Summary of the Proceedings at the Special Co-ordination Meeting of the NAT Systems Planning Group (NAT/SPG)

(2-3 September 1980, Montreal)

1. Introduction

1.1 The Special Co-ordination Meeting of the NAT/SPG was held on 2-3 September 1980 in accordance with Conclusion 17/2 of the NAT/SPG 17. A list of participants in the Meeting is shown in Appendix A.

1.2 When opening the Meeting, the Chairman wished to place on record the appreciation of the Group for the arrangements which had been made by ICAO to permit the convening of this Meeting and for the support given to it.

1.3 During contacts between Members prior to the Meeting, it had become apparent that it would be useful if a number of questions could be reviewed which had come up and, at the opening of the Meeting this led to agreement on the following agenda:

a) scrutiny of the navigation data obtained by monitoring during the period from 1 March to 31 August 1980;

b) assessment of this data as to its significance regarding the application of 60NM as of 30 October 1980 (Conclusion 17/1 refers);

c) review of the situation regarding the methods used for the assessment;

d) development of a contingency plan regarding lateral separation in cases of deterioration of the navigation situation;

e) review of proposals of the USA for the amendment of the NAT RAC SUPPs on lateral separation in the New York OCA; and

f) position of the Group in respect of that portion of a planned round-the-world flight by a manned balloon affecting the NAT Region.

1.4 In adopting the above agenda, the Group decided not to include in it a proposal from Iceland, made prior to the Meeting, to consider the extension of MNPS airspace to the North pole as proposed by Iceland at NAT/SPG 17. It was, however, agreed that this matter would be fully discussed at NAT/SPG 18 in May 1981.

2. Summary of Discussions and Conclusions

2.1 Scrutiny of navigation data

2.1.1 The Group had before it data on the navigation performance of NAT flights as observed by the Gander, Brest, Land's End, Shannon and Scottish radars which had been collected and collated by the UK and this was reviewed in accordance with established practice. In reviewing this data, the Group was, however, aware that navigation errors continued to occur in the Reykjavik OCA, outside the established "observation window" of Gander, and with respect to Westbound flights in the Shanwick OCA and Eastbound flights in the Gander OCA. It was also recalled that details of such errors were circulated to Members by the UK together with the monthly monitoring reports.

Errors

2.1.2 From the data presented by the UK, the Group found that, for the period from 1 March to 31 August 1980, there were a total of 16 errors of 30NM or more off track in 38950 observed flights. Full explanations of the causes of all errors were not available and in those cases where these were missing the Group therefore attributed to them the most probable causes considering all relevant aspects. The classification of errors was that agreed at NAT/SPG 17 (para 1.2.3 on page 1-2 of Summary NAT/SPG 17 refers).

2.1.3 For errors falling in the 50-70NM band off track, the Group was able to determine whether the flights concerned were operated within the Organized Track System(OTS) or not. For errors outside this band, this attribution was, however, not possible.

2.1.4 The Group then agreed on the following breakdown of the observed errors :

Class	Error		REMARKS
	⩾30NM	of these 50-70NM	
A	5	0	
C	6	6*	2 within OTS, 4 outside, * one not a normal way-point insertion error
D	2	1*	*1 within the OTS
F	3	1*	*1 within the OTS
Total	16	Sub-total 8	

It was noted that one of the Class C errors was associated with a re-clearance by ATC when the flight concerned was approaching landfall. It was also noted that Class A errors (aircraft not certified for operation in MNPS airspace) continued to occur and that no Class B errors (ATC System loop error) qualifying for inclusion in the data covering the observation period had occurred.

2.1.5 In view of the above, the Group agreed that, while the results of the monitoring were within the expected range and had not shown the increase in errors which had been anticipated by some as a result of the Summer peak in NAT traffic, there was certainly no reason for complacency by States and operators concerned. It therefore expected that all parties concerned would continue in their serious efforts to further improve the general level of navigation performance by flights in the NAT Region.

2.2 Assessment of the navigation data in respect of lateral separation

2.2.1 Based on the results of the scrutiny of observed off-track navigation errors, the Group proceeded with their assessment with respect to lateral separation. In this respect it was agreed that the assessment should be related to the total of the observed traffic and also to traffic observed which was operating on the Organized Track System(OTS).

2.2.2 A proposal to also make a special assessment covering only that portion of the observed traffic which was not operating on the OTS was not pursued because it was pointed out that this would not yield useable results since the analysis used for the original development of the MNPS was based on :

a) the operation of aircraft along parallel tracks, which was frequently not the case for those operating outside the OTS; and

b) assumed traffic densities (packing of aircraft) which, outside the OTS were extremely low.

In addition the very low size of the traffic sample available for such flights was insufficient for any meaningful evaluation.

To illustrate the above, the Group agreed to include in this Summary a "stop-the-clock" presentation of a typical NAT traffic situation and this is shown in Appendix B.

2.2.3 Examination of the error data for the full year between 1 September 1979 and 31 August 1980 covering the total observed traffic as well as that operating on the OTS and that operating outside the OTS showed that, in each case, the MNPS criterion for off-track errors of 30NM or more (5.3×10^{-4}) had been met. This data was therefore not presented graphically, but it is included in the tables shown below.

2.2.4 For off-track errors of 50-70NM error graphs have been prepared in which data is presented in two formats, i.e. one related to the sequential testing "accept" and "reject" lines and one related to the basic MNPS criterion and this for :

a) the total observed traffic; and

b) the observed traffic operating on the OTS.

These graphs are shown in Appendix C.

2.2.5 The following tables show the data which has been used in the preparation of the attached graphs:

a) Total observed traffic

Period of observation: 1 September 1979 to 31 August 1980
No. of observed flights: 69,998
No. of errors of 30NM or more: 27
Relevant MNPS criteria 37.1
No. of 50-70NM errors: (a) unweighted 12 (graphs C1 and C2)
(b) weighted 8 (graphs C3 and C4)
Relevant MNPS criterion 9.1

b) Observed traffic on OTS

Period of observation : 1 September 1979 to 31 August 1980
No. of observed flights: 52,500
No. of errors of 30NM or more :19
Relevant MNPS criteria: 27.8
No. of 50-70NM errors: (a) unweighted 6 (graphs C5 and C6)
(b) weighted 4.54(graphs C7 and C8)
Relevant MNPS criterion 6.8

2.2.6 As to the difference in numbers between "unweighted"* and "weighted"* errors shown in the above tables, these result from the fact that the "unweighted" errors show the number of observed errors without any application of a value regarding their operational significance derived from subsequent investigations into their causes and thus the proportion of time spent off-track by aircraft making such errors, while the "weighted " error figures more closely reflect this proportion. It was, however, pointed out that, if the "unweighted" error numbers were to be used for the formulation of an operational decision as to the action to be taken with regard to lateral separation, it was essential to take into account a number of relevant operational factors since otherwise any decision, based on the numbers of "unweighted" errors alone would not be realistic. A list of the relevant factors presented by the Member of the USA is shown in Appendix D.

