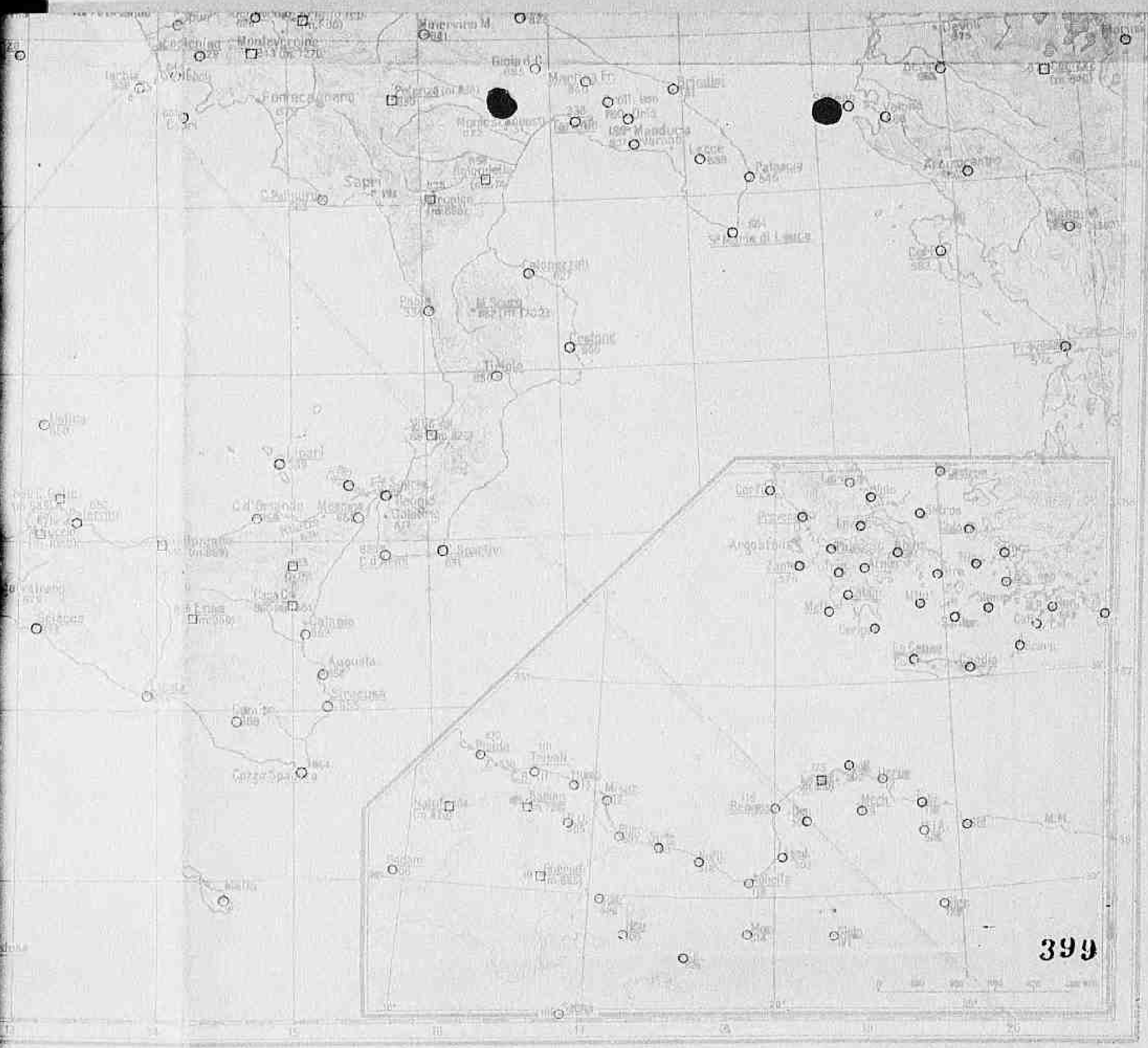






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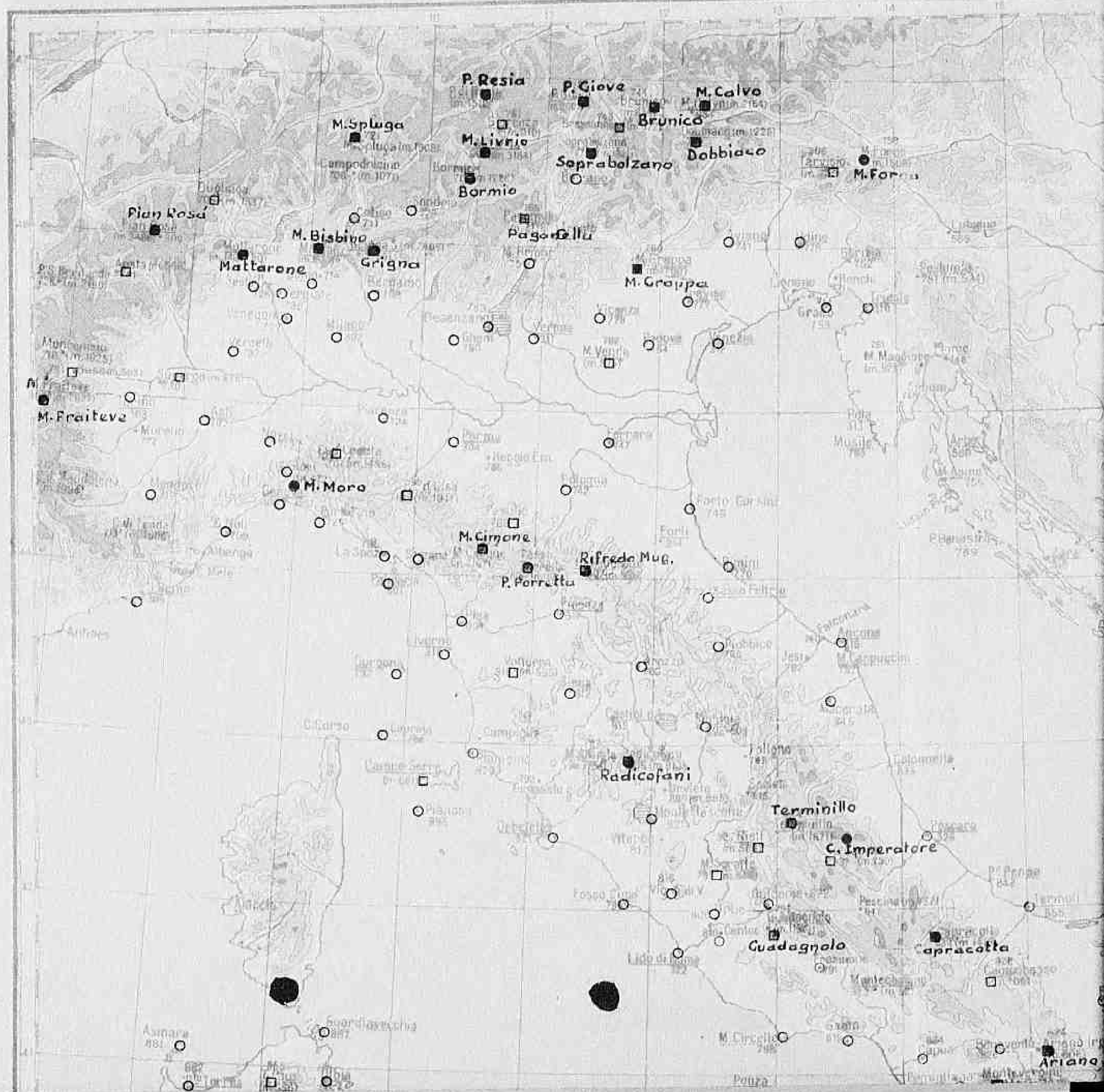
L'Assistente

