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LOW PROFILE ANTENNA PERFORMANCE STUDY
PART III: BIBLIOGRAPHY

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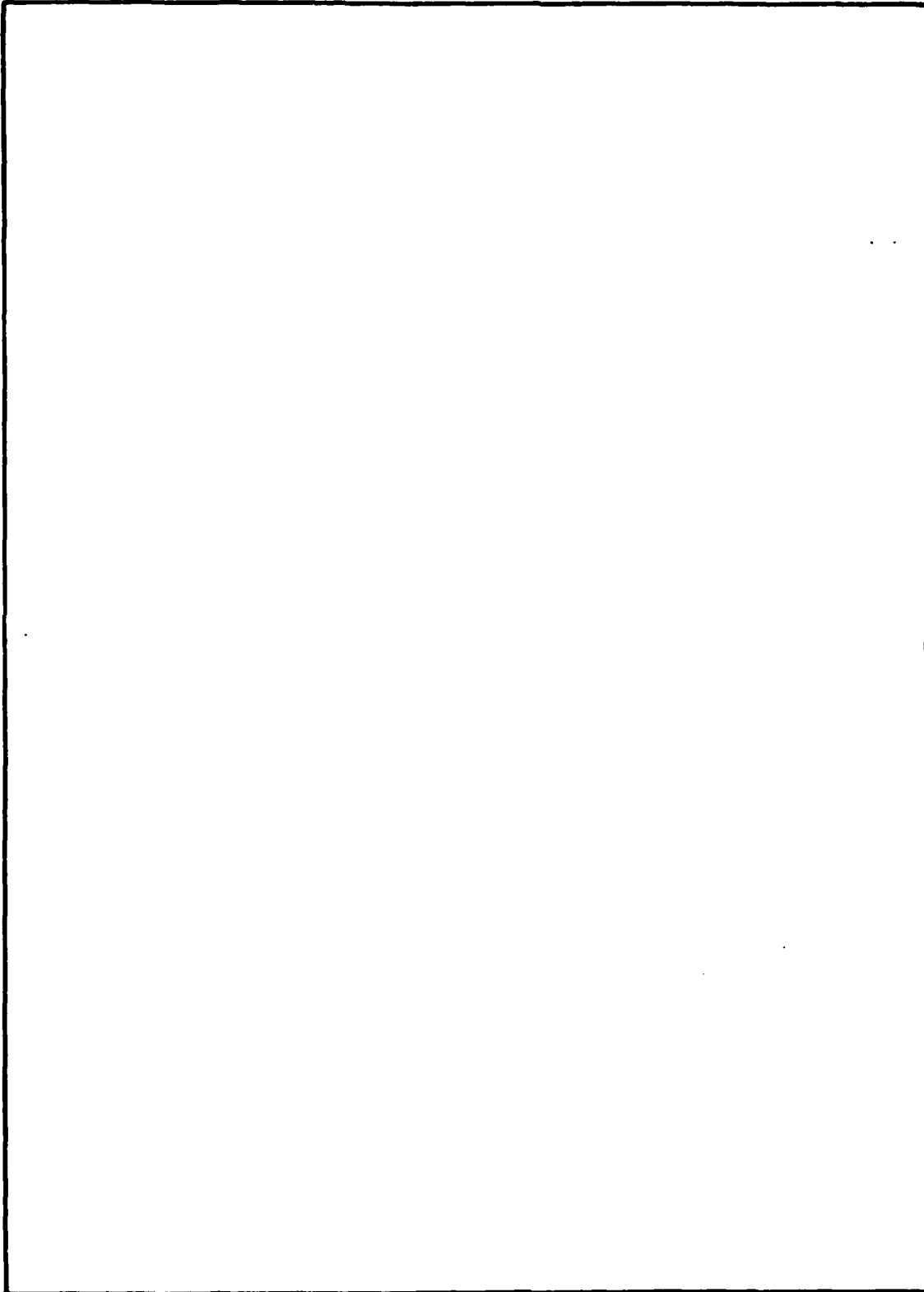
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| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report contains an extensive bibliography of information on the analysis, design, and experimentation of small antennas aimed at improving bandwidth and efficiency. The report also contains a tabular summary of the bandwidth of various small antennas which have been reported in the literature. This report forms the third part of a three part series of reports entitled, "Low-Profile Antenna Performance Study." | | |

