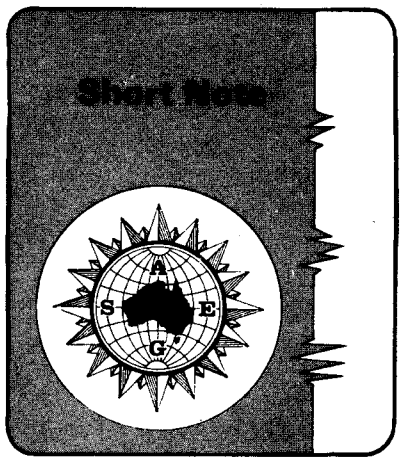
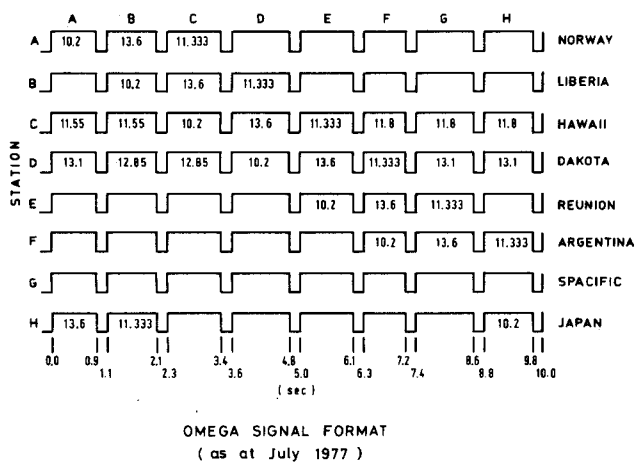


Omega and EM Exploration

There have been reports recently of interference with EM measurements in the Gippsland area, presumably as a result of Omega site evaluation. In reply to my query, the Minister for Transport, Mr. Nixon, provided the following information (see attached diagrams):

> "As you are probably aware, seven of the intended eight Omega transmitting facilities are currently in operation. The Australian facility, when it is commissioned will complete the world-wide network. The radio frequencies that are currently being transmitted are shown in the Omega signal format in the attached figure 1. The frequencies are not radiated continuously by each station but only for a segment of time in the 10 second cycle, for example Norway radiates on 10.2 kHz followed by 13.6 kHz and then 11.333 kHz followed by five blank segments. The final signal format has not yet been established and will be an agenda item at a forthcoming Omega Technical Conference in Japan. At this point in time the proposed final signal format is shown in the attached figure 2. You should note that the Australian facility will occupy the Station G position in the signal format."

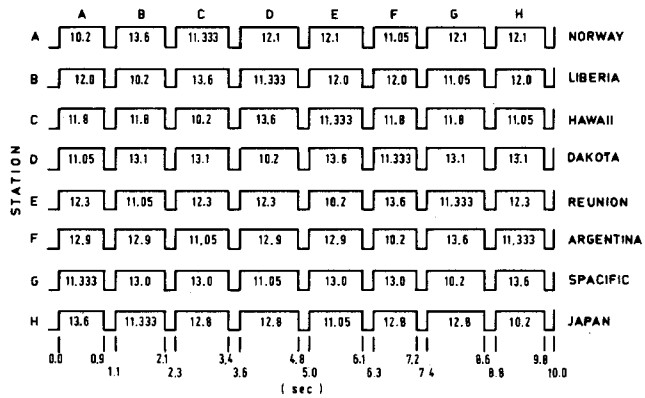
The objectives of this note are to bring the matter to the attention of others who may be having difficulty for reason of these tests, and to point out some implications of the developments.



OMEGA SIGNAL FORMAT
(as at July 1977)

Figure 1

First, one might expect to have a great deal more interference in the future, when Omega becomes operational, on all broad band electrical equipment (TEM, PEM, time-domain IP). Nearer to the transmitter, the large fields will interfere with *any* sensitive receiver, whether broad band or tuned, because of nonlinearity in components.



PROPOSED FINAL OMEGA SIGNAL FORMAT
(as at July 1977)

Figure 2

Second, Omega signals could be used as a source of EM signals for exploration, much as VLF fields from North West Cape and Japan have been used. The transmitter is ideally located for exploring the Tasman Geosyncline, and the frequency will give approximately 50% greater penetration than does NWC. (This may still be inadequate for large parts of the Geosyncline.) However, the 0.2-second transmission gaps each 1.1 second will pose some probelms, particularly for airborne measurements.

K. Vozoff
Macquarie University

Editors Note

*The Omega antenna will be vertical and will be fed with 150 kilowatts of audio, of which 10 kilowatts will be radiated to annoy of assist us, depending on our moods. To help you prepare for this, I have asked Dr. A. P. Raiche to prepare a geophysicists guide to Omega for the next Bulletin. This will give the field strengths (***E** *and* **H***) and polarizations as a function of distance from the transmitter. A useful general description is also given by D. R. Hutton (Omega radio navigation system, Search 8, 151-158, 1977).*