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* Note : The terms "unweighted" and "weighted" are used to refer to methodologies which, in para. 1.7 of the Summary NAT/SPG are referred to as Models 1 and 2 respectively.

2.2.7 In this respect it was found that the somewhat diverging views regarding the suitability of applying a numerical weighting scheme to observe errors prior to their use for assessment within the agreed model continued to exist and it was therefore agreed that studies on this matter, aimed at its resolution should be continued with all due urgency by all parties concerned. It was, however, also made clear that, despite these differences, the same conclusions were reached by the use of either of the two methodologies i.e. with and without the application of a numerical weighting scheme. These differences in views in no way reflected on the safety aspects of the situation but were more related to the application of the model (see also para 2.3.2).

2.2.8 As to the question which type of observed traffic was likely to be most representative of the situation with regard to navigation performance, the Group agreed that, for the determination of the need to take contingency measures (see para. 2.4) the traffic listed in table 2.2.5b), i.e. the one operating in the OTS, should be chosen as the primary element.

2.2.9 Then, considering the results obtained from the assessment of observed errors, as reflected in para. 2.2.5 above, the Group agreed unanimously that Conclusion 17/1, formulated at NAT/SPG 17 with regard to the introduction of 60NM lateral separation between aircraft operating in the MNPS airspace of the NAT Region remained valid.

CONCLUSION SP/1 : APPLICATION OF 60NM LATERAL SEPARATION IN THE MNPS AIRSPACE OF THE NAT REGION

That Conclusion 17/1 of the 17 Meeting of the NAT/SPG proposing 30 October 1980 as the date of application of 60NM lateral separation in the MNPS airspace of the NAT Region, as approved by the Council of ICAO on 18 June 1980, remained valid.

2.2.10 Following this decision by the Group, it noted statements from the Representatives of both, IATA and IFALPA who indicated their full support for this Conclusion. In their support, they wished, however, also to draw attention to the need for continued efforts by all parties concerned to further improve the level of navigation performance now achieved in order not to jeopardize the success of this measure which had been the subject of long and strenuous efforts by many. IFALPA wished to stress in particular that the problems still caused by :

a) the operation of non-MNPS certified aircraft in MNPS airspace;

b) the faulty insertion of way-point information into on-board navigation equipment; and

c) the use of faulty and/or out-dated track messages in the planning and conduct of flight in the OTS;

should receive most careful attention by all parties concerned because of the possible consequences they could cause now that 60NM lateral spearation was actually applied.

2.2.11 Recalling that similar views had already been expressed earlier in the Meeting (para. 2.1.5 refers) the Group agreed that this should be stated in the form of a specific Conclusion.

CONCLUSION SP/2: MEASURES FOR THE CONTINUED IMPROVEMENT OF THE NAVIGATION PERFORMANCE BY FLIGHTS IN THE NAT REGION

That States and operators concerned take all necessary measures to ensure the continued improvement of the navigation performance by flights inthe NAT Region, especially as regards;

a) the elimination of flight operations in MNPS airspace by aircraft which are not certified for such operations;

b) the reduction to the absolute minimum of navigation errors caused by faulty insertion of way-point information into navigation equipment on board aircraft; and

c) the elimination of errors caused by the use of faulty and/or out-dated track messages for the planning and conduct of flights in the Organized Track System.

2.2.12 In this respect it was hoped that the revised version of the NAT MNPS Operations Manual, being distributed by the UK in accordance with Conclusion 17/4 of NAT/SPG 17, would assist materially in achieving this objective. It was also hoped that, when distributing this Summary to interested States and Organizations, the European Office of ICAO, in its cover letter, would draw particular attention to this aspect of the matter, together with any proposals it saw fit to make in order to obtain best possible results.

2.2.13 Finally, the Group noted that relevant NOTAMS Class II announcing the use of 60NM lateral separation under specified conditions had already been published or were about to be published by States concerned.

2.3 Review of methods used for the assessment

2.3.1 The UK Member presented to the Group two papers containing proposals for a further refinement of the method used for the assessment of navigation data as to its significance on the lateral separation applied in the NAT Region. These papers again stressed the need for the application of a weighting process to specific errors based on their subsequent investigation and possible consequences.

2.3.2 While the views expressed in these papers were strongly supported by the Member of the Netherlands and by the Representatives of IATA and IFALPA, discussion showed that the Member of the USA still had certain reservations as to the detailed method proposed by the UK Member. In addition the Representative of the USSR pointed out that he had, as yet, had insufficient time to develop his position on the UK proposals. It was therefore agreed that this matter should be further studied and be brought forward for a review in depth at NAT/SPG 18. In this context it was hoped that the Member of the USA would put forward his views fully prior to NAT/SPG 18.

2.4 Contingency plan regarding lateral separation

2.4.1 With the introduction of 60NM lateral separation in the MNPS airspace of the NAT Region, the Group felt that it would be advisable to develop more formal provisions covering the action which should be taken in case the navigation performance in the NAT Region dropped to a level where the use of 60NM lateral separation no longer met the agreed safety criteria .

2.4.2 In developing such provisions the Group was however aware of the fact that it would not be possible to cover all imaginable cases and that it could only concentrate its attention on the most likely causes for deterioration, it being understood that cases not covered by its provisions would have to be resolved on an ad hoc basis by parties concerned using their best judgement and the high sense of responsibility which had already been shown in the past by States and operators concerned.

2.4.3 As to cases for which provisions should be developed, the Group agreed that these could be divided into the following broad categories:

a) deteriorations in navigation performance which can be attributed to specific causes; and

b) deteriorations of a general nature.

Specific causes

2.4.4 With respect to a) above the Group believed that, based on past experience, only two cases could be envisaged :

a) potential or observed navigation errors due to a significant loss of navigation guidance provided by long-range station referenced navigation systems; and

b) an abnormally large number of errors caused by a single operator.

In case of a) above, it was assumed that States of Registry would immediately become aware of such a situation and would, as a consequence, take action to ensure that operators relying on long-range station-referenced navigation systems as their primary means of navigation would limit their operations to flights outside the MNPS airspace and/or via routings which permitted the use of other navigation means(routings via Iceland and Greenland based on the use of short-range navigation aids).

2.4.5 In this respect the Group noted that, in the USA, measures were being taken to provide improved OMEGA/VLF performance monitoring and that, once these measures were completed, the USA was prepared to improve the NOTAM service covering significant changes in the operation of these facilities.

