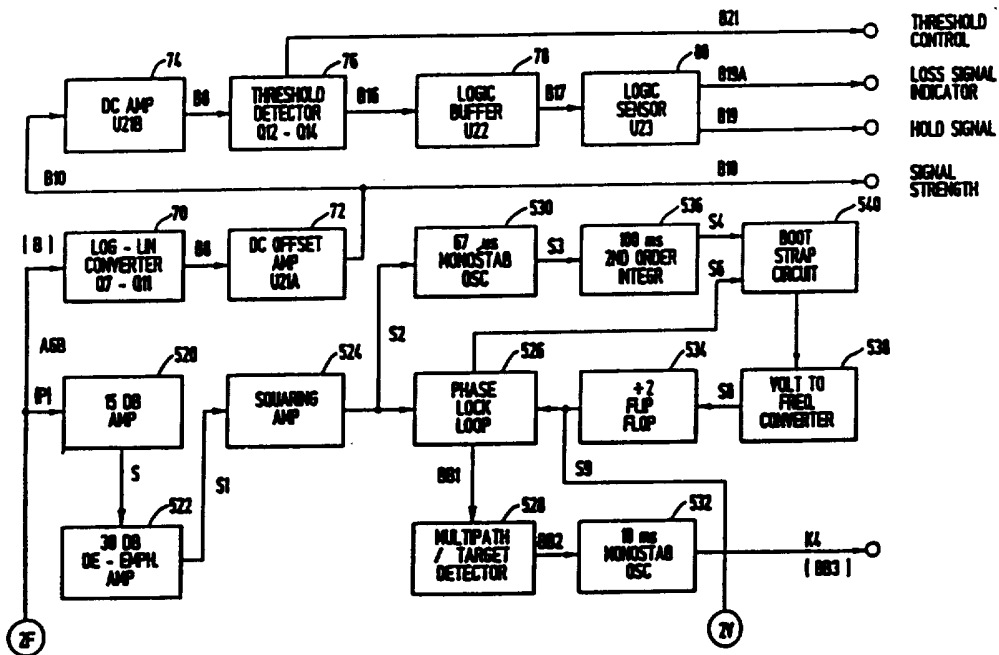




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>5</sup> : <b>G01S 13/536, 13/62, 13/93</b></p>	<p><b>A3</b></p>	<p>(11) International Publication Number: <b>WO 92/19980</b> (43) International Publication Date: 12 November 1992 (12.11.92)</p>
<p>(21) International Application Number: PCT/US92/03687 (22) International Filing Date: 4 May 1992 (04.05.92) (30) Priority data: 695,951 6 May 1991 (06.05.91) US 745,928 16 August 1991 (16.08.91) US 756,176 6 September 1991 (06.09.91) US (71) Applicant: IVHS TECHNOLOGIES, INC. [US/US]; 10802 Willow Court, San Diego, CA 92127 (US). (72) Inventors: ASBURY, Jimmie, R. ; P.O. Box 221057, San Diego, CA 92192 (US). DAVIS, John, W. ; 1512 Calle Narcisos, Encinitas, CA 92124 (US). (74) Agents: KONRAD, William, K. et al.; Spensley Horn Ju- bas &amp; Lubitz, 1880 Century Park East, Suite 500, Los An- geles, CA 90067 (US).</p>		<p>(81) Designated States: AT (European patent), AU, BE (Euro- pean patent), BR, CA, CH (European patent), DE (Eu- ropean patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, KR, LU (European patent), MC (European patent), NL (Eu- ropean patent), SE (European patent).  <b>Published</b> <i>With international search report.</i>  (88) Date of publication of the international search report: 4 February 1993 (04.02.93)</p>

(54) Title: MULTI-FREQUENCY AUTOMOTIVE RADAR SYSTEM



(57) Abstract

A Doppler control circuit (520, 524), for a CW or pulse Doppler radar system for monitoring not only the phase shift between echo signals from several targets but also the amplitude difference between the several targets and to further tune (52-59) the radar to a particular target among one or more targets from which echo signals return. The control circuit can be used in state of the art CW or pulse Doppler type radar systems.

