

# ECHO, BREAK, BLIP OR PIP ?

*The Production of a Glossary of Standard Radio Terms by an Interservices Committee.*

All readers of handbooks, text books and technical articles at some time or other must have been puzzled by the strange jargon used by the writers.

Sometimes a word is encountered for the first time, and the reader cannot make out its meaning from the context or from attempts at derivation; a more difficult situation arises, however, when a technical term is used with an unusual or a wrong meaning.

To clear up these difficulties, an Interservices Committee has held several meetings, and has produced an agreed glossary. As often happens, when attempts are made to reconcile the views of different users who have acquired their technical knowledge under very different conditions, agreement was only reached by a happy spirit of compromise. Although the glossary is published with the agreement of the three fighting services, there are naturally certain terms which members of a particular service would like to have changed, had the needs of that service only to be considered.

The glossary has been published for a limited circulation to Instructional and Research Establishments, and has been sent to certain Firms, Universities and Learned Societies, but it is hoped that it may later have a wider distribution.

The glossary contains about 600 entries, some 47 of which only appear in order to be labelled "depreciated."

To take the title of this article as an example :—

The R.A.F., who first used Radar (then known as R.D.F.), used the term *BLIP*. The Army used *BREAK* as indicating the gap in the time-base. The Navy used *ECHO*, because the effect was due to reflection; all the services occasionally used *PIP* to mean an echo.

The glossary definitions are :—

## **ECHO**

*A deflection or change of intensity, on a cathode-ray tube display, produced by the radar echo from a target.*

## **BREAK**

*An alternative term for echo, limited to a lateral discontinuity in a range-amplitude display.*

## **BLIP**

*Response*

*A deflection or change of intensity, on a cathode-ray tube display, produced by the signal from a responder.*

## **PIP**

*A deflection or change of intensity, on a cathode-ray tube display, produced as a calibration or range-marker.*

The alternative words *ECHO* and *BREAK* are intended to satisfy the R.A.F. and Navy and the Army respectively. A "Blip" (which gives a feeling of suddenness) is used for an echo which only appears

intermittently. "Pip" is now reserved for calibrating marks.

A good example of depreciation is the entry :—

## **TRACE**

*Scan (deprecated)*

*The pattern appearing on the screen of a cathode-ray tube.*

The use of *SCAN* (as applied to the trace on a Cathode-ray tube) arose from the television technique which used a cathode-ray beam to scan a picture to be televised. This was an active use of the beam, for the effect of the scanning was that signals were broadcast. Since the beam in the television receiver moved in exactly the same way, its movements became known as Scanning. In this case the beam was not looking at a picture (active) but was seen (passive), and the meaning of the active English word "to scan" had been lost. Nevertheless, the word scan is often applied to the time-base, particularly by the Americans. The Author of this article often absent-mindedly uses it.

This passive use of the word had no disadvantages in the early days of Radar. When, however, narrow-beam aerials, which actively scanned an area of sky, made their appearance, it was seen that confusion would soon arise between the two meanings.

It was decided to deprecate the use of the word in connection with time-bases.

Accordingly, the American A scan is now called an A Display.

The correct definition of *SCAN* is as follows :—

## **SCAN (radar)**

*To explore a region automatically and continuously by swinging a beam of radiation or receptivity.*

This is the only permissible use of Scan.

There follow some extracts from the glossary, with comments by the author, who was present at all the meetings of the committee. Historical notes are sometimes appended, as the knowledge of the circumstances surrounding invention of words is often an aid to their proper use.

## **PULSE**

*A variation in the value of some quantity as a function of time such that the value departs from a given datum for a time interval and then returns to this datum for a much longer time interval.*

## **R/F PULSE**

*Pulse*

*A train of oscillations whose envelope has the form of a pulse.*

## **RADIOGONIOMETER**

*Goniometer*

*An instrument which, when coupled to a suitable fixed aerial-system, enables the bearing of arriving*

waves to be determined by rotation of a movable part (B.S.I.).

It will be noticed that no mention is here made of the meaning "phase-shifting transformer."

This meaning crept in owing to the fact that a Service pattern goniometer (designed as part of a D/F set) was used as a phase-shifting transformer in a radar set.

The danger of such mis-use is illustrated by the following incident.

A scientist discovered that a certain type of magslip could be used (as a phase-shifting transformer) instead of the goniometer in a radar set.

He submitted a paper bearing the title "The Use of a Magslip as a Goniometer."

Consider the feelings of a non-radio reader who tries to use a magslip as a radio-goniometer!

### JITTER

*Random departure from temporal regularity of repetition.*

Note the word *temporal*; it is most often applied to the horizontal movement of an echo on a time-base. It should not be applied to a random variation in amplitude.

