DEFENSE INTELLIGENCE INFORMATION REPORT

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(Classification and Control Markings)

1. COUNTRY: AUSTRALIA, GREAT BRITAIN, GUAM, AND NEW GUINEA
2. SUBJECT: (U) Submerged Repeater for the Commonwealth 160 Circuit Cable
3. IDC NUMBER:
4. DATE OF INFORMATION: 1966
5. PLACE AND DATE OF ACQ: Frankfurt/M, W. Germany Mar 66
6. EVALUATION: SOURCE B INFORMATION 2
7. SOURCE: Volume 41, Number 1 issue of Electrical Communication 1966
8. REPORT NUMBER: 2 252 0234 66
9. DATE OF REPORT: 14 APR 1966
10. NO. OF PAGES: 2
11. REFERENCES: DIRM 302e
12. ORIGINATOR: [redacted]
13. PREPARED BY: [redacted]
14. APPROVING AUTHORITY: [redacted]

BUSC 552 (b) (1)

15. SUMMARY: (U) Report forwards an article written by W.J. Archibald, D.M. Dawidzuik, and J.F. Tilley from Standard Telephone & Cable Ltd., (STC) London, England. The article, which appeared in Volume 41 Number 1 1966 issue of Electrical Communication, describes the repeaters designed for use in the submarine cable system from Cairns, Australia to Madang, New Guinea and from Madang to Guam. These repeaters are for a system providing 160 telephone channels spaced at 3 Kc/s.

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REPORT: 1. (U) Enclosure 1 is an article which appeared in Volume 41, Number 1, 1966 issue of Electrical Communication. The article, written by W.J. Archibald, D.M. Dawidzuik, and J.F. Tilley from Standard Telephones & Cable Ltd. (STC), describes the repeaters designed for use in the submarine cable system from Cairns, Australia to Madang, New Guinea and from Madang to Guam. These repeaters are for a system providing 160 telephone channels spaced at 3 Kc/s. In addition to a description of the repeaters used in this circuit, it contains a block diagram of a repeater and the system frequency spectrum, various charts and graphs, and photographs of the repeater. In their conclusions to the article the authors state, "A 160-circuit submerged repeater has been developed as a replacement for the 120-circuit repeater for certain sections of the Commonwealth cable. By the choice of a frequency spectrum providing economic use of the bandwidth, all the components used, including

16. DISTRIBUTION BY ORIGINATOR:

17. DOWNGRADING DATA:
GRUP-3
Downgraded at 12 year intervals; not automatically declassified

18. ENCLOSURE DATA:
1 Enclosure:
(U) Article, "Submerged Repeater for the Commonwealth 160-Circuit Cable", in English, 1 cy, 10 pg.

REQUEST ATTACHMENT FROM DIAAP-1H2

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quartz crystals, are of types fully proved in the 80-circuit Commonwealth cable repeaters. It was thus possible to develop a reliable repeater in the relatively short period of seven months in accordance with the overall procurement schedule.

The Transmission Performance of the repeater meets the requirements for a 3000-nautical mile (5560-kilometre) system. However, the present design limits the maximum system length because of the 6.25 kilovolt rating of the capacitors used in the power-separating filters and the number of available supervisory carrier frequencies.

The 6.25-kilovolt capacitors, the repeater voltage drop of 86 volts, and the cable-section voltage drop of 21 volts limit the system to 117 repeaters. Under this condition the operating voltage supplied from each terminal would be 6.25 kilovolts.

The 9 kilohertz bandwidth allocated to the supervisory carrier band provides sufficient carrier frequencies for making loop gain and noise measurements on any one of up to 120 repeaters. Some carrier frequencies must of course be reserved for spare repeaters and for supervisory units at the shore-based terminals; consequently the supervisory requirement limits the system to 110 repeaters. Since the overall mean repeater spacing is 16.2 nautical miles (30.0 kilometres), the maximum route length of the present design is 1780 nautical miles (3297 kilometres). For routes up to 3000 nautical miles (5560 kilometres) higher-voltage power-separating filters and an extended supervisory system are employed.

System-noise calculations based on the measured values of amplifier noise and harmonics indicate that, provided the misalignments are kept within the allocated limits, the system noise averaged over all channels should meet the figure of 1 picowatt per kilometre, which is some 4.8 decibels below the figure of 3 picowatts per kilometre recommended by the International Telegraph and Telephone Consultative Committee."

2. (U) Short Biographies of the authors are included with the article.

COMMENTS: (U) This report is regraded UNCLASSIFIED when all references to the reporting unit are deleted.