\* (Referred to in PCT Gazette No. 04/1993, Section II)

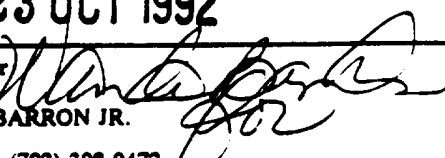
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INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US92/03687

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(5) :G01S 13/536, 13/62,13/93 US CL :342/112,114,70;101 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) U.S. : 342/109,111,129,71,72,99,27,28; 367/909 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) NONE		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US.A, 3,750,172 (TRESSELT) 31 JULY 1973 Figs. 1 and 3, col. 2, line 62- col. 3 line 19.	1-4, 6-8, 11- 17,19,20,22,23,25
Y	US.A, 3,750,172 (TRESSELT) 31 JULY 1973 Figs. 1 and 3, col. 2, line 62-col. 3 line 19.	5,9-10,18,21,24,26
X	US.A, 4,740,045 (GOODSON ET AL) 26 APRIL 1988 Fig. 5 col.3, line 15-28, col. 18, line 32-67.	1, 4, 11- 16,18,19,22,24,25
Y	US.A, 4,740,045 (GOODSON ET AL.) 26 APRIL 1988 Fig. 5, col.3, line 15-28 col. 18, line 32-67.	5,6-10,17,20,21,23,26
X	US.A, 3,898,655 (TRESSELT) 05 AUGUST 1975	1,4,10-17,19,22,23,25
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
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*E*	earlier document published on or after the international filing date	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
*L*	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
*O*	document referring to an oral disclosure, use, exhibition or other means	*Z* document member of the same patent family
*P*	document published prior to the international filing date but later than the priority date claimed	
Date of the actual completion of the international search 05 AUGUST 1992		Date of mailing of the international search report <b>23 OCT 1992</b>
Name and mailing address of the ISA/ Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231		Authorized officer  GILBERTO BARRON JR.
Facsimile No. NOT APPLICABLE		Telephone No. (703) 308-0472

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US92/03687

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US,A, 3,898,655 (TRESSELT) 05 AUGUST 1975	3,5,6- 10,18,20,21, 24,26
Y	US,A, 4,673,937 (DAVIS) 16 JUNE 1987	26
Y	US,A, 3,778,826 (FLANNERY ET AL) 11 DECEMBER 1973 col. 5, line 38-col. 6, line 68.	27,29,30,32
Y	US,A, 3,967,283 (CLARK ET AL) 29 JUNE 1976 Fig. 9, col. 16, line 1-35.	28,31,33,34
X	US,A, 3,742,497 (SATO ET AL) 26 JUNE 1973 Fig.1, col. 4, line 9-24.	35,39-40,42 48,49,50,51
Y	US,A, 3,742,497 (SATO ET AL) 26 JUNE 1973 Fig. 1, col. 4, line 9-24	43
X	US,A, 3,176,294 (MERLO ET AL) 30 MARCH 1965 col. 2, line 13-36.	35,39-40,42, 44-46,48-54
Y	US,A, 3,176,294 (MERLO ET AL) 30 MARCH 1965 col. 2, line 13-16.	43,47
X	US,A, 4,236,140 (AKER ET AL) 25 NOVEMBER 1980	35,39,40,43,44, 45,47,48-54
Y	US,A, 4,236,140 (AKER ER AL) 25 NOVEMBER 1980	42,46

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US92/03687

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:  
Please See Extra Sheet.

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims. (Telephone Practice)
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US92/03687

## BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING

This ISA found multiple inventions as follows:

Group I, Claims 1-26, drawn to multifrequency radar class 342/112.

Group II, Claims 27-34 drawn to persistence environmental filter 342/114.

Claims III, Claims 35-54 drawn to de-emphasis circuit 342/101.

Inventions of Groups I thru III are related as subcombinations usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In instant case, invention of Groups II and III have separate utility such as in single frequency radar system. Further, invention of Group III has separate utility from Group II such as police radar systems, i.e. detection speeds greater than predetermined amount.

Because these inventions are distinct for the reasons given above and have:

- 1). Acquired a separate status in the art by their different classification.
- 2). Acquired a separate status in the art because of their recognized divergent subject matter, and.
- 3). The search required for Group I is not required for Groups II and III.
- 4). The search required for Group II is not required for Groups I and III.

restriction for examination purposes is indicated is proper.