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Bibliography

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MILLSTONE and HAYSTACK SCIENTIFIC and TECHNICAL PUBLICATIONS

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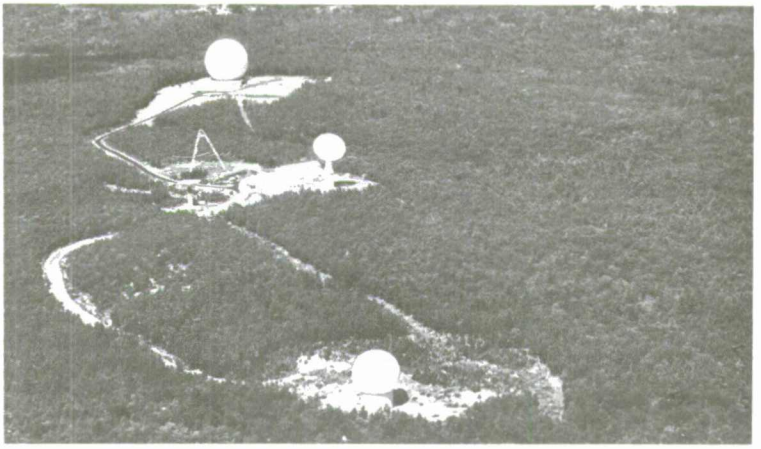
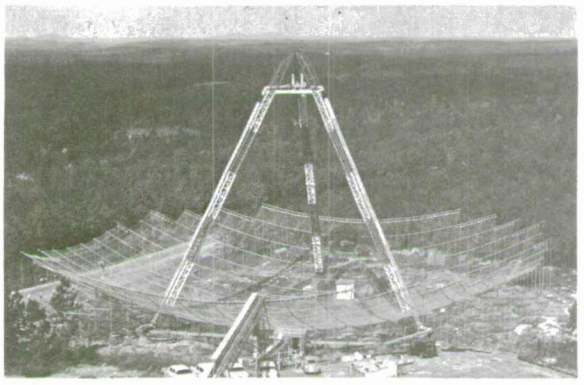
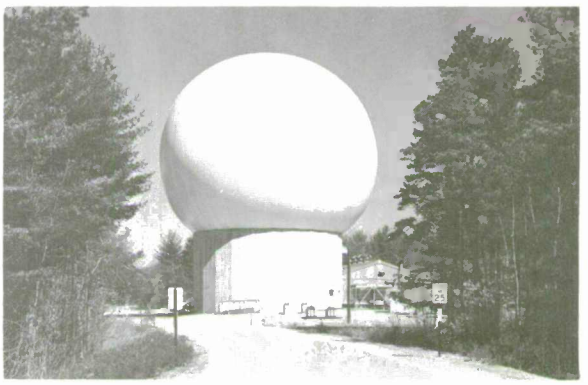


Foreground, Westford Communications Terminal; middle, Millstone Hill Radar and Ionospheric Research Facility; background, Haystack Microwave Research Facility

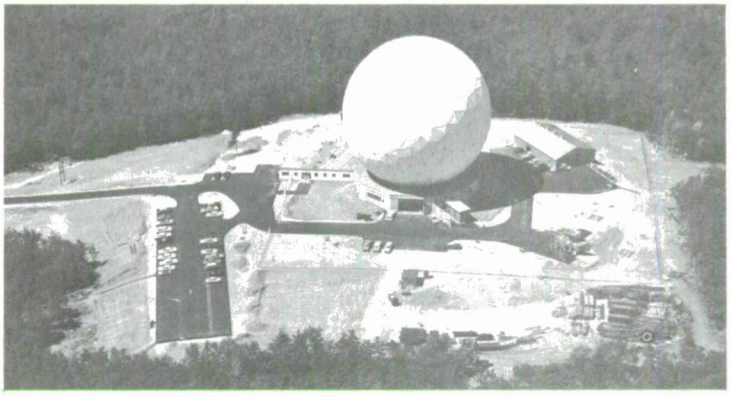
Millstone Hill Radar and Ionospheric Research Facility



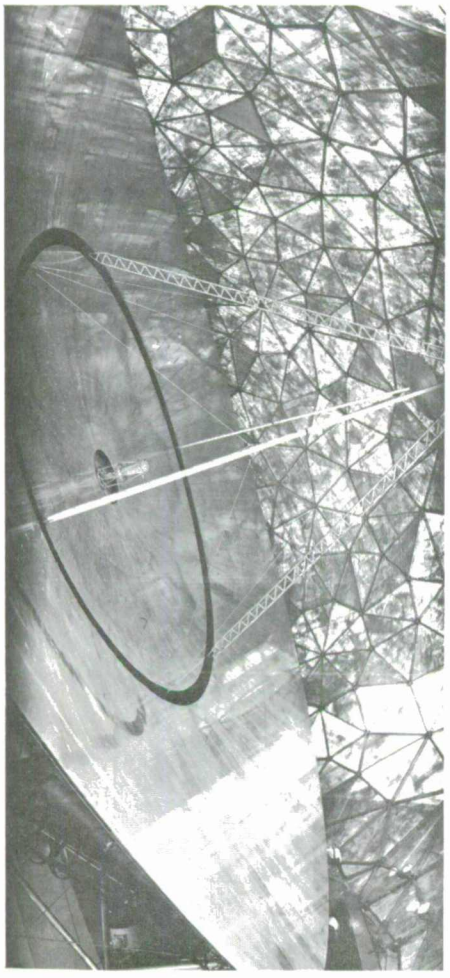
Zenith-pointing ionospheric research antenna