2.4.6 The Group agreed that in such a case, lateral separation would not need to be increased as a matter of principle.

2.4.7 As to the case described in para. 2.4.4 b) it was felt that this would not occur as a sudden event but would rather be the product of an observable trend. It was therefore believed that, in this case, the operator concerned and its State of Registry would be informed of the situation, together with a request that appropriate corrective action, including temporary suspension of flight operations in MNPS airspace, would be taken. Only in the unlikely event that both the operator and its State of Registry failed to respond to such a request would it be necessary to consider a general increase in lateral separation, provided it was found that the number of errors accrued by the operator in question affected theoverall safety. This extreme action would, however, be the subject of direct consultations between the provider States concerned and the operator as well as its State of Registry.

General causes

2.4.8 With respect to a deterioration of the navigation performance covering a large number of operations and which cannot be attributed to any of the specific cases mentioned above, the Group believed that, to cope with such a situation, it would be necessary to :

a) determine the level at which an increase in separation will have to be envisaged;

b) determine the conditions under which, after restoration of a normal situation, the increase in separation can be abolished; and

c) specify the type of measures which should be taken regarding an increase in lateral separation.

2.4.9 As to a) above, the Group agreed the following:

If in any sample of six months monitored traffic, the assessed lateral errors off track between 50 and 70NM in the most recent period have exceeded this MNPS criterion by more than a factor of 2 and specific corrective action does not appear feasible, the monitoring agency, after urgent consultation with all ATC provider States concerned shall take action to increase the lateral separation in the MNPS airspace by applying the measures described in para. 2.4.11. In addition, ICAO shall be informed of the situation.

2.4.10 As to the restoration of normal lateral separation (para. 2.4.8b) refers) this should be done in accordance with the following provision:

Application of the previously used lateral separation shall only be restored when a sample of at least 25000 flights in MNPS airspace has shown that the MNPS criterion in question is again being met. The restoration shall be subject to agreement by the NAT/SPG and ICAO shall be informed accordingly.

2.4.11 In case lateral separation has to be increased in accordance with the provision in para. 2.4.9, this shall be done in accordance with the following:

As a first step, lateral separation throughout the MNPS airspace will be increased to 120NM. This will be followed by the use of composite separation, consisting of 60NM lateral combined with 1000 feet vertical separation, within the OTS in MNPS airspace as soon as OAC's concerned are able to revert to the use of this type of separation. In the remainder of the MNPS airspace, 120NM lateral separation will continue to apply.

2.4.12 In taking the above action, the Group was aware that an immediate reversion to the use of composite separation may not be possible because of problems which could be caused in the transition areas on either side of the North Atlantic. It was also aware that, the longer the period was before such a measure had to be applied, the bigger might be the difficulties with the application of the above measures because of changes in the overall environment which may have taken place in the meantime and which affected the ATC situation. It was therefore agreed that the provisions in para. 2.4.11 should be reviewed and, if necessary, up-dated in the light of circumstances not later than in 1983.

2.4.13 It was also agreed that, as a temporary measure, the OAC Chiefs should discuss detailed application measures at their forthcoming meeting and that, in case of need, appropriate measures should be used until such time as more permanent provisions have been developed by NAT/SPG 18.

2.5 Proposals by the USA for the Amendment of the NAT RAC SUPPs on lateral separation in the New York Oceanic OCA.

2.5.1 The Member of the USA informed the Group that the application of 60NM lateral separation in the MNPS airspace was likely to give considerable problems to New York OCA because, for certain flights, controllers were required to apply up to 3 different lateral separation minima, depending on the portion of the New York OCA wherein they were operating in the course of one single flight.

2.5.2 He therefore informed the Group that his Administration intended to present to ICAO a formal proposal of amendment to the relevant NAT RAC SUPPs as follows :

That para. 2.1.1 b) on page RAC 1-1 as amended by Amendment 154 to Doc 7030, be replaced by the following new para. :

"2.1.1

b) 60NM between aircraft which meet the MNPS and which i) operate within the MNPS airspace, or ii) while operating in the New York oceanic control area at flight levels contained within the vertical limits of the MNPS airspace, are in transit to or from this airspace;"

2.5.3 The Group agreed to this proposal and left it to its Member of the USA to ensure that it would be presented formally to ICAO as soon as possible.

2.5.4 In the course of discussions on this subject, it was also noted that similar difficulties could arise in the New York OCA with regard to the provisions concerning the application of 90 NM lateral separation. Initial discussions seemed to indicate that these problems could be overcome if, instead of the provisions in the NAT RAC SUPPs governing this question (paras 2.1.1 c) i) and ii) refer), arrangements were made to permit New York OAC to use 90NM lateral separation in the area outside the MNPS airspace and situated West of 60° West.

2.5.5 As it was, however, not possible in the time available, to review this matter in the desired detail, it was agreed to leave it at this time to further study by all parties concerned, on the understanding that it would be formally raised once these studies had been completed.

2.6 Planned round-the-world flight by a manned balloon

2.6.1 The Group was informed that plans were being made to conduct a manned balloon flight around the world sometime in Spring 1981 and that it was planned to conduct that portion of the flight crossing the NAT Region so that, to achieve optimum flight progress, maximum advantage could be taken of Jet-streams which, as experience has shown, generally occur in the height band between FL310 and 350.

2.6.2 In the discussion of this matter, the group found it appropriate to express its growing concern over the fact that in recent times there was a growing tendency of conducting activities in the NAT Region which tended to interfere with the normal flight operations in that area, thus upsetting a carefully balanced transport system and imposing on both users and operators additional efforts and possible economic penalties. The Group believed that in these difficult times, this presented unwarranted additional complications for those engaged in providing a vital link across the North Atlantic which did not appear to be warranted when related to the benefits likely to be accrued from these more or less spectacular activities which, when conducted as record-breaking attempts, generally resulted in further attempts within shorter or longer intervals.

2.6.3 With regard to the specific case of the manned balloon flight in question, the Group therefore was in agreement that, if at all possible, its initiators should be discouraged from this undertaking, at least as far as flight accross the NAT Region was concerned and, should this not be possible, States concerned, and more especially the State of Registry of the balloon should at least ensure that, in the NAT Region, the flight was definitely restricted to operating outside the MNPS airspace.

2.7 Any other business

2.7.1 Use of the Mach number technique for longitudinal separation

Under this item, the Member of the UK recalled that, at previous NAT/SPG Meetings when discussing longitudinal separation, he had informed the Group that Shanwick OAC was using a procedure whereby, on entry into the NAT Region a multiple of 4 minutes was added to the separation minimum between successive aircraft, operating along the same track and at the same level and bound for points in North America, for each 0.01 Mach by which the Mach Number of the succeeding aircraft was higher than that of the preceding one (i.e. 15 + 4 = 19 minutes if the preceding aircraft operated at Mach 0.82 and the succeding one at Mach 0.83).

2.7.2 Experience with the use of this rule-of-thumb had now shown that this resulted in excessive longitudinal separation on exit from the NAT Region of the flights concerned and was therefore wasteful in terms of capacity of the ATC system, apart from the fact that it could also result in fuel penalties to the succeeding flight.