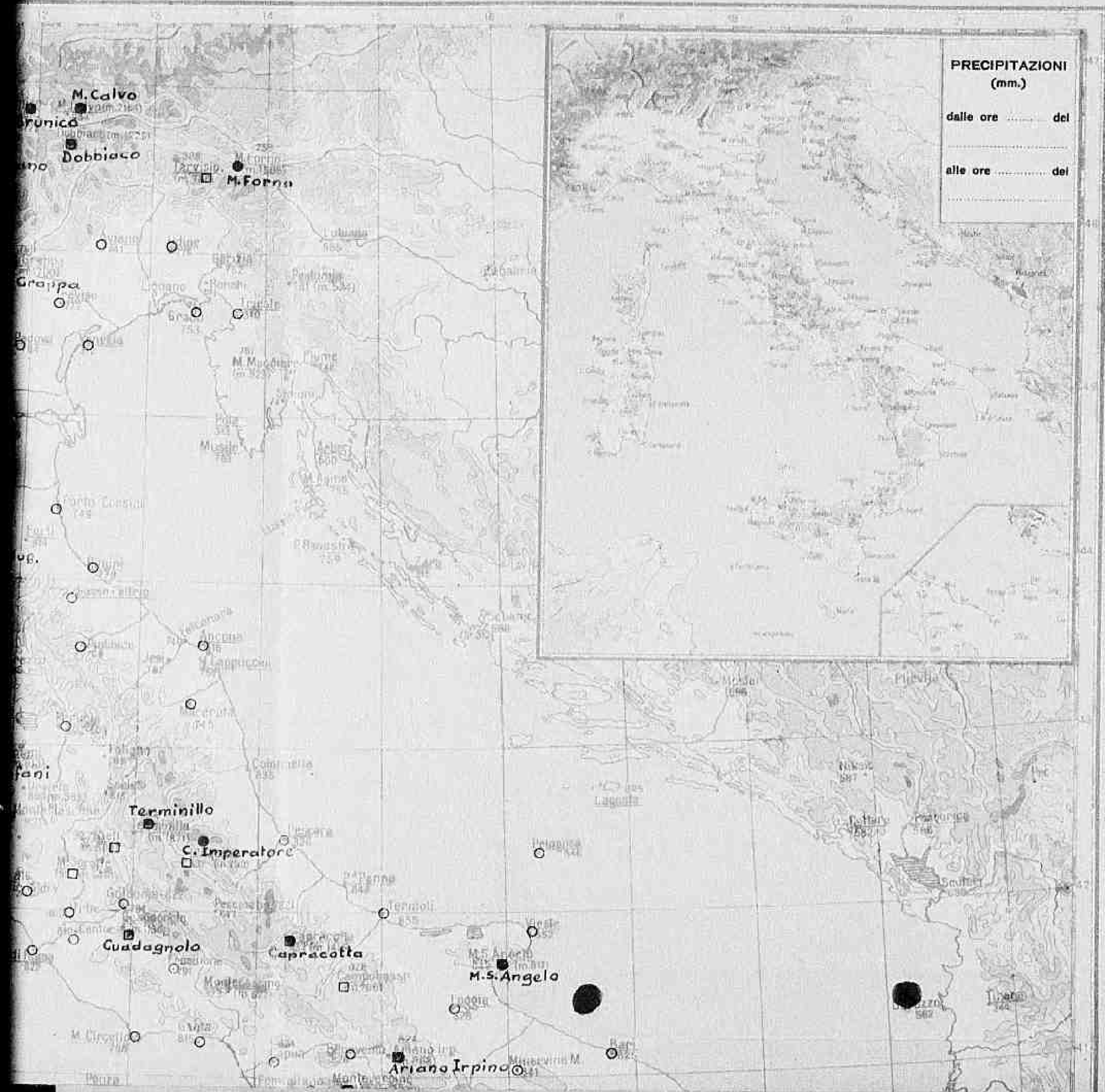
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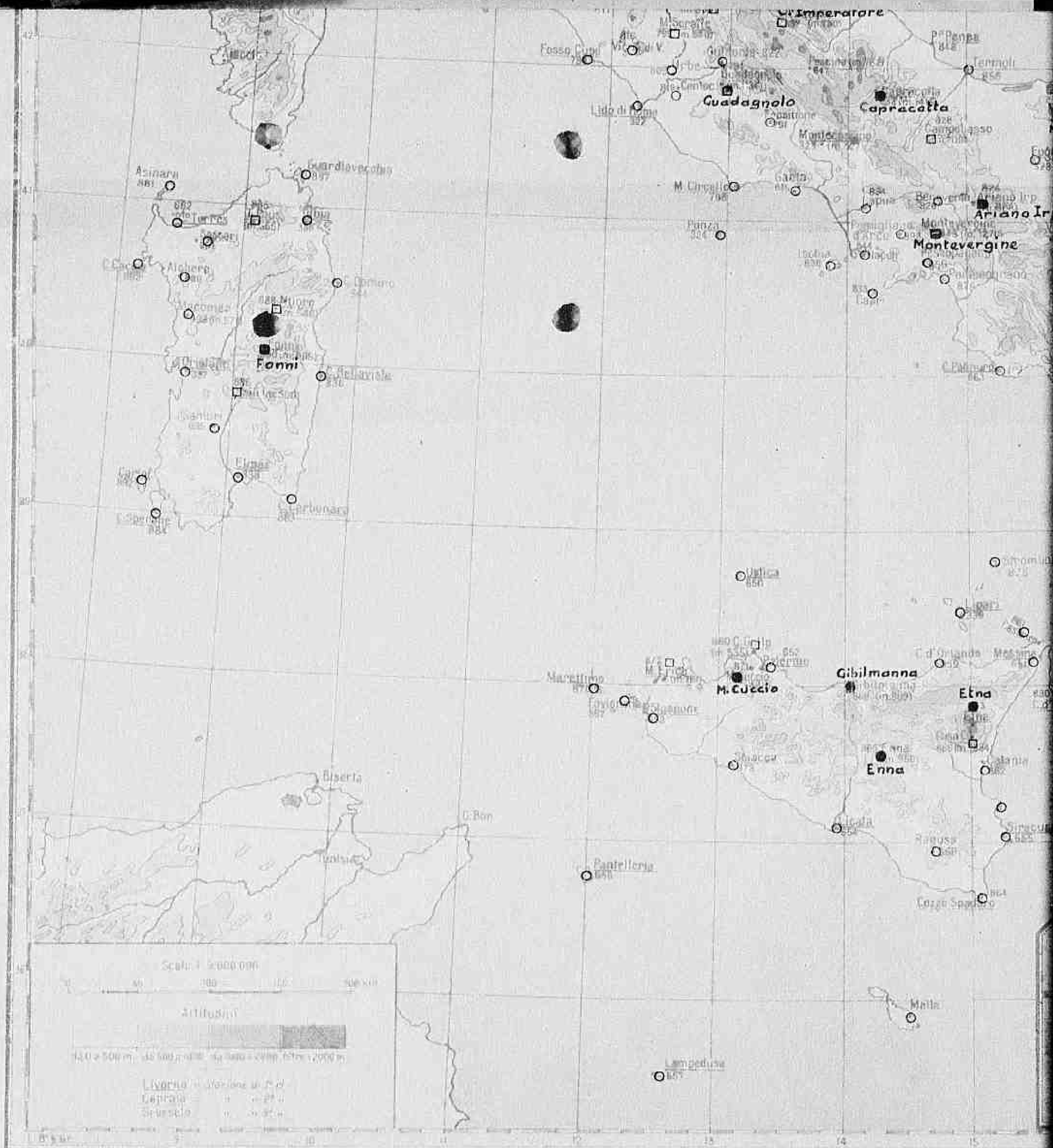
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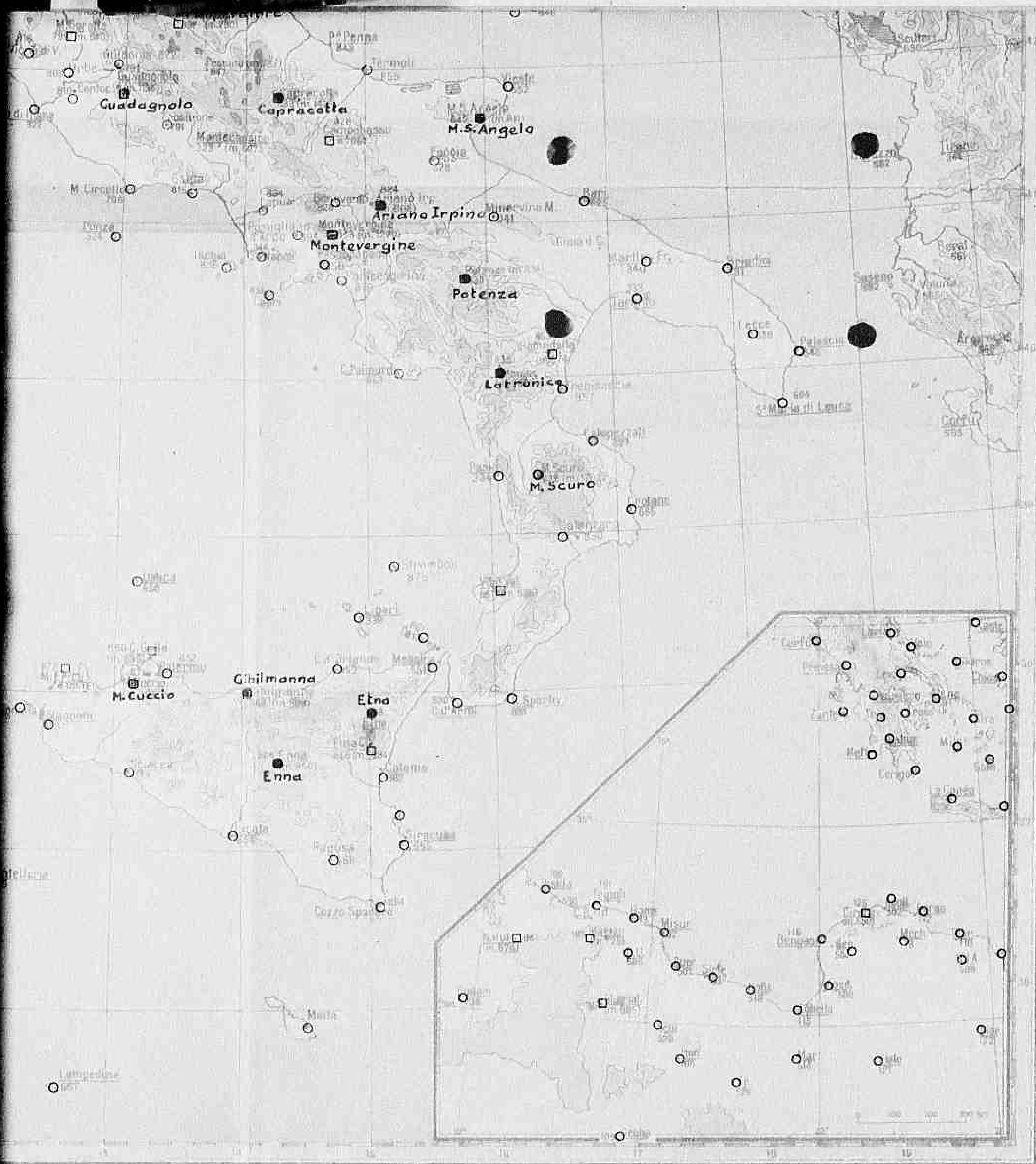
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MINISTERO DELL'AERONAUTICA
DIREZIONE DELLE COMUNICAZIONI