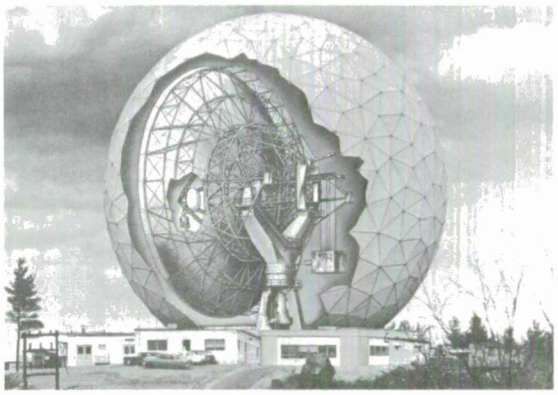
Westford Communications Terminal



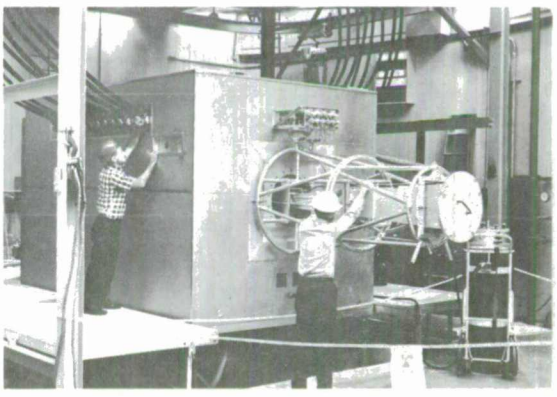
Haystack Microwave Research Facility



Precision-surface primary and secondary reflectors



Antenna system with plug-in RF electronics being hoisted into place



Planetary Radar Box

MILLSTONE AND HAYSTACK
SCIENTIFIC AND TECHNICAL PUBLICATIONS

This document is a bibliography of most of the significant publications, in whatever form, resulting from the work conducted at the Millstone Radar Facility and the Haystack Microwave Research Facility, two of the major instruments at Lincoln Laboratory's Millstone Hill Field Station.

The original Millstone Radar which went into operation in the fall of 1957 was unusual in many respects, among them its high average power (150 kw) at 68-cm wavelength and its agile 84-foot diameter antenna system. It was the first radar to utilize a large general-purpose digital computer as an integral part of the radar system for real-time data processing and control purposes. This was the CG24, perhaps the earliest all-solid-state computer, developed at Lincoln Laboratory for this application.

Over the intervening years the Field Station instrumentation has developed to include an updated version of the Millstone Radar having 18 db more overall sensitivity than the original version, a 220-foot diameter fixed-dish Thomson Scatter Radar Facility operating at UHF, and the Haystack facility. Thomson Scatter work began at Millstone in 1960 and has been an intensive program since 1963. In 1964, Haystack became an operational part of the Field Station instrumentation. At this writing, it incorporates the world's most sensitive planetary radar system, with a transmitter power output of nearly 500,000 watts at a wavelength of 3.8 cm. With this radar complementing the observations possible with the upgraded Millstone configuration, a variety of studies of the planetary and lunar motions, surfaces and atmospheres have been carried out at several wavelengths. Additionally the Haystack facility provides for Radio Astronomy observations, both continuum and spectral-line, at a number of frequencies from 18-cm through 8-mm wavelength.

In addition to the work mentioned above, the Station carries out research programs in space surveillance and tracking techniques and studies of atmospheric propagation and refraction as they affect radar tracking and space communications performance.

Accepted for the Air Force
Franklin C. Hudson
Chief, Lincoln Laboratory Office

Contents

* * *

In the following bibliography, citations are arranged according to the subject divisions listed in the table of contents above. Citations under each subject heading appear in inverse chronological order, with the most recent publication at the head of the list.

The numbers preceded by "LL" are Lincoln Laboratory identification. LL GR stands for a Group Report; TR is a Technical Report; JA is a Journal Article; MS is a Meeting Speech.

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Reports having AD numbers may be obtained by authorized users of DDC by processing the standard form 1.

Organizations not registered with DDC may procure copies as follows:

Articles assigned CFSTI numbers may be purchased at the standard prices of $3.00 per paper copy or 65 cents per microfiche from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia, 22151.

Papers assigned H numbers may be purchased at the prices indicated (M = 35mm microfilm, P = photoprint) from the M.I.T. Microreproduction Laboratory, Rm. 14-0551, Cambridge, Mass., 02139.

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Inquiries relating to the use and operation of the Haystack and Millstone facilities should be referred to Paul B. Sebring, Group Leader, Group 31, M.I.T. Lincoln Laboratory, Haystack Hill Site, Westford, Mass., 01886.

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This document is a bibliography of most of the significant publications, in whatever form, resulting from the work conducted at the Millstone Radar Facility and the Haystack Microwave Research Facility, two of the major instruments at Lincoln Laboratory's Millstone Hill Field Station.

14. KEY WORDS

Bibliography
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Addendum to Bibliography 36

Millstone and Haystack Scientific and Technical Publications

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1. On page 4 in the second entry under Planets the author R.P. Engels should be R.P. Ingalls.

2. On page 17 as the first entry under Instrumentation and Techniques add:

Haystack Antenna Reflector Surface Improvement Program
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29 Jan. 1968, 29 pp. LL TN 1968-7 DDC AD-667518

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