

NRC Publications Archive Archives des publications du CNRC

A possible early-warning fence across the North Atlantic Rettie, R. S.

For the publisher's version, please access the DOI link below. / Pour consulter la version de l'éditeur, utilisez le lien DOI ci-dessous.

Publisher's version / Version de l'éditeur:

<https://doi.org/10.4224/21273102>

Report (National Research Council of Canada. Radio and Electrical Engineering Division : ERB); no. ERB-299, 1953

NRC Publications Archive Record / Notice des Archives des publications du CNRC :

<https://nrc-publications.canada.ca/eng/view/object/?id=ef222093-53bd-45e9-b976-e3f6ab7d0dc5>

<https://publications-cnrc.canada.ca/fra/voir/objet/?id=ef222093-53bd-45e9-b976-e3f6ab7d0dc5>

Access and use of this website and the material on it are subject to the Terms and Conditions set forth at

<https://nrc-publications.canada.ca/eng/copyright>

READ THESE TERMS AND CONDITIONS CAREFULLY BEFORE USING THIS WEBSITE.

L'accès à ce site Web et l'utilisation de son contenu sont assujettis aux conditions présentées dans le site

<https://publications-cnrc.canada.ca/fra/droits>

LISEZ CES CONDITIONS ATTENTIVEMENT AVANT D'UTILISER CE SITE WEB.

Questions? Contact the NRC Publications Archive team at

PublicationsArchive-ArchivesPublications@nrc-cnrc.gc.ca. If you wish to email the authors directly, please see the first page of the publication for their contact information.

Vous avez des questions? Nous pouvons vous aider. Pour communiquer directement avec un auteur, consultez la première page de la revue dans laquelle son article a été publié afin de trouver ses coordonnées. Si vous n'arrivez pas à les repérer, communiquez avec nous à PublicationsArchive-ArchivesPublications@nrc-cnrc.gc.ca.

Ser
QC1
N21

ERB

259

SECRET

ERB-299

SECRET

26295

A Possible Early-Warning Fence Across the North
Atlantic

ANALYZED

R.S. Rettie-

CANADA INSTITUTE FOR S.T.I.
N.R.C.C.

MAY 16 1995

INSTITUT CANADIEN DE S.T.I.
C.N.R.C.

ON LOAN

from
National Research Council
Radio & E.E. Division
Document Control Section

Declassified to
OPEN

ORIGINAL SIGNED BY
ORIGINAL SIGNED PAR
J.Y. Wang

Authority

Date: 03/01/21

1985

NRC # 21914

A Possible Early-Warning Fence Across the North Atlantic

by H. S. Rettie

1. There have been various proposals or requirements made for AEW (Airborne Early Warning) patrols to be established across the north-eastern and north-western ocean approaches to the North American continent. Examples may be found in various reports of Projects Charles and Lincoln.
2. An interesting proposal for Trans-Atlantic television relay has also appeared (Tele-Tech. II, 8, p.33, August 1952) and a copy is attached to this report. VHF and microwave relays are suggested running up the Labrador coast, overwater to Greenland, up the east coast of Greenland, overwater to Iceland, across Iceland, overwater to the Faroes Islands and again to the Shetland Islands, and then south towards London. Microwave links are proposed for the end sections and VHF links from Labrador to the Shetlands. The longest overwater link suggested is less than 300 miles and very high altitude terminals are available, ranging from 1500 feet (Shetlands) through 2900 feet (Faroes), 7000 and 3000 feet (Iceland) to 9000 or 10000 feet (Greenland) and 7000 feet (Baffin Island).
3. It seems that in some of the overland and overwater links the McGill Early Warning Fence equipment might be used effectively. It would serve a dual purpose in providing both early warning information and a communication system. If required, standard radars at the terminals of the links could give good coverage out to about 100 miles and the McGill system would supplement this by closing the gaps between radar coverages so that good low elevation performance could be realized throughout. While it is not suggested that the system should offer additional facilities, it should be noted that it could carry, if necessary, other communication channels including television.
4. The present McGill system now has a transmitter power of about 50 watts operating at 600 mc/s. and is designed to operate over 30 or 40 miles only. Sufficient data is not yet available to enable an estimate to be made of the increase in size of the equipment needed to give operation over a 300 mile path. It is however known that the chief limitation of the system as it now stands is the transmission of a reference signal while there appear to be adequate safety factors as far as the aircraft reflected signals are concerned. Elevated terminals would therefore allow a large increase in possible length of link to 50 or 75 miles, with the same transmitter power and frequency. With the elevations mentioned above and a link length of 300 miles, it is also apparent that a reduction in frequency from 600 to 100 or 150 mc/s. would be useful in that more advantage could be taken of diffraction around the curve of the earth. If this change were made while keeping the antenna gains constant, a guess at the necessary transmitter power to give aircraft reflections would be 500 or 1000 watts. Certainly if good quality television signals