BRITISH EUROPEAN AIRWAYS

H.Q., Bourne School, Cavendish Ave., 5th. Rudship.

August 12th. 1946.

*Confidential**Dear A.V.M.,*

With reference to my signal dated 25.7.46, I have now written to Col. de Vincenti on the subject of Gee and told him of the formation of Committee Gee.

I am enclosing a copy of this letter for your information, together with a copy of our Memorandum on Air Traffic Control.

Admiral Holland had a long talk with me with regard to the cost of installations to Italy. I propose to look into this problem and take it up with the B.E.A. Board with a view to suggesting that B.E.A. might foot the bill as a part of its investment in the Anglo-Italian Company. I think something of this nature can be arranged, but at this juncture this is strictly between you and myself. Sir John Sirao did discuss this point briefly with me when he was over here in the early part of July.

Many thanks for all your help in this matter. I do look forward to meeting you again and hope it will not be long before I re-visit Rome.

Until then, au revoir,

*Yours**(D. Seward)*

398

Air-Vice-Marshal Brodie,
British Air Forces Sub-Commission,
ROME.



COPY. Air Vice Marshal Brodie.

British European Airways,
Bourn School,
Cavendish Avenue,
South Quispip,
Middlesex.

DS/PWA/C3/DO.

August, 1946.

Col. A. De Vincenti,
Ministero Aeronautica,
Direzioe Comunicazioni,
Rome, Italy.

Since meeting you at the Paris P.I.C.A.O. Conference in the Spring, we have been investigating in some detail, the problems of implementing the British Government's Gee proposals. It is as a result of this that I am now writing to you to give you some idea of what has been happening in this country.

2. On our return to U.K. we, in B.E.A., prepared concrete proposals for the use of Gee as the basis of an official Air Traffic Control System. Our plan is contained briefly in a Memorandum on Air Traffic Control, two copies of which I am enclosing for your information. You will see that this paper arrives at a conclusion that Gee is a vital part of a control organisation which has to handle modern high frequency operations with their attendant high traffic densities at terminal airports.

3. We have examined the possibilities of other systems such as Decca, omni-directional ranges with distance reading indication etc., and find that not one can be made available for some considerable time. It is also apparent to us that it would be criminal negligence to depend on untried equipment for that control upon which the whole safety of air transport rests.

4. For the immediate future we have therefore selected Gee because of those years of use under the most exacting conditions which have proved it to be basically sound and highly reliable, both technically and operationally. We have gone even further and examined the Gee system for extended development to meet the commercial plan of the future. This, because the most logical step from our interim system is one which is based on a similar type of operation, thereby the training problems which always follow adoption of new ideas. Therefore to produce a similar, more economical and better Gee, the following development programme has already been instituted:-

✓ (a) Miniaturisation down to a total installed weight of approximately 25/30 lbs. including converter for A.C. supply to D.C.

✓ (b) Indicator size of approximately 5" x 4 1/2" x 1 1/2".

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 - ✓ (a) Miniaturisation down to a total installed weight of approximately 25/30 lbs. including converter for A.C. supply to D.C.
 - ✓ (b) Indicator size of approximately 5" x 4½" x 11".
 - ✓ (c) Employment of a 1½" cathode ray tube with magnifying glasses which is visible under all lighting conditions without the use of a mask.
 - ✓ (d) Dial presentation on the indicator giving the Gee coordinates directly as numbers.
 - ✓ (e) Left/right needle presentation to the pilot.
 - ✓ (f) Development of a computer to provide a finalised pilot's indicator giving range and bearing in addition to left/right tracking indication. It should also give the facility for cross lattice flying, i.e. homing with pilot indication will be possible between any two points within the coverage of the system.

- 4./ (g) Provision of automatic triggering of slave stations and facilities for self-monitoring the ground station equipment. This makes for great economy of manpower in the operation of the stations.
- (h) Provision of chain frequency separation by pulse recurrence frequencies in lieu of radio frequencies. The aim should be to provide world wide Gee coverage, if necessary, on not more than two/three radio frequencies.
- (j) Development of a system which combines the medium and short range navigation of Gee with the facility for long range navigation provided by Loran, to be known as Gloran.
5. Of the above, (a), (b), (c) and (d) are virtually complete and will probably be shown at the forthcoming F.I.C.A.O. demonstrations in the U.K. in September. (e), (f), (g) and (h) are well advanced in theory, and practical development has already started at Cassors as the result of development contracts from the Ministry of Supply. (j) is long term, but is the logical follow-up of the first programme. It should not involve new installations of ground or airborne equipment but only additions which will give the combined facility - Gloran. The initial development of this latter project has commenced.
6. It may be of interest to you to know that I have recently taken on three expert research and design engineers who were on the staff of the British Government's telecommunications research establishment for radar during the war years. These three, by agreement with the Director of Communications Development (Ministry of Supply) have now been attached to Cassors to assist with the new development programme outlined in Para. 5. above. I mention this to indicate to you the great importance that we in B.E.A., attach to Gee, present and future.
7. All programmes involving installation of ground and airborne equipment present that awkward problem of implementation. I recently discussed this point with the Ministries concerned, and it became clear that a co-ordinating authority was required to stimulate requests from the foreign operators and Governments. Further, such an authority should be able to put the foreign interests in touch with the necessary Government or commercial organisations, who can assist with the provision and installation of those aids to Navigation, Air Traffic Control and Communications they wish to install in their own countries. At the last F.I.C.A.O. Conference you will remember that certain promises were made by the British Government to selected European countries, of which Italy was one. Generally speaking these were for the supply of a Gee Ground Chain, technical advice and installation, assistance with training of maintenance personnel and the installation of the Gee airborne equipment in five aircraft of each of the country's operating Companies, - all at the expense of the British Government. This offer has been confirmed in writing by the Ministry of Civil Aviation. However it may be a problem for foreign Governments and operators to find the ways and means of taking advantage of this offer.
8. As a result of these discussions it was agreed by the Ministries of Civil Aviation, Transport, and Supply, in conjunction with Sir

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8. As a result of these discussions it was agreed by the Ministries of Civil Aviation, Transport, and Supply, in conjunction with Sir Robert Watson-Watt and Sir Robert Penwick (formerly Controller of Communications and Communications Equipment, Air Ministry and M.A.P.), to set up just such a co-ordinating committee, to be known as Committee Gee. With the concurrence of my Board of Directors, I have been appointed Chairman of this Committee.