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LOW-PROFILE ANTENNA PERFORMANCE STUDY

PART III: BIBLIOGRAPHY

1. REVIEW

This report contains an extensive bibliography of information on small antennas; specifically, ideas and techniques for the enhancement of antenna bandwidth and efficiency. Parts I and II of this report series dealt with tuning and matching network effects on the bandwidth of small antennas, and a review of published techniques both theoretical and experimental, for increasing the bandwidth of small antennas. A small antenna is defined as one whose largest linear dimension is $<0.1\lambda$.

The majority of articles listed in the bibliography come from the IEEE Transactions on Antennas and Propagation for the past 25 years or so. The newest articles are as recent as June 1977. Pertinent reports and papers from other sources are also listed, and can be easily obtained. A small section of the bibliography is devoted to active antennas and techniques. In the present study, active antennas were not examined, but are considered to be an important addition to the art of small broadband antennas.

Every effort has been made to group the articles under their most meaningful classification, but some of the papers should, properly, appear under several headings. This list is not considered to be complete, by any means; but it is believed to be comprehensive enough to give an excellent picture of the state-of-the-art of small, broadband antennas and techniques.

2. ANTENNA BANDWIDTH SUMMARY

A tabular summary of the ideas and techniques investigated during the project and presented in this three-part report series on the performance of low-profile antennas is included in Table I of this report. The antennas and techniques are rated with regard to bandwidth improvements and size. Reference numbers refer to the article or report containing the theoretical, experimental, or numerical data.

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TABLE I
SUMMARY OF BANDWIDTH CHARACTERISTICS
OF VARIOUS "SMALL" ANTENNAS

| NO. | ANTENNA TYPE OR TECHNIQUE | BANDWIDTH (IMPEDANCE AND PATTERN) | SIZE HGT X DIA.) | REFERENCE |
|-----|-----------------------------------|---|---------------------------------------|-----------|
| 1 | STUB + L-NETWORK | 1.16:1 (MIDBAND) | $0.1\lambda \times 0.005\lambda$ | B1 |
| 2 | LOOP + L-NETWORK | 1.05:1 (MIDBAND) | $0.1\lambda \times 0.05\lambda$ | B1 |
| 3 | TOP-LOADED STUB + L-NETWORK | $\sim 1.24:1$ (MIDBAND) | $\lambda/8 \times \lambda/8$ | B2 |
| 4 | TOP-LOADED, FOLDED + L-NETWORK | $\sim 1.22:1$ | $0.07\lambda \times 0.1\lambda$ | B2, F9 |
| 5 | ELECTRICALLY THICK MONOPOLE | $\sim 1.8:1$ | $\lambda/2 \times \lambda/4$ | E6 |
| 6 | MONOPOLE-SLOT | 1.3:1 | $\lambda/4 \times \frac{3\lambda}{8}$ | H3 |
| 7 | PARASITE-LOADING | 1.8:1 | $\lambda/2 \times 0.05\lambda$ | G5 |
| 8 | GOUBAU ANTENNA | 2:1 | $0.05\lambda \times 0.2\lambda$ | B3 |
| 9 | ESCP* | $>2.5:1$ | $\lambda/9 \times \lambda/4$ | H5 |
| 10 | SLOTTED-CONE ANTENNA | $>3:1$ | $\lambda/8 \times 0.44\lambda$ | F11 |
| 11 | HALLEN | $>3:1$ | $\lambda/2 \times 0.03\lambda$ | G9 |

*ESCP \equiv Electrically Small, Complementary Pair