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D E C I S I O N
of 7 June 2000

Case Number: T 1012/99 - 3.5.1

Application Number: 92306513.0

Publication Number: 0524771

IPC: G01S 5/04

Language of the proceedings: EN

Title of invention:

DF method

Applicant:

TERRAFIX LTD.

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 52(1), 56

Keyword:

"Inventive step (no)"

Decisions cited:

-

Catchword:

-



Case Number: T 1012/99 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 7 June 2000

Appellant: TERRAFIX LTD.
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 31 May 1999
refusing European patent application
No. 92 306 513.0 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: P. K. J. van den Berg
Members: A. S. Clelland
P. H. Mühlens

Summary of Facts and Submissions

I. This is an appeal against the decision of the Examining Division to refuse application 92 306 513.0 on the ground that the subject-matter of independent claim 1 lacked an inventive step, Articles 52(1) and 56 EPC. The Examining Division's refusal relied primarily on the following document:

D5: Herndon H. JENKINS: "Small-Aperture Radio Direction-Finding", Artech House, Boston, 1991, ISBN 0-89006-420-2: Chapter 7: "Passive Geolocation", pages 179 to 198.

II. The appellant (applicant) lodged an appeal and requested cancellation of the decision and grant of the patent on the basis of the documents on file. As an auxiliary request the appellant asked that a patent be granted on the basis of claims 1 to 7 on file, ie omitting the method claims.

III. In response to a communication in which the rapporteur, on behalf of the Board, raised the issue of inventive step in respect of the claims of both requests, the appellant filed revised sets of claims of respective main, first and second auxiliary requests. A revised description was also filed.

IV. Oral proceedings were held on 7 June 2000. In the course of the oral proceedings the appellant modified his main request and asked that main requests "A" and "B" be considered in turn prior to consideration of the auxiliary requests. The appellants' **main request A** is that the decision under appeal be set aside and a patent granted on the basis of the following documents:

Claims: 1 to 9 as filed on 5 May 2000;

Description: pages 1, 1a and 2 to 4 as filed on 5 May 2000;

Drawings: sheets 1 to 4 as originally filed.

Main request B is based on the above documents but omits claims 8 and 9 (method claims). **Auxiliary request I** replaces the claims with claims 1 to 5 as filed on 5 May 2000, whilst **auxiliary request II** replaces the claims by claims 1 and 2 as filed on 5 May 2000.

V. Claim 1 of both **main requests A** and **B** reads as follows:

"A mobile or transportable direction finding receiving station, comprising a DF receiver (1) with directional antenna (2) for determining the direction of a moving target in relation to the DF receiver, characterised in that the receiving station further comprises an automatic heading device (4) for compensating for changes in the receiver orientation, an automatic location device (5) for determining in real-time the position of the DF receiver, and means (3,7) coupled to the DF receiver, the automatic heading device, and the automatic location device for transmitting the DF receiver position and information concerning the target position to a control point."

Claim 1 of auxiliary request I adds to the above claim the subject-matter of claim 4 of the main request, thereby directing claim 1 to a target tracking system comprising a plurality of mobile or transportable direction finding receiving stations connected to a

control point where computations of target position are performed. Claim 1 of **auxiliary request II** adds to claim 1 of auxiliary request I the subject-matter of claims 2, 3 and 5 of that request, ie at least some of the receiving stations being mounted on a land vehicle, the provision of a time device to which the means for transmitting DF receiver and target position information are coupled, and the ability to calculate target positions when the receiver stations are moving.

VI. In the course of the written and the oral proceedings the appellant argued that the invention provided a mobile direction finding receiving station which avoided the need for fixed stations and permitted quick and accurate operation. Although the solution was very simple this should not be held against it; the technology to provide a solution to this problem had existed since 1977 but until the invention no one had thought of solving the problem of identifying the position of a mobile tracking station without the use of fixed stations. The invention pre-dated the existence of GPS and should not therefore be tied to use with this system; it should moreover be remembered that almost a decade had elapsed since the priority date and the GPS receivers of today bore no relation to the devices available in 1991. The invention had moreover had considerable commercial success and had been sold to many national and international police forces and security services.

It was accepted that the most relevant prior art was represented by Chapter 7 of textbook D5. Great care was however necessary in analysing the chapter: it represented a consolidation of the known art on passive geolocation but did not refer in the bibliography to

any single document relevant to the application. The chapter discussed three differing approaches to direction finding, namely homing, navigation and triangulation. Homing was pertinent to a mobile platform and was used to guide the platform to the target; navigation was only relevant for enabling the target to determine its position; and triangulation could only identify the position of a moving target if at least two DF receivers having well defined positions were available to give the bearing to the target. A single, moving, receiver, could not be used for triangulation of a moving target because of the delay between taking measurements. In their consideration of this document the Examining Division had apparently confused triangulation and homing.

The list of desiderata at paragraph 7.7 should be read in the context of the preceding paragraphs, which clearly separated homing, navigation and triangulation. The argument relied upon against claim 1 combined parts of the same work dealing with different subjects in an impermissible manner. Although with reference to triangulation the book disclosed the use of a mobile net tracking a fixed target or a fixed net tracking a mobile target, there was no disclosure of the difficult case of mobile receivers tracking a mobile target. At the claimed priority date, 1991, no such system had been produced.

In 1991 the skilled person would only have considered GPS for navigational purposes, as indeed was disclosed in D5 at page 181. D5 nowhere suggested the use of GPS in the context of triangulation. The argument advanced was based on an *ex post facto* knowledge of modern GPS instruments and their accuracy, but at the claimed

priority date such instruments were bulky, inaccurate, and of limited coverage. The averagely skilled person could not have arrived at the claimed solution without the exercise of inventive skill.