9. This Committee will shortly be operating from an address in London of which I will notify you later. At present, however, we are carrying on at my existing offices at B.E.A. H.Q., and we will welcome any communication from you requesting information on Gee, including the supply and installation of airborne and ground equipment. All such correspondence should be addressed to Committee Gee, c/o. Group Captain Savard, Bourne School, Cavendish Avenue, South Milslop, Middlesex.

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10. I would be extremely pleased to hear from your Government with regard to their requirements for both the ground and airborne equipment for the Gee system. As you may know there were two Gee Chains in Italy in the latter part of the war which were installed for the use of the Royal Air Force. These Chains are in the process of being withdrawn due to the departure of a proportion of the Royal Air Force contingent from Italy. In the event of the Italian Government wishing to avail itself of the British Government's offer to supply Gee Chains however, fully serviced ground station equipment can be made available and shipped to Italy for installation to meet the civil plan. It is generally thought that two Chains would be required, one being based in the Rome area, and the other being based in Northern Italy.

11. Your request for the Gee System would naturally be of considerable interest to B.E.A., which intends to adopt Gee as its main Navigational and Air Traffic Control aid. B.E.A. therefore hopes that the Italian/B.E.A. Company will adopt the same system and operate in a similar manner. Therefore I can assure you that we will give all possible assistance and advice on receipt of a request from your Government and air operating company (or companies) for the Gee System.

D. J.
D. Seward.

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British European Airways,
Bourne School,
Cavenfish Avenue,
South Ruislip.

10th July, 1946.

Dear Sir,

NAVIGATIONAL AIR TRAFFIC CONTROL PROBLEMS.

We enclose for your information a paper produced by British European Airways entitled "Memorandum on Navigational and A.T.C. practices in relation to aerodrome capacities under all-weather conditions". This paper deals essentially with the immediate problems confronting the B.E.A. in its attempt to inaugurate a rapidly expanding programme of scheduled Services into and out of Northolt Airport, but it also touches on matters of much wider significance, notably the Air Traffic Control Requirements (Appendix B) and the development of a somewhat revolutionary approach Control procedure based on a lattice system of Navigation (Appendix A.).

We desire to emphasize that the figures quoted for all-weather landing rates are conservative and take into account some allocation which it is feared is bound to result from the close proximity of London Airport. It is considered that under the conditions described a landing rate of one aircraft per six minutes could readily be achieved at Northolt under severely restrictive weather conditions without much practical experience. But given some experience and with a certain amount of elaboration, there seems no reason to doubt that the proposed procedure could effectively handle aircraft arriving at intervals of two minutes or even less.

It is most urgently requested that the effort devoted to Traffic Control and associated navigational problems be intensified to the maximum possible degree, since any reversion to pre-war conditions of cancellation, diversion and delay in bad weather will inevitably reflect adversely on British Aviation in general and British Radio Aid and Control systems in particular.

Yours faithfully,

W. T. Lawrence

D. S. (M)
Controller Nav. & Tels.
B.E.A.

Air Vice-Marshal A.C. Collier C.B., C.D.,
D.G. 2.8.,

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Yours faithfully,

John T. Anderson

D. S. M.
Controller Nav. & Tels.
B.E.A.

Air Vice-Marshal L.C. Collier C.B., C.M.,
D.G. 2.3.,
Ministry of Civil Aviation,
Inveresk House,
Strand, W.C.

(Copies as per Distribution List).

Introduction

1. In this paper an attempt is first made to estimate the maximum all-weather air traffic capacity of Northolt Airfield. Having regard to the many uncertain factors which need to be considered, the subject is dealt with in three stages as under :-

- (a) The period June - September 1946
- (b) The winter 1946 - 1947
- (c) Late 1947, subject to the provision of certain additional features and the introduction of new control techniques.

The Problem

2. Broadly speaking, there are three main factors which govern the traffic capacity of any airfield. These offer distinct problems but are inter-dependent in that the maximum traffic handling capacity cannot be reached without the maximum efficiency in the three :-

- (a) Rate at which an aircraft can complete final approach, land and clear the runway (referred to as "Landing Rate")
- (b) Accuracy and ease with which aircraft can arrive in time and space at the point from which final approach is started (referred to as "Navigational Accuracy")
- (c) Efficiency of Control Staff, Communications and Control Room Appliances (referred to as "Control Efficiency").

3. An additional factor which should be borne in mind is the extent of any interference from aircraft operating from an adjacent airfield. In the case of Northolt it is certain that the amount of traffic which can be handled with safety will be adversely affected by the close proximity of London Airport (Heathrow). The risk of collision has been reduced, but not eliminated, by the introduction of variable circuits and the hazard is likely to assume serious proportions as the amount of traffic increases.

I - The Period June - September 1946

Landing Rate

4. The radio facilities available at Northolt at the present time are VHF R/T, HF and MF R/T and D/F, Radio Track Guide (RTG) and MF Radio Range, the last mentioned surviving both Northolt and Heathrow. The absence of any precise means of final instrument approach on to the runway excludes commercial operators from laying down weather minima lower than a cloud base of 250 feet or 500 yards horizontal visibility. 334
to these minima approaches can be made successfully by means of the RTG, or MF or HF procedures using D/F ground assistance; the time lag, however, is such that it takes at least 15 minutes for an aircraft to descend from a waiting position at 2000' to within sight of the ground, with the necessary margin of safety. It has then still to manoeuvre into position for landing, touch down and clear the runway.

5. Allowing for other traffic, possible shortcomings in communications contact and other sources of congestion, a reasonable average Landing Rate during the period under review, i.e. the present summer, is in the neighbourhood of one aircraft per 20 to 30 minutes under the most adverse weather conditions permissible. Isolated faster Landing Rate can be cited, but the average must be taken into account.

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6. Aircraft taking off do not present so difficult a problem, since they can be cleared from the Control Zone beneath the level of the incoming and waiting traffic. Uncertainty as to the precise time and place at which descending aircraft will break cloud, however, means that some delays will be inevitable.

Navigational Accuracy

7. The accuracy with which aircraft, using aids now in use, can, under zero visibility, arrive in time and space at a point from which a direct approach to the runway can be made is not sufficiently high to consider dispensing with the orbital and vertical stacking of aircraft. Nor is the accuracy with which aircraft can maintain a given track or hold-off at a given position within the Control Zone sufficiently high to obviate

- 2 -

obviate recourse to height operation when two or more aircraft are awaiting their turn to land.

6. It may be concluded from the foregoing that, given only a reliable and accurate aid to navigation, not subject to congestion, the handling capacity could be increased without reducing the safety factor since aircraft could then be fed into the final approach land in much more regular succession.

Control Efficiency

2. The existing system of Airfield Control is largely a legacy of the pre-war organisation and badly needs adapting to modern standards, taking full advantage of experience gained in the Services. Even in the Services, insufficient attention is given to have been directed to the provision of adequate Control Room appliances, computers, plotting and display boards, and the like. The Control organisation is probably able to deal reasonably well with the landing rate of one per 20 to 30 minutes mentioned in paragraph 5 above, but considerable improvements will be essential if a high traffic density is to be achieved with efficiency and safety.

II - Winter 1946/7

Landing Rate

10. Plans already in being for improving the facilities for landing aircraft at Northolt and Heathrow include the extension of radio communications and D/T and the completion of S.B.A. on the main runway at each terminal.

14. The provision of S.B.A. at Northolt will certainly simplify the pilot's task in making the final approach under bad weather conditions. It will not, however, serve to any marked degree to lessen the collision risk between aircraft awaiting permission to land at either Northolt or Heathrow. The existing S.B.A. procedure calls for an allowance of about 10 minutes per landing and it is not thought possible to improve on this figure with safety unless some better system than stacking round the airfield can be devised for securing the steady feed of aircraft into the S.B.A. pattern.