2.7.3 The Member of the UK therefore informed the Group that it was intended to change the rule so that, for any difference in Mach of 0.01 only a multiple of 3 minutes be added to the minimum longitudinal separation at entry and this was agreed by the Group.

Departure of participants in NAT/SPG Meeting

2.7.4 Though the Group in its existence had seen the departure of many who had participated in its activities, it had generally refrained from putting such events on record. However on the occasion of the departure of Fred Moore and Pat Reynolds, the Group wanted to express its appreciation for the valuable assistance they had provided to the Group during difficult times and the unwavering enthousiasm they had shown for its objectives.

ATTENDANCE LIST

CANADA

Gilles Foy
L.J. Desmarais
J.D. Lyon
D.R. Mair
K.J. McDonald
W.E. Payn
L.Hugh Saunders
Ray Taylor

DENMARK

Niels Boserup Olsen

FRANCE

D. Thouvignon

IRELAND

R. Howley

NETHERLANDS, KINGDOM OF THE

J.G. Ten Velden
A. Pool

PORTUGAL

Joao Sequeira
M.C. de Brito
J. Dias

SPAIN

J.M. Fonseca

UNION OF SOVIET SOCIALIST REPUBLICS

I. Fedorov
M. Boltalin
J. Romanenko
P. Vlassov

UNITED KINGDOM

Alan White
Roger Croxford
Gordon Limbrick
Graham Stamp

UNITED STATES

John Matt
Allen Busch
Kenneth L. Fisher
J. Roger Fleming
Eugene L. Parker
Howard Rubenstein

IATA

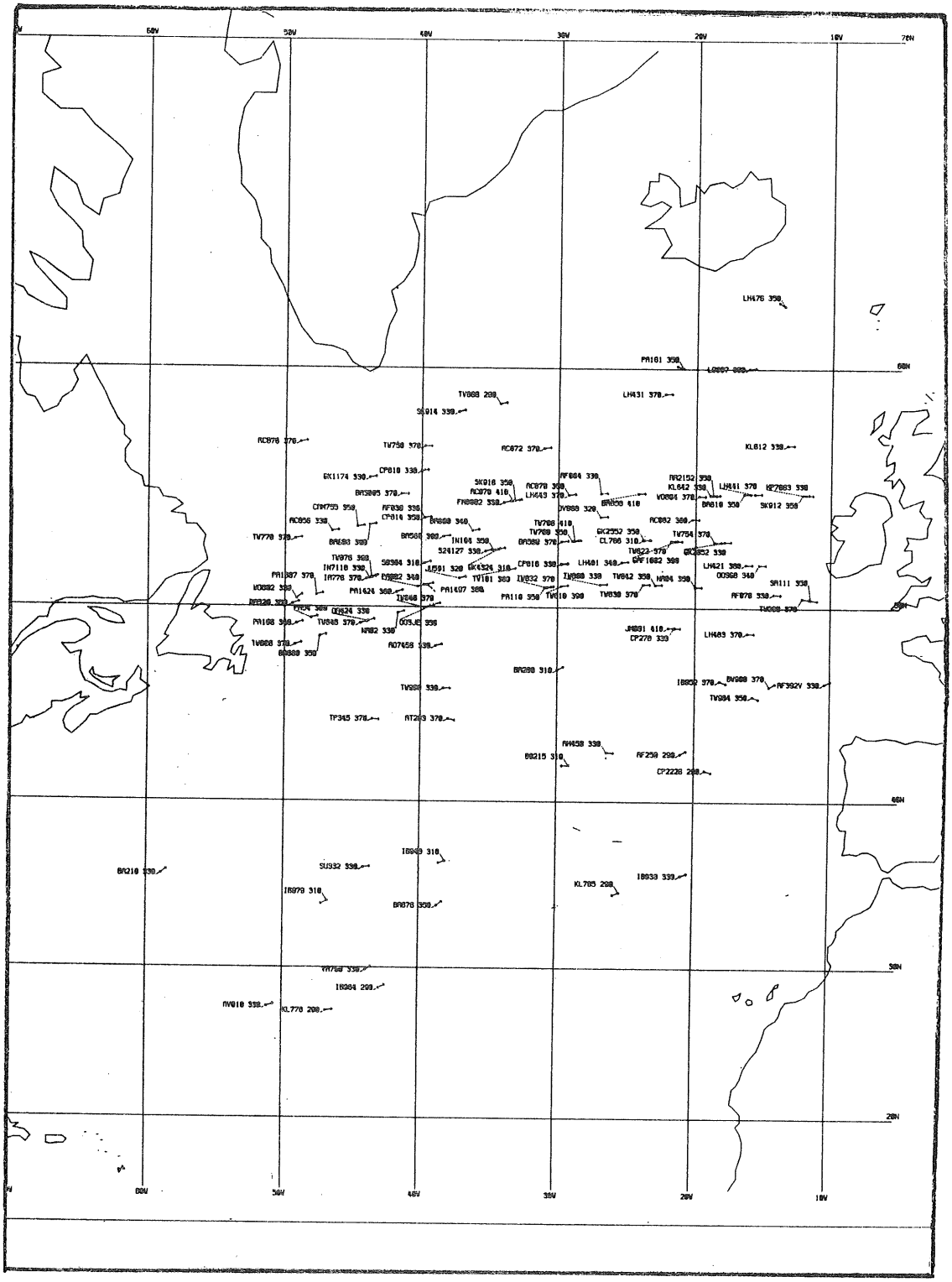
John Hardonk
N.F.J. Heath
Lincoln Lee
Ron Peel