The only manner in which the claimed subject-matter could be derived from D5 was on the basis of what the skilled person **could** do rather than what he **would** do; it was clear from prior art at the appellant's disposal that the preferred solution at the claimed priority date was the provision of separate fixed stations by means of which the position of mobile DF stations was calculated for use by a control point.

Reasons for the Decision

1. The only point at issue is inventive step. It was common ground at the oral proceedings that the single most relevant document is Chapter 7 of the textbook referred to above as D5. This chapter, as pointed out by the appellant, is concerned with passive geolocation techniques which can be divided into three groups: in the first place homing, in which a movable receiver tracks down the target, secondly navigation in which a moving receiver can determine its position from fixed transmitters and thirdly triangulation in which, primarily, fixed DF receivers are used to track a fixed or moving target.
2. The question to be answered is how the skilled person would, at the claimed priority date, have tracked a moving target. As noted above, the appellant asserts that he would have required fixed stations to do this, either directly by means of the fixed stations

themselves or using movable stations the positions of which are determined by the fixed stations. The appellant has not contested that at the priority date the skilled person would have been interested in using movable stations to identify a movable target, as is indeed disclosed in Chapter 7 of D5, see the paragraph bridging pages 196 and 197. In discussing "small-aperture" DF systems, which the Board understands to be systems with a base line of one-half wavelength or less, this passage states that such systems are used tactically with a level of operation varying from a totally manual mode to a fully automatic mode. Both mobile and fixed nets are said to exist. A manual, mobile net is said to be common in wildlife tracking applications and an automated stationary net used in communication intelligence operations. It is accepted that in the examples given there is no reference to automated mobile nets. However, the Board takes the view that the mere automation of an operation - in this case direction finding - which was formerly performed manually is a well-known aim of industry and thus unlikely to involve an inventive step. The Board concludes that the automation of a mobile net would at the claimed priority date have been appreciated by the skilled person as being desirable.

3. In the specific example of wildlife tracking given at page 197 of D5 a target, the animal, is tracked manually by mobile stations. In the Board's view it would have been obvious to the skilled person to automate the tracking.

4. Claim 1 is directed to a DF receiving station *per se*. The features of the claim preamble are implied by the passage at page 197 of D5 referring to the mobile

tracking of wildlife. An animal is moreover likely to be a moving target. The first characterising feature, that the receiving station comprises an automatic heading device for compensating for changes in the receiver orientation, is a self-evident requirement in any DF receiver; in any practical system target bearing with respect to a reference direction, for example magnetic north, will be determined irrespective of receiver orientation. The claim furthermore requires an automatic location device for determining in real-time the position of the DF receiver. For the sake of argument the Board accepts that at the claimed priority date the skilled person would not immediately have thought of a GPS receiver in this context. Nevertheless, as indeed acknowledged by the appellant in the course of the oral proceedings, precision navigation aids which would enable an automatic determination of receiver location were readily available at the claimed priority date, see paragraph 7.3 "navigation" at page 181 of D5. The navigational aids discussed in this paragraph - LORAN, SATNAV, GPS and TACAN are automatic systems which in real-time, or at least in a short time, give the position of the receiver.

5. That an automatic measurement should be carried out in real-time would appear self-evident; in any case, the basic discussion of triangulation techniques at page 183, 7.5.1, states that "the coordinates of the DF locations are either known *a priori* or measured simultaneously with bearing acquisition". The Board considers that the latter case implies real-time measurement of position.

Although the appellant asserted that navigation was

irrelevant to direction finding in that it was concerned with a moving receiver and fixed transmitters, it appears to the Board that the skilled person is solving a navigational problem in finding his position. The Board accordingly considers that D5 would lead the skilled person without the exercise of invention to the provision of an automatic location device for determining in real-time the position of the DF receiver. The only remaining feature in claim 1 is the transmission of receiver location and target heading to a control point, which is self-evidently necessary in any network and is discussed in D5 at page 197.

6. The Board accordingly concludes that the subject-matter of claim 1 of the main request does not involve an inventive step.

7. Turning now to claim 1 of the **first auxiliary request** this is directed to a plurality of stations connected to a control point which performs computations of target position presumably based on the received target headings. Since D5 discloses at page 197 the provision of networks it would appear self-evident that the data from the various receivers must be combined at a control point. The Board accordingly concludes that claim 1 of the first auxiliary request does not involve an inventive step.

8. Claim 1 of the **second auxiliary request** adds to claim 1 of the first auxiliary request features which are either implicit in the system of that request or which are obviously necessary in any practical system. If a system is mobile, as in the example of wildlife tracking given in D5, the probability is that the

receivers are mounted on a land vehicle, and in this case if the location of the vehicle can be determined in real-time then the target position can be calculated when the receiver stations are moving. The only remaining feature in the claim is the provision of a time device, the transmitting means *inter alia* being coupled to it. The claim does not indicate any specific function for the time device but the description states at page 3, line 12 onwards that such a device may be used optionally to provide a means of accurately time-stamping information. The Board considers that if the skilled person felt the need to provide such information he would know how to do so, the claim and indeed the description going no further than the mere statement that time-stamp information is provided. Claim 1 of the second auxiliary request accordingly also lacks an inventive step.

9. It is observed that the application as a whole goes no further than advancing the idea of automatic position measurement in the context of a mobile DF system. There is no technical teaching as to how this is done. Given that the mere idea of automatic position measurement was known in the field of navigation prior to claimed priority date, its application to mobile DF receivers would appear self-evident.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Kiehl

P. K. J. van den Berg