12. If the airfield remains open for pilots of widely varying experience, their liability to conflict with aircraft using the Radio Range and other aids to approach to Heathrow, coupled with poor position-holding, may well aggravate delays and extend the average landing rate to something of the order of one aircraft per 20 minutes.

13. Departing aircraft can be fitted into the pattern but great care will be needed owing, again, to the lack of positive knowledge of the positions of incoming aircraft and also to the spread caused by the "figure-of-eight" procedure involved in both S.B.A. and Range let-down procedure.

11. All things considered, one movement, in or out, every 15 minutes is an optimistic figure for Northolt in nil visibility under the conditions anticipated during the coming winter, if due regard is going to be paid to the safety factor.

Practical Accuracy

15. The provision of additional D/T facilities will to some extent lessen the risk of saturation under conditions of air congestion, but will not fundamentally increase navigation proficiency.

Control Efficiency

II - Winter 1946/7

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393

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Navigation Accuracy

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Control Efficiency

16. The present plans of the Ministry of Civil Aviation include the taking over of the existing C.A.C. organisation from the I.A.F. and the institution of full "Area Control" throughout the South East Flight Safety Region. The existing D/T fixer service will be employed together with at least two HF communication channels and additional VHF D/T facilities in approach and airfield zones.

17. Provided that suitable Display apparatus is made available for the Controllers - and progress in this direction does not appear too good - these arrangements should go far towards increasing the safety factor by ensuring the co-ordination of flights within the region under I.F.R. conditions. They are, however, not likely to do much towards solving the problem of providing a carefully regulated flow of incoming aircraft to the London terminals.

/III

III - Late 1947

Landing Rate

19. It is estimated that, provided immediate action is taken to implement the recommendations noted below, the Landing Rate at Northolt could be increased to one aircraft per 6 minutes average towards the middle or end of 1947. It will be noted that the following are all-important to the achievement of safe operation at this rate :-

- (a) Air-ground R/T communication up to 75 miles at 2,000' with 100% reliability
- (b) SRA or SC3 51 or equivalent providing direct instrument approach without local orbit, figure-of-eight or other delaying procedure
- (c) An accurate and reliable air-interpreted hyperbolic navigation system, free from static and other interference and not subject to saturation, to ensure accurate positioning of the aircraft in time and space in the SRA or SC3 51 beam in accordance with instructions from Control.
- (d) A Control organisation, suitably equipped with all necessary Display systems and appliances, capable of directing aircraft to ensure the essential even flow/parking full use of the aids available.
- (e) The exclusion, under I.T.R. conditions, of all aircraft not suitably equipped to conform with the suggested procedure.

19. The suggested procedure, which is described in greater detail in Appendix 'A' to this paper, involves the use of a "Gate" 8-10 miles from the centre of the airfield, on the approach beam at the downwind end of the runway. By the means described in the appendix it is hoped to ensure an even flow of aircraft through this gate. The aircraft will land direct without any orbit and the frequency of one aircraft per 6 minutes quoted is arrived at by allowing a minimum separation of 2 minutes between successive aircraft and a timing error of plus or minus two minutes at the Gate. When aircraft arrive at the gate exactly on time, one will be entering the Gate as its predecessor clears the runway; with the minimum separation of 2 minutes which results from one being 2 minutes early and its predecessor 2 minutes late, one will be touching down as the other crosses the outer marker. This time-separation is considered acceptable as the extreme but not for continuous working.

Navigation Accuracy

20. It cannot be emphasised too strongly that the successful achievement of a high landing rate depends very largely on what may be regarded as comparatively long range control. Little will be gained by the provision of a perfect instrument aid to final approach and landing if aircraft have not the means of positioning themselves accurately in time and space at the "Gate". Given a regulated flow at this point, then the actual landings can be carried out smoothly without any congestion in the vicinity of the airfield.

21. In the past it seems to have been assumed that the landing of large numbers of aircraft on instruments necessitated the provision of waiting or hold-off points. It is contended that this is a fallacy which results from the failure to appreciate the problem as a whole. All too often even the experienced pilot is hard to state that no improved navigational aid is needed... "it is easy enough to get from A to B, the trouble is to get down on arrival at B". What is not realised is that it is not enough

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22. By the adoption of some system such as that described in Appendix 'A' it is considered that the requisite flow of incoming aircraft at 6 minute intervals can be achieved. As mentioned above, allowance is made for errors up to plus or minus 2 minutes maximum; this allowance may appear excessive and, indeed, with experience the rate can probably be increased. But until considerable experience has been gained it is considered advisable not to attempt a higher scheduled rate.

/Control

Control Efficiency

23. To achieve the landing rate of one aircraft per 6 minutes with safety and efficiency drastic improvements in the air traffic control organisation will be necessary. This subject is dealt with in Appendix 'B' to this paper but two points are thought worthy of repetition here :-

- (a) the control of large numbers of commercial aircraft is a task carrying extremely heavy responsibility and demands highly-skilled and well-trained personnel;
- (b) safety can never be assured without adequate means of enforcing certain rules and regulations - that one offender flying solo can jeopardize the lives of many innocents is a situation which can no longer be tolerated.

Recommendations

24. In order to implement the procedure described, action should be taken now to provide the following facilities :-

- (a) VHF R/T (minimum 2 channels) with range up to 75 miles at 2,000';
- (b) HF or HF W/T, free from congestion up to 300 miles, or VHF cover along all routes through relay stations
- (c) A hyperbolic navigation system, free from saturation and interference obstacles and of sufficient accuracy to bring aircraft directly on to final approach
- (d) an approved final approach system giving continuous instrument presentation from 2,000' at 10 miles down to zero height 500 yards from upwind end of runway
- (e) Adequate display, plotting and other Control facilities for both Area and Approach Control zones
- (f) Air Traffic Control Officers qualified and able to deal with delaying action in flight, queue-flow, standing-off and associated procedures
- (g) Reservation or Approach Area(s) for suitably equipped aircraft.

Standard Equipment

25. The foregoing pre-supposes standardization on the following equipments, or suitable alternatives, and it is emphasised that the serviceability rate of all must be high to create confidence in users and prevent unnecessary misunderstandings and delays:-

(a) Airborne

- (i) Pilot-operated VHF R/T with press-button selection and parallel mix feed to SRA reception
- (ii) Pilot-operated SRA or SRS 51
- (iii) CW Communication system
- (iv) The Gee airborne equipment.

(b) Ground

- (1) VHF transmitters (minimum 2 channels) for R/T communications and providing a clear service

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- (b) HF or HF W/T, free from congestion up to 300 miles, or VHF cover along all routes through relay stations
- (c) A hyperbolic navigation system, free from saturation and interference troubles and of sufficient accuracy to bring aircraft directly on to final approach
- (d) An approved final approach system giving continuous instrument presentation from 2,000' at 10 miles down to zero height 500 yards from upwind end of runway.
- (e) Adequate display, plotting and other Control facilities for both Area and Approach Control zones
- (f) Air Traffic Control Officers qualified and able to deal with delaying action in flight, go-around, standing-off and associated procedures
- (g) Reservation of Approach zone(s) for suitably equipped aircraft.

Standard Equipment

25. The foregoing pre-supposes standardization of the following equipments, or suitable alternatives, and it is emphasised that the serviceability rate of all must be high to create confidence in users and prevent unnecessary misunderstandings and delays:-

(a) Airborne

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- (i) Pilot-operated VHF R/T with press-button selection and parallel mix feed to SRA reception
- (ii) Pilot-operated SRA or SRS 54
- (iii) CW Communication system
- (iv) The Gee airborne equipment.

(b) Ground

- (i) VHF transceivers (minimum 2 channels) for R/T communications and providing a fixer service
- (ii) VHF Cathode Ray R/T or one channel providing display direct to Approach Control
- (iii) SRA or SRS 54 for direct instrument approach from 10 miles at 1500/2000 feet without local orbit, figure-of-eight or other delaying procedure
- (iv) Gee chains to meet requirements
- (v) HF and/or MF transceivers (minimum 2 channels) for R/T facilities.
- (vi) Sodium and contact lighting, or better.

Conclusion

26. The proposals outlined in this paper should give an optimum landing rate at Northolt towards the middle or end of 1947 of 10 aircraft per hour under conditions of 250 yards horizontal and 50 feet vertical visibility at surface level. In the same /period

period 20 take-offs should be possible.