IFALPA

Harry Gallagher

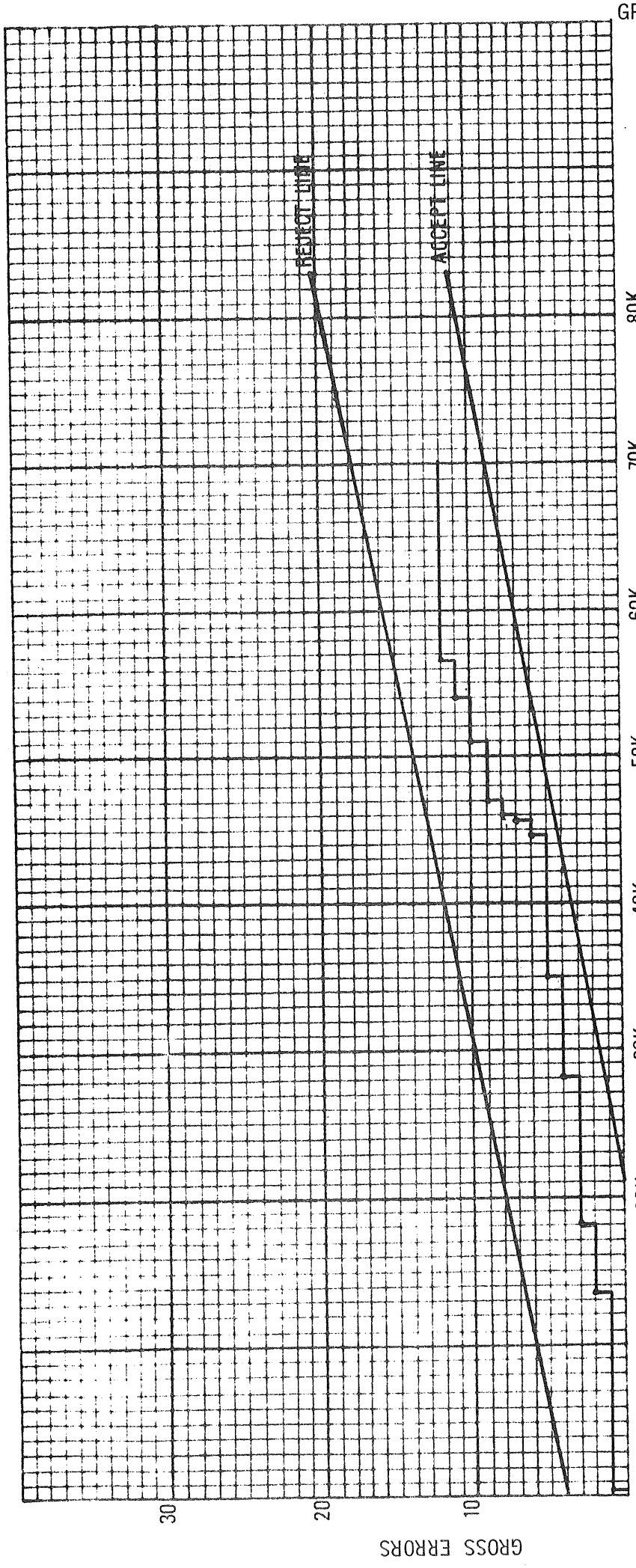
APPENDIX B

TYPICAL TRAFFIC SITUATION IN THE NAT REGION



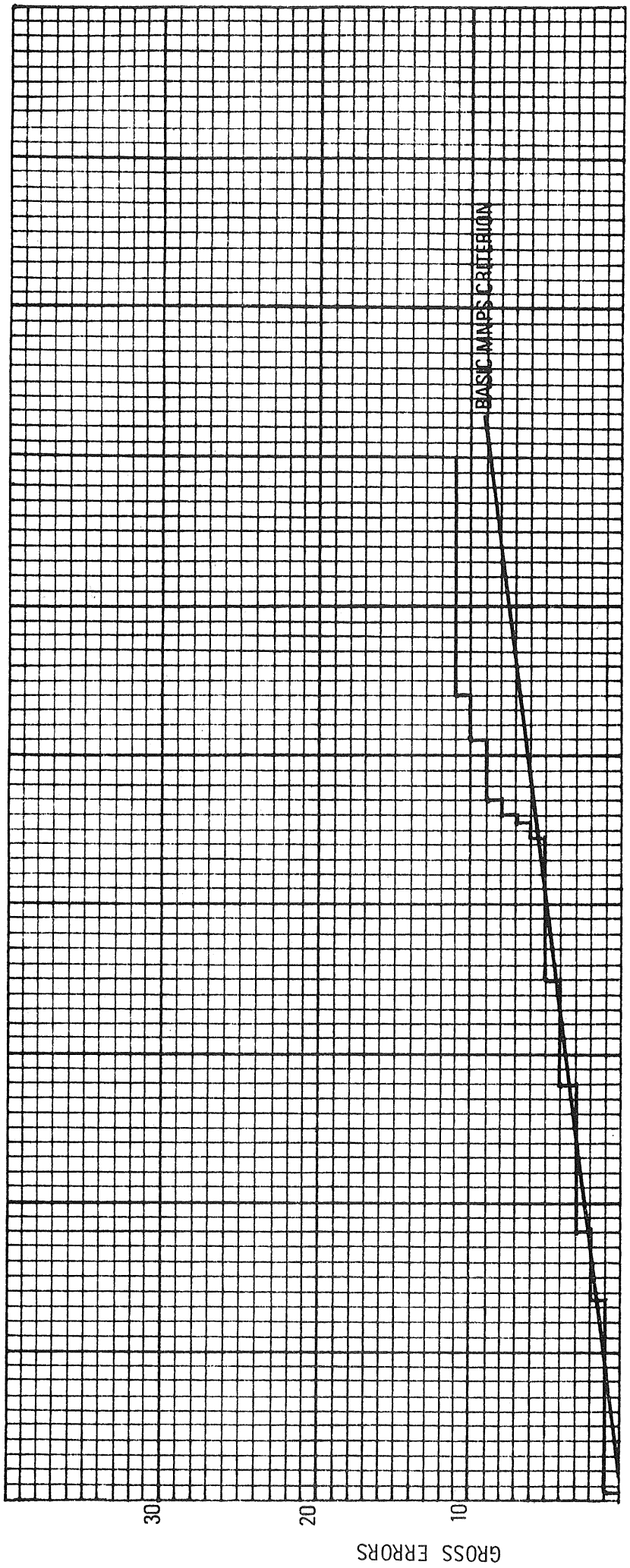
APPENDIX C
GRAPH C-1

TOTAL NUMBER OF OBSERVATIONS FROM 1/9/79 TO 31/8/80



