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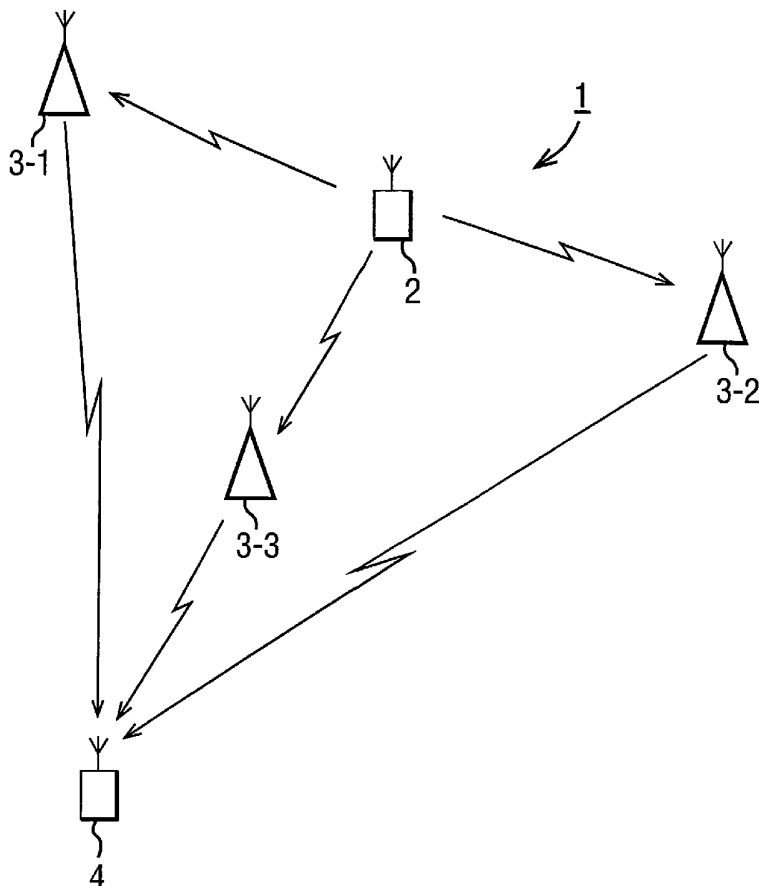
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[Continued on next page]

(54) Title: TAG TRACKING



(57) Abstract: The present invention provides a position determining system in which a mobile tag having an unknown position is tracked in space over time. In use, the mobile tag either transmits or receives signals comprising a pair of tones at different frequencies from a number of base stations having known locations. The phase of each of the received signals is then measured and the measured phases are then passed to a processing unit which determines the position of the tag at the time of the transmission of the signals on the basis of the difference between the measured phases of the two tones. In a preferred embodiment, this system is combined with a conventional phase-based position measurement which is derived from phase measurements of similar tones transmitted between the mobile tag and different base stations.



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INTERNATIONAL SEARCH REPORT

Inter al Application No
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A. CLASSIFICATION OF SUBJECT MATTER IPC 7 G01S5/14 G01S11/02				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols) IPC 7 G01S H04B				
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 practical, search terms used) EPO-Internal, PAJ, WPI Data, INSPEC				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X Y X X	US 3 696 427 A (NARD GEORGES PIERRE) 3 October 1972 (1972-10-03) abstract; figures column 1, line 55 -column 4, line 39 --- GB 2 267 623 A (RACAL POSITIONING SYST LTD) 8 December 1993 (1993-12-08) page 7, line 14 - line 27 page 10, line 21 -page 11, line 10 page 21, line 2 - line 11 --- US 4 283 726 A (SPENCE LEWIS C ET AL) 11 August 1981 (1981-08-11) abstract; figures 1,2 column 3, line 55 -column 4, line 54 --- -/--	1,2,9, 60-62 74,75 1,9, 60-62 60		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.				
<input checked="" type="checkbox"/> Patent family members are listed in annex.				
° Special categories of cited documents :				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; padding: 5px;"> <ul style="list-style-type: none"> *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *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) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 50%; vertical-align: top; padding: 5px;"> <ul style="list-style-type: none"> *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *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 *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. *&* document member of the same patent family </td> </tr> </table>			<ul style="list-style-type: none"> *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *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) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed 	<ul style="list-style-type: none"> *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *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 *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. *&* document member of the same patent family
<ul style="list-style-type: none"> *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *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) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed 	<ul style="list-style-type: none"> *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *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 *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. *&* document member of the same patent family 			
Date of the actual completion of the international search <p style="text-align: center; font-weight: bold;">27 February 2003</p>	Date of mailing of the international search report <p style="text-align: center; font-weight: bold;">10/03/2003</p>			
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer <p style="text-align: center; font-weight: bold;">Niemeijer, R</p>			

INTERNATIONAL SEARCH REPORT

International Application No

PC1/GB 02/02245

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 96 25673 A (NEXUS 1994 LTD) 22 August 1996 (1996-08-22)	11-13, 15-17, 24,25, 27-34, 46,47, 49, 52-54, 59, 63-65, 70-72,76
Y	abstract; figures 1,8-10 page 4, line 23 -page 7, line 30 page 15, line 17 - line 26 page 20, line 20 -page 21, line 3 page 23, line 11 -page 28, line 28	55-58
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Y	US 6 066 967 A (MARKOWITZ WILLIAM M ET AL) 23 May 2000 (2000-05-23) abstract; figure 5 column 3, line 8 -column 4, line 53 column 6, line 32 - line 36	55-58
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E	WO 02 41029 A (DUFFETT SMITH PETER ;BARTLETT DAVID (GB); SMITH PAUL (GB); REYNOLD) 23 May 2002 (2002-05-23) the whole document	11-59, 63-73,76

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 02/02245

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

This International Search 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:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-10,60-62,74,75

Position determination of receiver using dual carrier transmitting stations at known locations based on phase differences between carriers of same stations as well as phase difference between carriers of different stations

2. Claims: 11-59,63-73,76

Position determination of dual carrier transmitter using phase difference of dual carriers at different receivers of known location

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 02/02245

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