### POLAR DIAGRAM

*A mathematical term for a diagram using polar co-ordinates. Its colloquial unqualified use is deprecated.*

The terms Field Strength (Vertical or Horizontal) diagram, etc., should be used instead.

### SQUEGGER

*A self-quenching oscillator in which the suppression occurs in the grid circuit.*

Name derived from a device which squeaked and acted as a megger. The term should not be used for any effect not produced as defined above.

### WAVEGUIDE

*An elongated enclosure bounded by one or more conducting surfaces and/or discontinuities in a dielectric, along which electromagnetic waves are guided. Commonly restricted to a rectangular or circular metal tube of such dimensions that energy at the desired frequency can be propagated.*

An earlier definition (which appeared in a "Most Secret" document) facetiously defined a waveguide as "Plumbing for pushing pulses up a pipe."

### AERIAL

*That part of a radio transmitting system from which electromagnetic waves are radiated into space. This includes any device for directing the radiation, but does not include the transmission line or guide to the primary radiating elements.*

The dipole in front of the mirror of Type 271 is not an aerial but a primary radiating element for :—

### PRIMARY RADIATING ELEMENT

*Primary Radiator*

*One element of an aerial at which radiated energy leaves the transmission system.*

### BACK-TO-FRONT RATIO (in D.F.)

*The ratio of the signal voltage on the reciprocal bearing to that on the correct bearing.*

### FRONT-TO-BACK RATIO

*The ratio of the field strength of an aerial or array in the desired direction to its maximum field strength in the rear sector.*

The existence of this pair of definitions shows the danger of altering a definition even slightly.

### LOBE

(a) *The portion of a field-strength diagram within a solid angle bounded by a region or regions of minimum radiation*

(b) *The cross section of a lobe as defined in (a) by any specified plane*

(c) *The radiation of electromagnetic energy corresponding with the field-strength distribution represented as in (a) or (b).*

This definition is considered fairly satisfactory and was the result of long discussion

**RADAR** *Not defined.—See note at end.*

### BEAM SWITCHING

*Split (deprecated)*

*Aerial switching* ..

*Lobe switching* ..

*Beam Splitting* ..

*Echo Splitting* ..

*Lobe Swinging* ..

*Lobing* ..

(a) *A method of obtaining more accurately the bearing and/or elevation of an object by comparing the signals received when the beam is in directions differing slightly in bearing and/or elevation. When these signals are equal, the object lies between the directions in a known angular relation to them.*

(b) *A small periodic oscillation or conical motion of a beam by which improved accuracy of bearing and elevation is obtained by comparison of signal amplitudes at various points during the cycle.*

*Of the two methods (a) is the discontinuous and (b) the continuous variety.*

**Split (Deprecated).**—This word was first used in connection with a side-by-side display (as in Type 274 bearing tube). There were two echoes instead of one, and by adjusting the separation control the echo appeared to split into two. Since the split echo was used with the switched beam, a careless transfer of adjective produced a split beam. This suggests a radiation diagram consisting of a main lobe with a crevasse in the centre—a condition which is used in some radio techniques. It actually refers to the alternate existence of two beams, and is therefore better called a switched beam.

### RELAXATION CIRCUIT

*A circuit arrangement, usually of valves, reactances and resistances, which has two states or conditions, one, both, or neither of which may be stable. The transient voltage produced by passing from one to the other, or the voltage in a state of rest, can be used in other circuits.*

## FLIP-FLOP CIRCUIT

*Kipp relay (deprecated)*

*One-shot multivibrator (deprecated)*

*A relaxation circuit having one stable and one unstable condition. By applying a triggering pulse or signal it may be made to pass very rapidly into the unstable condition, whence, after a certain time interval, it automatically returns to the stable condition.*

## STABLE TRIGGER CIRCUIT

*Trigger Circuit*

*A relaxation circuit which has two stable conditions, and can be made to pass very rapidly from one to the other by applying a suitable triggering pulse or signal. The Eccles-Jordan circuit is an example of a trigger circuit.*

## MULTIVIBRATOR

*A relaxation circuit which has two unstable conditions and successively passes from one to the other as long as it is operating. The Abraham-Bloch multivibrator is an example.*

These definitions caused most trouble of all the definitions. During the discussion, the following views were put forward :—

- (1) Multivibrator should be reserved for its original use—as a harmonic-rich source of oscillation, used for frequency-multiplication.
- (2) The terms Flip-Flip and Flop-Flop were suggested for circuits which have two stable or two unstable conditions. The terms were rejected owing to the possibility of misprints and because it was difficult to remember whether Flip or Flop should be associated with stable or unstable respectively.

The above definitions were finally arrived at, and it is thought that a reasonable compromise has been reached.

And what of the most important word Radar ?

The committee decided that the definition and consequent delimitation of the word was so fraught with difficulties of a political nature, that action should be left to others.