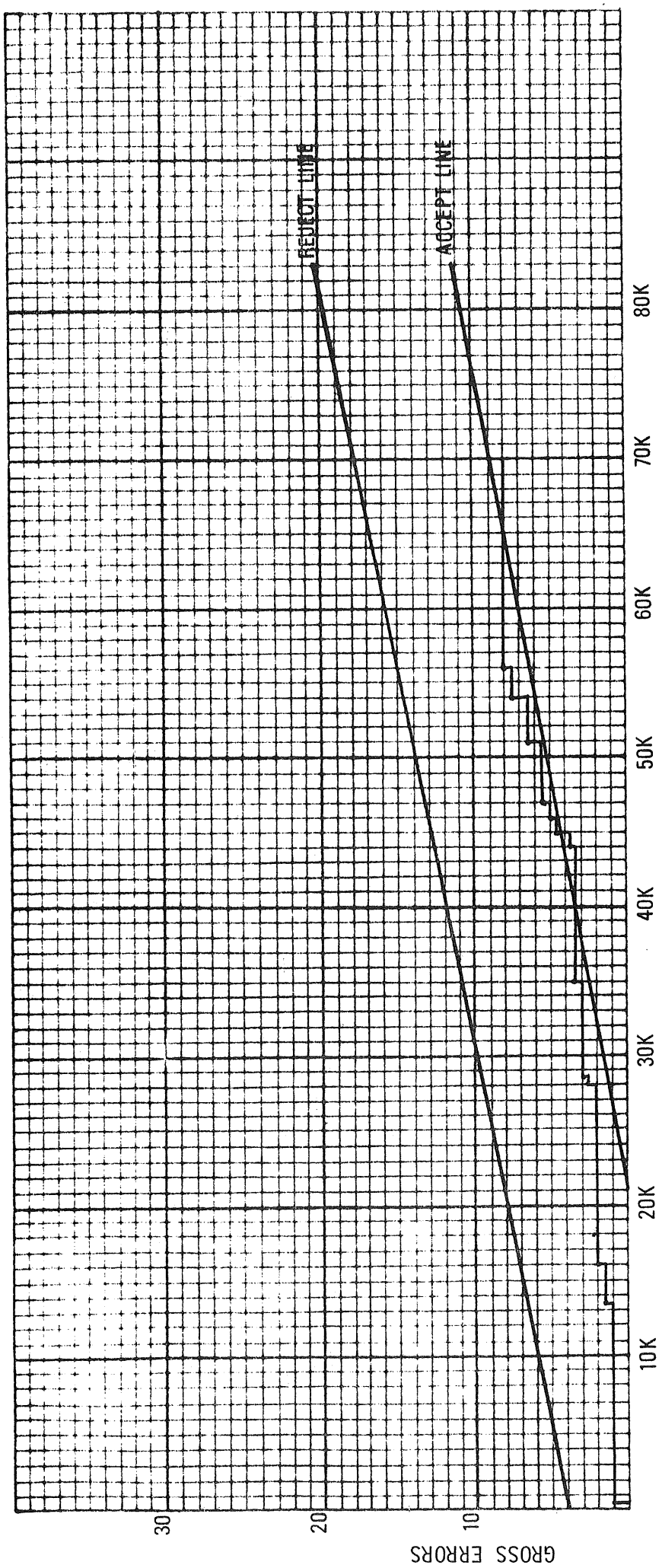
APPENDIX C
GRAPH C-2

TOTAL NUMBER OF OBSERVATIONS FROM 1/9/79 TO 31/8/80



APPENDIX C
GRAPH C-3

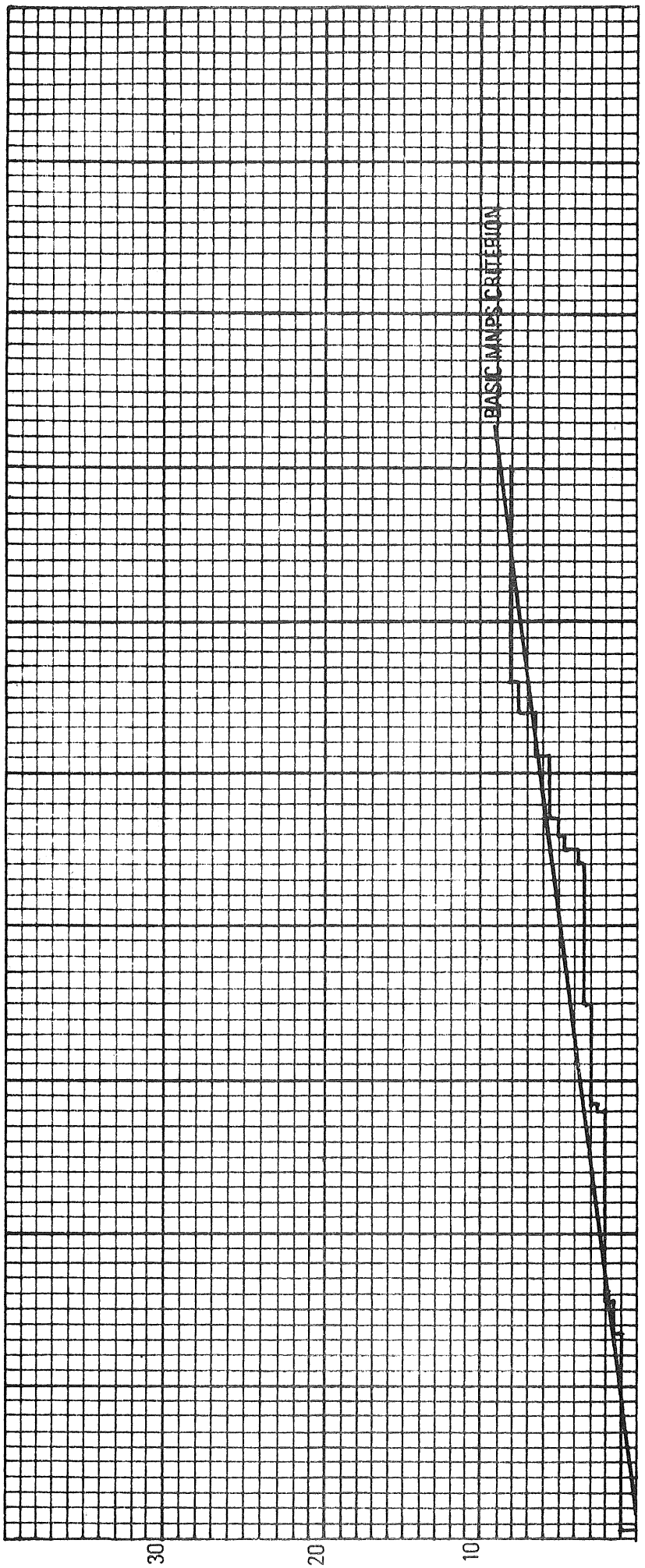
TOTAL NUMBER OF OBSERVATIONS FROM 1/9/79 TO 31/8/80