27. It is apposite to compare this estimated capacity with that achieved under operational conditions in P.A.F. Commands when an hourly landing rate of 20 aircraft in 250 yards visibility was common. Admittedly the safety factor was probably not so high, though casualties were rare, but the main factor which contributed towards the success achieved was that the aircraft concerned were of the same type and used the same equipment. The inference is that for high density working the 'rogue' aircraft must be excluded. Such aircraft are all too liable to cause delays out of all proportion to the majority user-interest.

28. This in turn lends emphasis to the advantages of operating to carefully planned schedules at reserved terminal airfields open only to aircraft fitted with certain standardized radio aids to navigation, approach and instrument landing.

29. It is not unreasonable to suppose that, could an airfield be set aside, under I.P.R. conditions, for the sole use of aircraft capable of conforming to the procedure recommended in this paper, the reputations of the operators concerned for safe and regular schedule working under all weather conditions would soon attain wide-spread recognition. Without the reservation of an airfield the efficiency of the operators prepared to equip themselves fully would inevitably suffer from time to time through inordinate delays caused by aircraft relying on mediocre and obsolete equipment.

Nav. & Tels. B.E.A.
17.6.46.

Appendix 'A'Application of the GEE System to the Approach and Landing ProblemIntroduction

1. At the present time it is, unfortunately, not possible to put forward a concrete scheme for the use of the GEE system as an aid to all-weather landings at Northolt since the London Gee Chain, designed and installed by the R.A.F. to meet the need, has been withdrawn and no decision has yet been made regarding an alternative layout. It is, however, possible to give a general indication of the manner in which the facilities afforded by a hyperbolic navigation aid can be exploited.
2. In the first place it should be remembered that the GEE system offers the following advantages over all other aids at present available :-
 - (a) the provision of instantaneous fixes of very high accuracy to an unlimited number of aircraft at all times (the system is air-interpreted)
 - (b) a selection of "tracking" lines along which aircraft can proceed with ease and accuracy, with continuous cross-check on progress.
3. The present aim is to devise some means whereby these facilities can be applied to eliminate entirely the necessity for orbiting and to obviate stacking of aircraft either in the vicinity of the airfield or elsewhere. It has been estimated that aircraft could be safely brought into Northolt under instrument conditions at a rate of one per 6 minutes provided that the aircraft could be fed into a "gate" at the perimeter of the Airfield Control Zone in regular succession at this same rate. It is the purpose in this Appendix to indicate how such a regulated flow might be achieved.

General Considerations

4. An aircraft fitted with GEE equipment can, where adequate cover exists, adhere extremely closely to its flight plan. The first essentials to success are, therefore, that aircraft take off strictly to time and that traffic schedules are carefully compiled to facilitate a regular flow. Variations in wind velocities, however, make it impossible at times for aircraft to keep to the published schedules and therefore some means must be provided whereby aircraft can arrive not merely on their E.T.A. But contrive to reach the Gate with equal accuracy at a specific time required by the control authorities. The sequence of events can thus be summarized as under :-

- (a) aircraft advises Control its ETA at the gate
- (b) Control, if unable to accept at this ETA, passes the aircraft an "RTA" (Required Time of Arrival)
- (c) by resort to the scheme outlined below, the ETA and RTA are made to correspond.

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Outline of the Proposed GEE Approach Scheme

5. A minimum of two GEE position lines (or 'Lattice lines') passes through any given point within the coverage. It is proposed that instrument approach to the Gate shall in all cases be made along the most convenient of these lines - normally the one which lies nearest to the track of the incoming aircraft.

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- (a) aircraft advises Control its ETA at the gate
- (b) Control, if unable to accept at this ETA, passes the aircraft an "ETA" (Required Time of Arrival)
- (c) by resort to the scheme outlined below, the ETA and ETA are **389** made to correspond.

Outline of the Proposed GEE Approach Scheme

5. A minimum of two GEE position lines (or 'Lattice lines') passes through any given point within the coverage. It is proposed that instrument approach to the Gate shall in all cases be made along the most convenient of these lines - normally the one which lies nearest to the track of the incoming aircraft.
6. Having regard to the high speeds of modern aircraft it is necessary, to ensure an even flow at the gate, to exercise timing control from a point some distance out and it is thought that this point might conveniently lie on the perimeter of a circle of 50 miles radius centred on the airfield.
7. The aircraft will thus be required to pass to control some ten minutes in advance the ETA (a) at the 50 mile circle and (b) at the gate.
8. If no state of congestion exists and the controller can accept the aircraft at the time given then no special action is needed. Using GEE for navigation, the aircraft should arrive at the very outside within 2 minutes of its ETA and can come straight in from the gate to land.
9. Should two or more aircraft pass ETAs separated by less than the requisite 6 minutes it will be necessary for the controller to decide on the sequence in which he can best accept them and to pass to each its ETA.

- 2 -

10. The procedure by which aircraft can adjust ETA to conform to control requirements is illustrated in Figure 1. Briefly the idea is that a greater or less delay is introduced by turning off track at the 50 mile point to meet the chosen lattice line of approach to the gate at a greater or less distance from the gate. By this means aircraft approaching from all points of the compass are brought accurately on to one of three or more approach tracks and so spaced in time as to arrive at the gate itself at an even regulated flow. From the gate, each aircraft lands directly without any preliminary orbit.

Overshoot Procedure

11. In order to cater for any aircraft which, for some reason or other, may not be able to land on its first approach, it is proposed to utilise holding points remote from the airfield and on the upwind end of the runway in use. These are shown in Figure 1 and the technique (used by R.A.F. Bomber Command for Operations "Glimmer" and "Taxable" on D-Day) is to fly to and fro along parallel lattice lines. As soon as the aircraft can again be fitted into the traffic pattern it will return to the Gate along the most convenient lattice line, again without making any orbit of the field.

Emergency Procedure

12. In the event of any contingency likely to prevent aircraft from landing for some ten minutes or more the following procedure is suggested :-

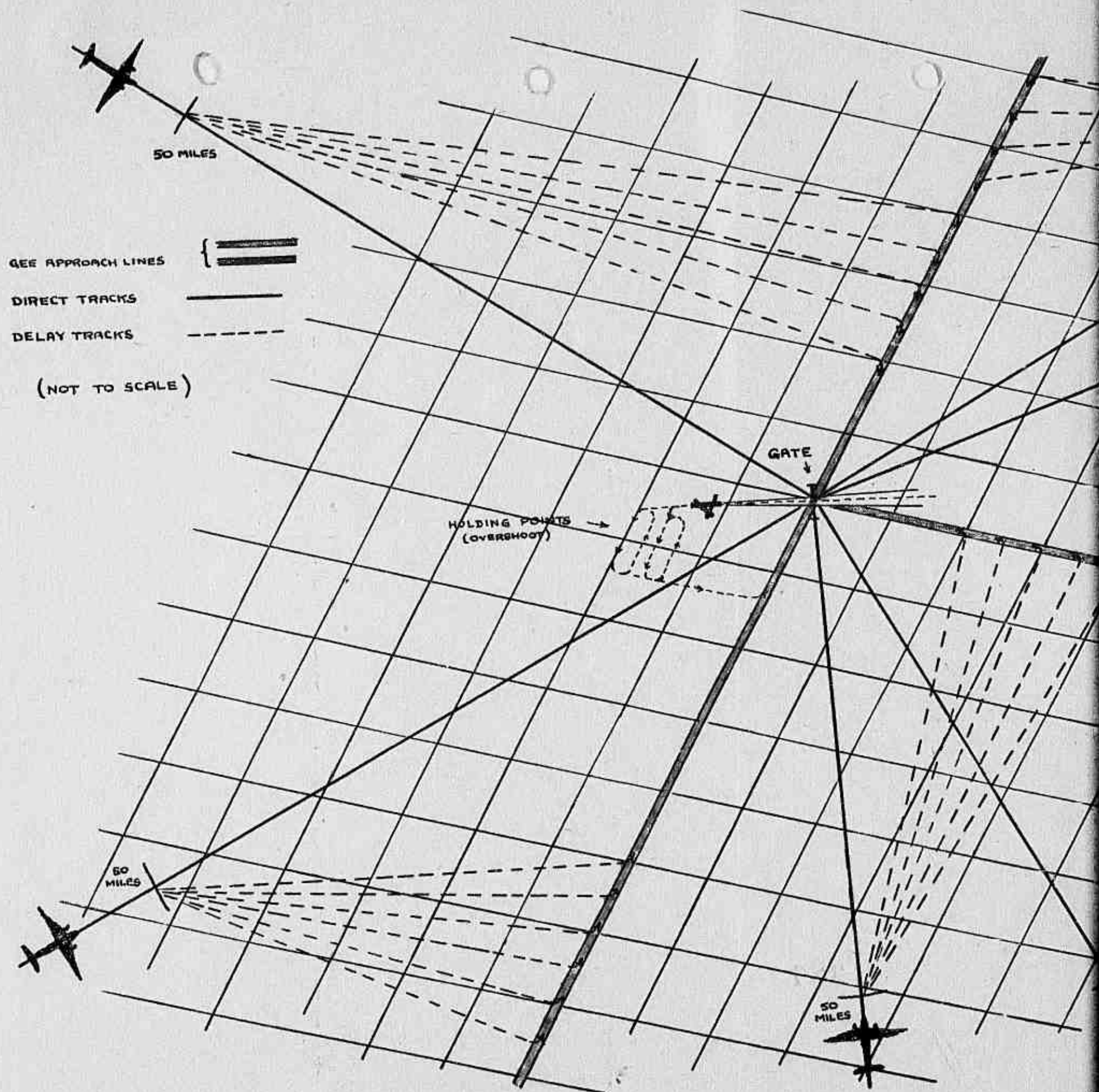
- (a) If incoming traffic is arriving at maximum frequency then time lost due to delay cannot be made up and aircraft outside the 50 mile circle should immediately be given diversion instructions.
- (b) Aircraft within the 50 mile circle can either :-
 - (i) continue on course and proceed to waiting positions established for overshoot,
 - (ii) extend the delay as long as necessary by completing similar elongated orbits off their respective lattice lines of approach.