SECRET

- 2 -

can be provided over such links, the necessary reference signal for the McGill fence would be available. It is unlikely that ships would give recognizable signals due to their slow speeds.

5. In addition to the usual difficulties of installation, manning and supply, there are certain unknown technical factors which might make this proposal unworkable. These include auroral reflections which would be expected at frequencies of the order of 100 mc/s. It would probably be necessary to have operators attend these long links and their presence would help to avoid this trouble and might even allow the use of still lower frequencies. Another difficulty about which we have practically no knowledge, is whether or not such a long path has sufficient short term stability to allow the sorting out of very low frequency aircraft signals. Atmospheric variations and multi-path effects would be cumulative and while they might be ignored over a 30 mile link, they might be very troublesome over 300 miles.

6. An additional possibility would be the use of weather ships or even unattended packaged transmitters established midway on the long links. To replace these latter items occasionally after storm or enemy damage would probably be less expensive than AEW.

7. It appears that the possibility of using VHF fence-type links as an alternative to AEW patrols on the north-east rn approaches is worthy of detailed consideration. Practical experiments might be well worth-while, operating for example between Gaspe and P.E.I. or Cape Breton, and between Cape Breton and Newfoundland.

TELE-TECH

RADIO-TELEVISION-ELECTRONIC INDUSTRIES

O. H. CALDWELL, Editorial Director ★ M. CLEMENTS, Publisher ★ 480 Lexington Ave., New York (17) N. Y.

Let's Get Action on **TRANS-ATLANTIC TV!**

To the President,
The White House, Washington, D. C.

Dear Mr. President:

Right now, TV networks link practically every TV station in the United States. And this month, Canadian and Mexican transmitters are to be added to the American continental system.

Next step in TV networking obviously must be to Europe and South America.

Many methods for trans-ocean TV have been proposed and discussed:

1. Airplane-relay between a dozen or more express planes continuously flying a regular route across the ocean.
2. "Stratovision-relay" between "stationed" planes flying in circles over a series of flat-top carriers suitably spaced at ocean intervals.
3. A microwave and VHF relay chain up the Labrador coast, across Greenland and Iceland to the British Isles.
4. A submarine cable using new coaxial techniques and employing transistors to reduce current drain of the many repeaters required.
5. Long-distance "scatter" transmission, offering possibilities with increase of transmitter power.
6. Miscellaneous marginal proposals, including moon reflections during limited (5-hour) periods at varying times.

But even with a standard US TV signal delivered across the Atlantic at adequate level, another set of difficulties arises from the differences in video specifications "over there." Our 525-line picture would have to

be converted—for England, 405 lines; Holland, Denmark and Germany, 625 lines; Belgium, 819 lines; and France, 441 and 819 lines.

Yet all these baffling difficulties undoubtedly will be overcome, when the tremendous significance of trans-Atlantic TV is fully appreciated. Not only will the great news events of Europe be brought "live" into 20 million American homes, but the underprivileged of Europe can be shown the wonderful richness of life in America, our great cities, our comfortable modern homes and farms, our bulging food stores, our labor-saving devices, our modern factories with ideal working conditions, our freedoms for all individuals.

Surely trans-Atlantic TV will work new miracles of world understanding and better appreciation of American ideals. In addition to the "Voice of America," we shall be able to give them "The View of America."

To speed up this interchange of television programs across the Atlantic, we urge that you, your Secretary of State, or your White House Telecommunications Adviser, the eminently qualified Haraden Pratt, immediately appoint a technical committee to investigate the feasibility and cost of such a TV over-ocean link, and report to the President and Congress the funds and methods needed to get fast action on Trans-Atlantic TV.

Publishers, TELE-TECH