APPENDIX C

GRAPH C-4

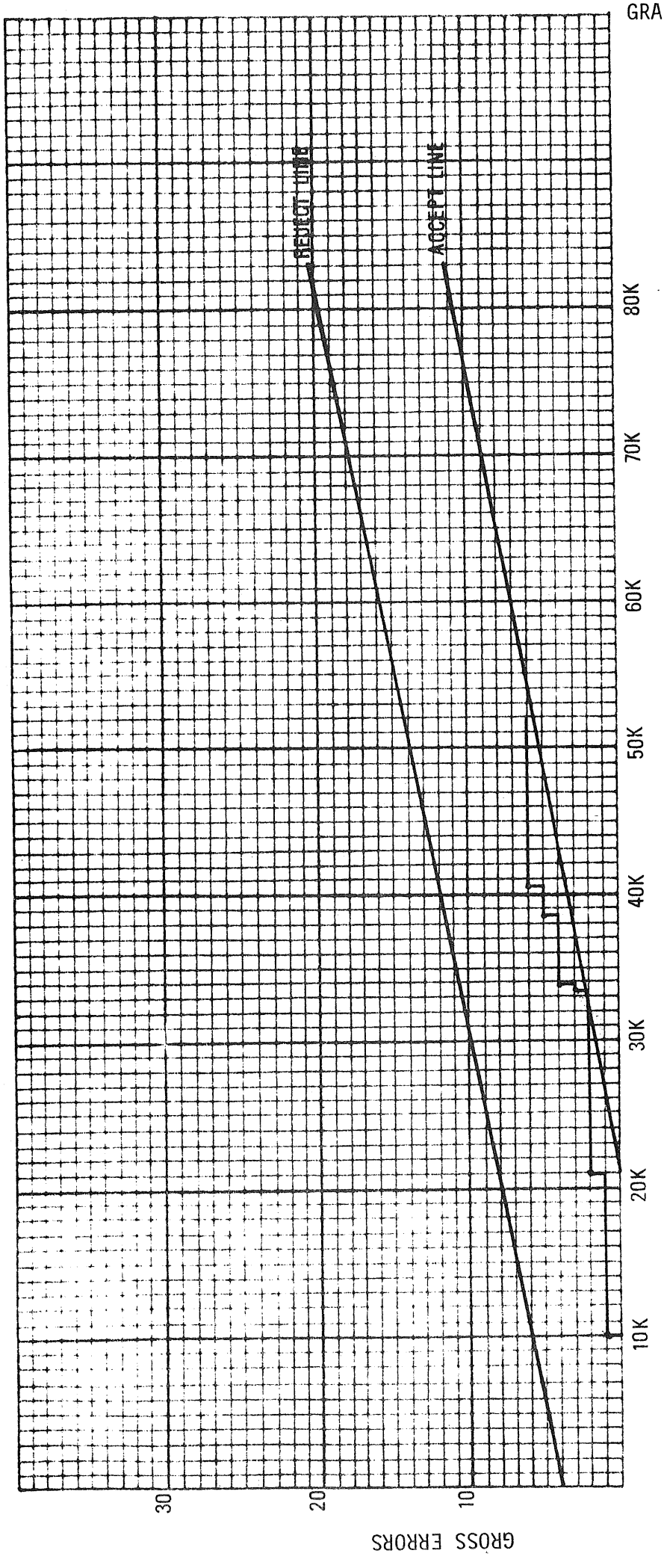
TOTAL NUMBER OF OBSERVATIONS FROM 1/9/79 TO 31/8/80



APPENDIX C

GRAPH C-5

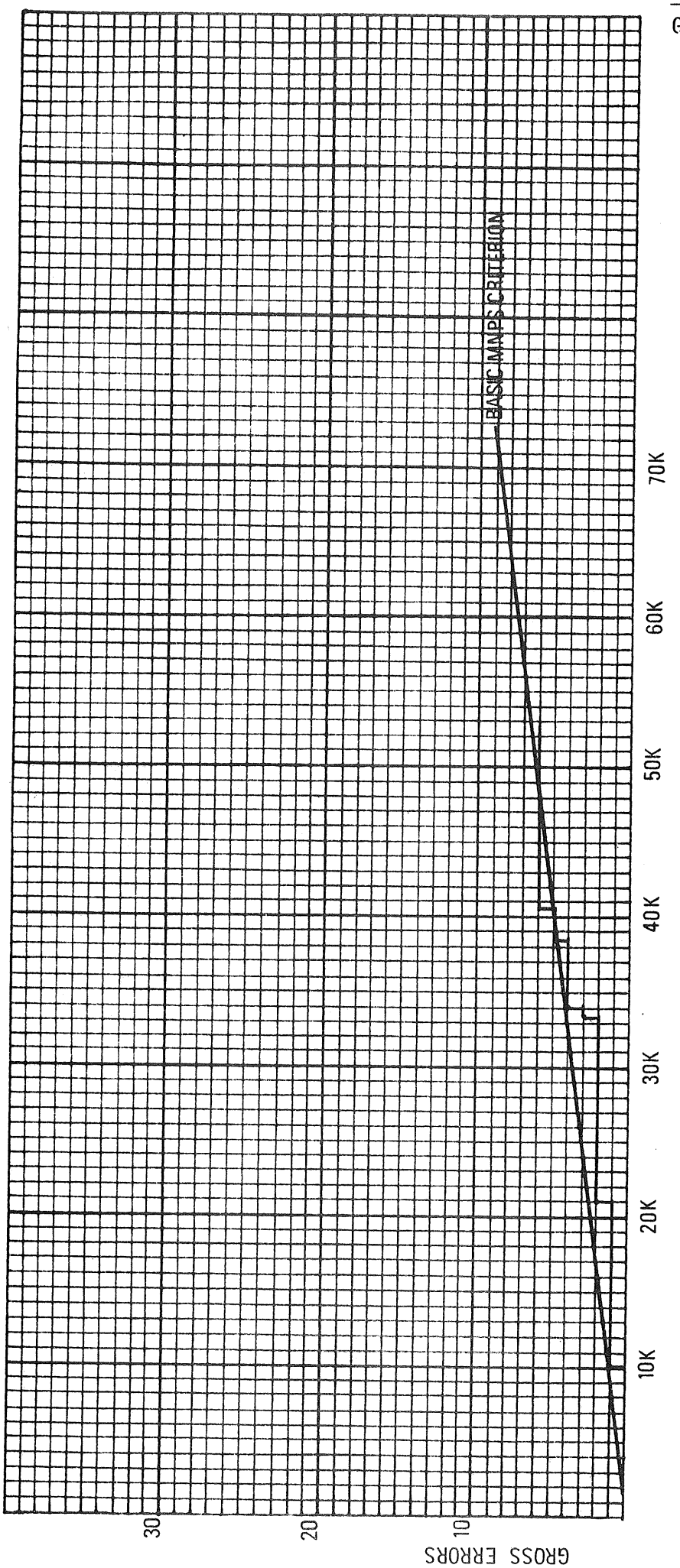
TOTAL NUMBER OF OBSERVAIONS FROM 1/9/79 TO 31/8/80