13. Which of these two alternatives is most likely to be more acceptable can best be determined by practical trial. The former is probably preferable since it does not call for the immediate implementation by all aircraft of a sudden change of programme.

Notes

(a) Figure 1 may convey the impression that in some cases somewhat steep turns are required. This is not the case since the GEE operator can tell continuously just how far along any line he is and can thus tell the pilot when to start a Rate 1 turn to join the new track on the correct heading. The positions from which such turns should be started can, if desired, be pre-computed.

(b) The technique is known for producing a computer, which will enable the Controller to tell at a glance the track to be followed by any given aircraft to any required delay. Alternatively tables could be compiled, based initially on an average wind velocity, which would probably serve adequately until such time as intensive working calls for really high precision.



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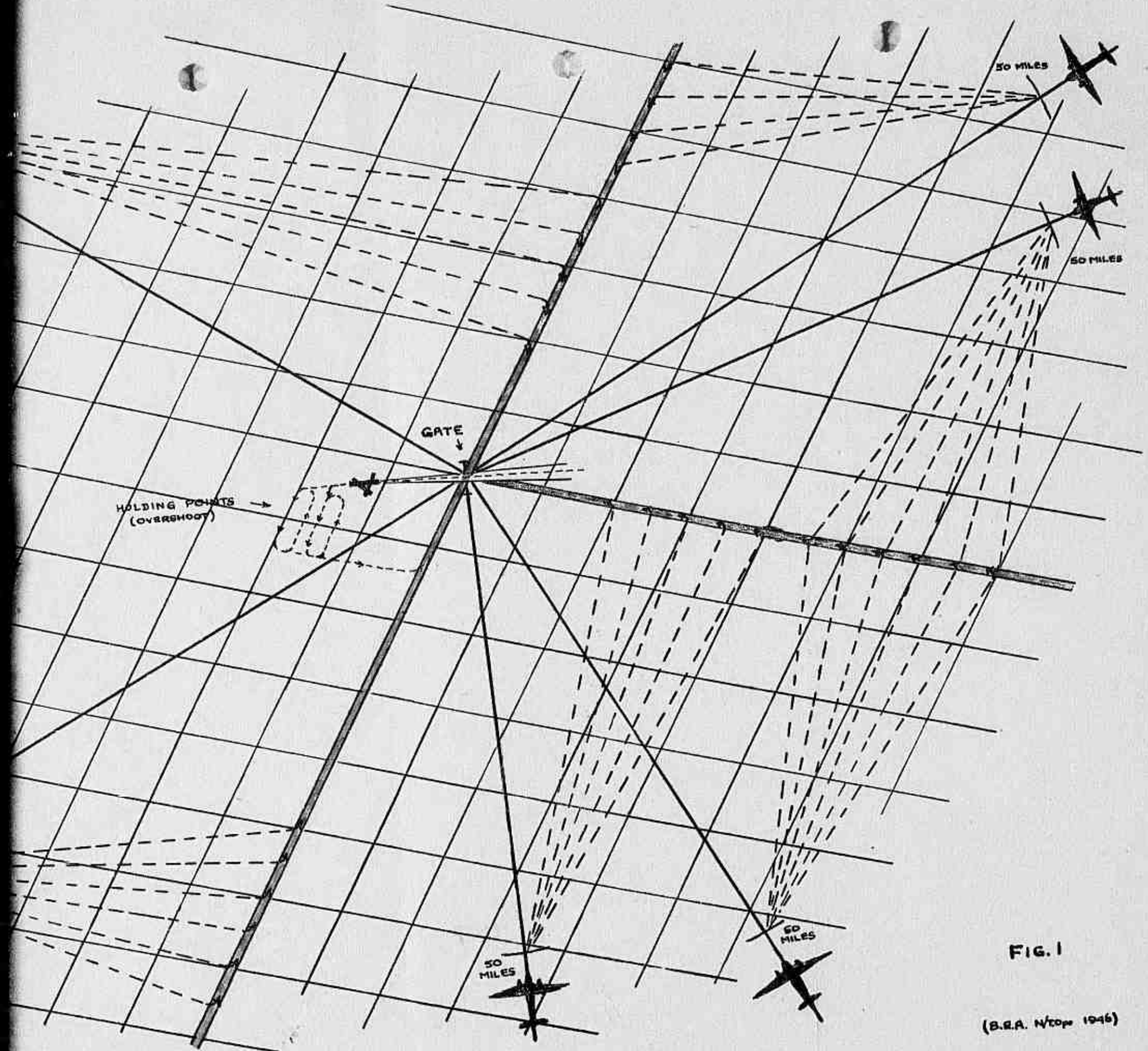


FIG. 1

(B.R.A. N/Top 1946)

Appendix 'B'A.T.C. Requirements

1. To obtain the greatest capacity at Northolt the following improvements to the A.T.C. organisation are essential:-
 - (a) A means of plotting and co-ordinating under I.F.P. conditions, aircraft movements affecting the Northolt Approach Zone.
 - (b) Efficient transfer of aircraft from Area Control to Approach Control, and vice versa.
 - (c) Reservation of the Northolt and Heathrow Approach Zones for aircraft equipped to agreed minimum standards.
 - (d) Installation of adequate air and surface communication channels (VHF, D/T, point-to-point, speech and teleprinter).
 - (e) Provision of A.T.C. officers fully qualified to practice the proposed technique.
 - (f) Powers of absolute legislative and executive authority for the enforcement of A.T.C. regulations, to be vested in the A.T.C. organisation.
2. In bringing about the above improvements the following action will be necessary:-
 - (a) Introduction of Air Navigation Orders in keeping with the new conditions.
 - (b) Enrolment and training of A.T.C. Controllers of the right calibre and establishment of their status commensurate with their responsibilities.
 - (c) Development, production and installation of modern radio/radar aids to navigation.
 - (d) Conversion of the pre-war Area Controls to Flight Safety Regions, Control Areas and Approach Zones, etc.
 - (e) Introduction of a complete network of telecommunications over all planned routes for scheduled services.
3. It will be noted that a large expansion of the present organisation is **386** essential.

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Declassified E.O. 12356 Section 3.3/NND No.

785017



TELEGRAMMA VIA ITALO RADIO

LDN/Z/RH 073026

Prefixo - e - Numero - Qualifica - Provenienza - Parole - Data - Ora - Indicazione di Servizio

GM261/25 LONDON 35 25 1211 =

Le ore indicate sono quelle del paese di origine

AIRVICEMARSHALL BRODIE AIR
FORCES SUT COMMISSION

ROME =

REFERENCE YOUR CONVERSATION WITH ADMIRAL HOLLAD^N WELCOME ENQUIRY
FROM ITALY STOP ADDRESS TO GROUP CAPTAIN DAWARD^{SAWARD} COMMITTEE GEE
C/O BRITISH EUROPEAN AIRWAYS BOURNE SCHOOL CAVENDISH AVENUE SOUTH
RUISLIP +

SSA1/SIGS.

01



*Sign / I think you should pass this
for their memo which we could treat
as an internal report & subject to agreement
by Downing St. 385
10/27/7*

Il Governo Italiano e la Società Italcable non assumono alcuna responsabilità in conseguenza del servizio telegrafico

(Mod. 855 - Ord. 1017 del 15-4-54) Arti Grafiche L'Espresso & Petrelli - Milano (300.000)

RISPONDETE VIA ITALO RADIO

A Roma, Catania, Firenze, Genova, Lentini, Messina,
Milano, Napoli, Palermo, Siracusa, Taormina,
Torino, Trieste, Venezia,

presentate o telefonate i Vostri telegrammi «Via
Italo Radio» agli Uffici della «Italcable» Ser-
vizi Cablografici Radiotelegrafici e Radioelet-
trici.

Per evitare errori di trasmissione scrivete sempre:
se a mano, con la massima chiarezza; se a
macchina, in lettere maiuscole e con doppio
spazio fra le lettere e le linee.

SERVIZIO RADIOTELEFONICO DIRETTO CON

AMERICA DEL NORD, CENTRALE E DEL SUD,
VICINO ED ESTREMO ORIENTE

*L'uso della "Via Italo Radio", non comporta alcun aumento di spesa, inquantochè
le tariffe praticate dalla Società sono pari a quelle della via meno costosa.
Presentando quindi i Vostri telegrammi agli sportelli sociali
otterrete rapidità ed accuratezza, senza alcun aumento di spesa.*

Rivolgetevi sempre agli Uffici della «ITALCABLE»,
per informazioni, suggerimenti, tariffe, ecc.

La Società sarà lieta di esservi utile e profitterà della
Vostra amichevole e gradita collaborazione per migliorare
sempre più i propri servizi.

Fatevi correntisti della Società.

Oltre alla comodità di pagare l'importo dei Vostri tele-
grammi alla fine del mese, senza alcun aumento di spesa,
avrete anche il vantaggio di possedere una tessera con la
quale potrete inviare i telegrammi stessi da qualsiasi ufficio
della «ITALCABLE».

4A
Air Forces Sub Commission,
Allied Commission,
Rome.

25th July 1946.

Dear Sir -

Having shown me your letter of the 18th July A.V.M. Brodie has asked me to write to you explaining the delay in sending you the Italian Air Ministry's queries as raised by DeVincenti at our discussion in Rome.

The delay is regretted but unavoidable as DeVincenti is away in the north on leave and will not be back for a fortnight or so. No doubt we shall receive the I.A.M.'s communication upon his return, when the contents will be immediately forwarded to the Steering Committee.

It is interesting to learn that the British Government has adopted "Gee" as the official navigational aid for Civil Aviation in the British Isles, and I have acquainted the I.A.M. with the fact.

yours faithfully
A. W. Kay. s/w.

Vice Admiral Holland,
Cossor House,
Highbury Grove,
London, N.5.

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file 5541/5165

Telephone : Canonbury 1234.

Cossor House,
Highbury Grove,
London, N.5.

18th July, 1946.

Dear Brodie.

I thought it might be of use to you to let Devinenti know that last Friday the B.B.C. announced that the British Government had adopted GEE as the official navigational aid for Civil Aviation in the British Isles. I did say that this was probably going to happen when I had that meeting with him in Ray's office, and thus this merely confirms what I said. I hope he is forwarding his queries through you for the Steering Committee. I have warned Seward that this was the arrangement.

It was very nice seeing you again and I will give you a ring the next time I am in Rome.

yours truly

Cecil Hurand

Air Vice-Marshal I.E. Brodie, O.B.E.,
Royal Air Force Sub-Commission,
Allied Control Commission,
ROME.

Sign off for action pl. x lib. know what to do ref φ

1/15 383
23/7.

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EXTRACT FROM THE R.A.F.'S NEWS BULLETIN
OF FRIDAY, 5TH JULY.

Navigation and air traffic control on the European network of airlines may be helped by a British designed war-time Radar system. Our air correspondent says it has been decided that the war-time "GEE" chains should be retained, and if necessary, supplemented for the benefit of civilian flying. These "GEE" chains were used by our bombers to pinpoint their positions and separate out the various bomber streams. After D-Day 14 "GEE" chains - each with 3 or 4 stations - came into action in various parts of Europe. 10 of them are still being used, 6 or 7 more could cope with all the dense civil air network over Europe.

MEMORANDUM

Director Thru: S.S.O.
D/Director

PROVISION OF "GEE" CHAINS IN ITALY

During the war there were three "Gee" chains in Italy operated by the R.A.F., one in the Bari/Foggia area, the second in the Naples area, and the third in the Leghorn area. These stations have been dismantled and there is now no "Gee" ground equipment in Italy.

2. In February the British made proposals to Italy, amongst other countries, for the employment of "Gee" in Europe. It was proposed that Italy should have two chains, a Milan chain and a Rome chain, the former of four and the latter of three stations. The estimated cost for completed installations with personnel and camp was £40,000 and £30,000 respectively per annum.

3. In May, at the Paris Conference, further proposals were made by the British Government to the Italian Delegation, as follows: -

(a) To supply, free of cost, ground equipment necessary to effect the coverage required for the operation of the main European services. In your case, this involves the supply of equipment for two 4 station chains.

(b) Free technical advice in connection with the siting and erection of the Gee stations.

(c) To supply free of cost, the necessary air-borne equipment required to equip five aircraft for each operator. (We are examining the possibility of actually installing the equipment in these aircraft free of charge, and although the offer cannot be made definitely at the present moment, we hope that we may be able to assist in this way.)

(d) The British Government will train instructors for both ground and air crews. This will be subject to a small standard charge, already in force, of two guineas per week.

4. At 1500 hrs on July 5th 1946 a conference was held in the Air Forces Sub Commission, on the provision of "Gee" to the Italian Government. Present were Vice Admiral Holland representing Cossor Radio Ltd. L/Col. DeVincenti, Major Ing. Sementrini and Major (Ing) Montuschi representing the I.A.M. and S/L Ray of the A.F.S.C. 381

5. Vice Admiral Holland explained the advantages of using "Gee", a relatively old but well-tried system in preference to

of er more modern systems that had not stood the searching test of a long war. A further advantage being that development work is proceeding at Cossora under Government authority to reduce the weight of "Gee" (airborne) to something like 30 lbs as against the present figure of 150 lbs - and what is more, to provide pilot presentation thereby obviating the necessity for an operator with attendant valuable reduction in weight. Cossora hope to have the prototype of the new equipment ready by Oct/Nov 1946.

6. L/Col. DeVincenti said that there were several points that were not clear in the proposal, mainly concerning the financial angle. He indicated that it would not be a sound bargain to go to all the expense of erecting installations and buildings on the tops of high and perhaps very inaccessible mountains, building roads and laying on power and water only to find that the installation was obsolete in perhaps one year or so.

Other points were: -

- (a) Was the equipment to be a free gift or was it to be a loan.
- (b) Would spares be supplied free or have to be bought.
- (c) Would modifications and improvements be carried out free of charge.
- (d) Would the services of experts be free.
- (e) Could the geographical siting be carried out as soon as possible in order that the Italians could estimate the probable cost of installation.

7. I considered it necessary at this juncture to point out to the Italians that Vice Admiral Holland was purely a representative of Cossora and not in a position to speak for the British Government. L/Col. DeVincenti then indicated that he would write to us for elucidation on the above points, it being essential to have the answers before the I.A.M. could make a decision. Vice Admiral Holland promised to pass on the points as far as they might affect his firm.

8. Vice Admiral Holland then left the conference and in a further discussion L/Col. DeVincenti indicated that with the rapid strides that are being made with new equipment he felt it would be wise to wait until he had attended the Radio Exhibition in England in September and the American Exhibition later in the year before a firm decision were made. I am in complete agreement with him there, bearing in mind financial costs and taking the long term view that it is essential to have the most efficient equipment. 380

9. As indicated in para 7 a communication on the subject can be expected from the I.A.M. in the next few days. I will keep you fully informed of any matters bearing on the subject.

(over)

AFSC/AIR/S541/ST

Awkey etc

A... RAY S/Ldr
Chief Signals Officer.
6/7/46

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