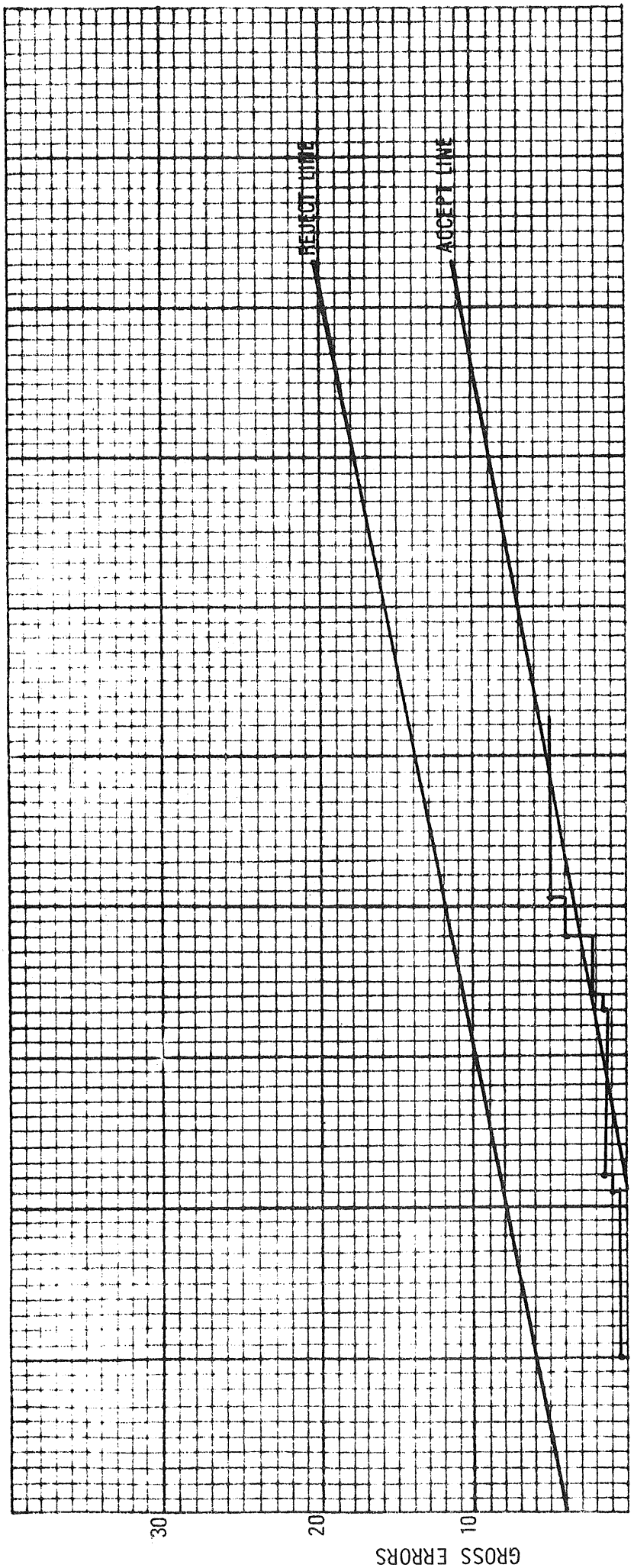
APPENDIX 6

GRAPH C-6

TOTAL NUMBER OF OBSERVATIONS FROM 1/9/79 TO 31/8/80



TOTAL NUMBER OF OBSERVATIONS FROM 1/9/79 TO 31/8/80



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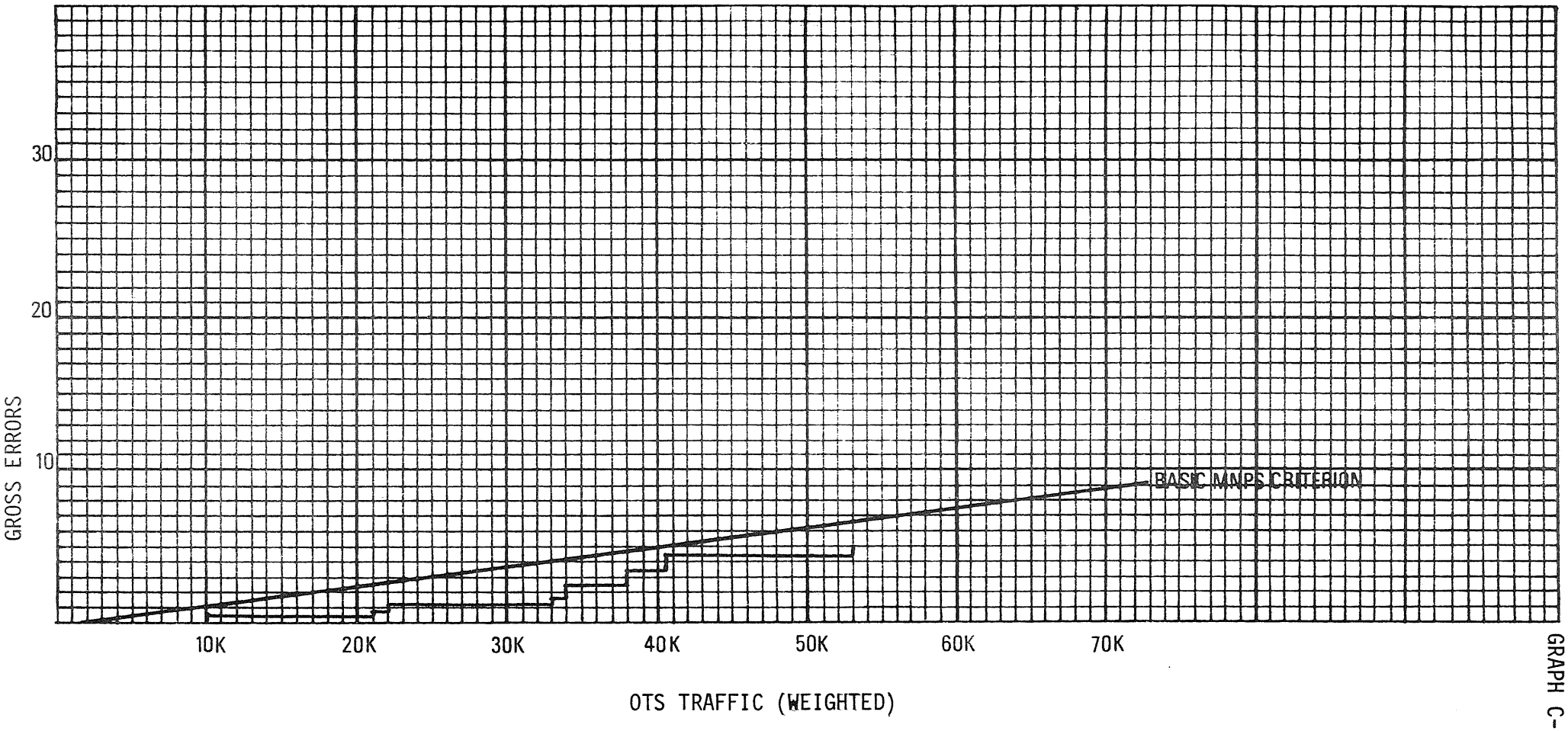

APPENDIX C
GRAPH C-8

List of operationally relevant factors to be considered when making an operational decision regarding lateral separation

a. The trend of navigation performance.

b. Estimated efficacy of corrective actions by operators, appropriate ATS authorities and State of Registry.

c. The effects of differences in estimated versus actual NAT traffic figures, since the degree of system saturation affects risk.

d. The effects of controller intervention. The new NAT position reporting procedure and revised enroute progress monitoring procedures at oceanic centers have been implemented, and should have the effect of reducing risk.

e. Some possible conservatism in the mathematical model as it involves risk caused by "waypoint blunders".

f. Continuing educational processes involving aircrews, operators and air traffic control personnel, primarily involving precautionary procedures.

g. Changes in the air traffic control procedures.

h. Possible additional improvements in flight deck procedures.