

31 October 2007

PATENTS ACT 1977

APPLICANT Andrew Cumming

ISSUE Whether patent application number GB
0600407.1 complies with section 1(2)

HEARING OFFICER R C Kennell

DECISION

Introduction

- 1 The above application arises from international application no. PCT / AU2004 / 000770 which was filed on 10 June 2004 and claims a priority date of 10 June 2003 from an earlier Australian application. The international application was published under serial no. WO 2004 / 109566 A1 on 16 December 2004 and re-printed under serial no. GB 2 419 204 A upon entry into the UK national phase.
- 2 For the UK national phase the applicant filed a replacement description and claims. However, the examiner has objected that the invention is excluded from patentability under section 1(2) of the Act. He offered a hearing, but the applicant wishes the matter to be decided on the basis of the papers on file.

The invention

- 3 The invention is concerned with the valuation of financial instruments, and particularly the modelling of unknown values of several rate series at specified times. It has been developed, as the specification states, primarily for modelling the zero coupon rate curves of one or more bond issuers.
- 4 Where a trading portfolio contains instruments which have not traded during the time period under consideration, current values of market rates are not available to input. Modelling techniques are therefore routinely applied in order to determine the daily profit and loss of trading portfolios and the risks in trading them. As the specification explains, prior art modelling methods have the disadvantage that they do not take account of all known rates, including those of other rate series and those known at other times, that are related to the unknown

rates.

- 5 Although the number of claims has been considerably reduced for the national phase, the specification still contains eleven independent claims. (Indeed the examiner has objected that the claims are not concise as required by section 14(5)(b)). There are five pairs of corresponding system and method claims 1/42, 8/43, 19/44, 30/45 and 33/46, together with claim 47 to a computer program product which corresponds to claims 1/42.
- 6 The method claims comprise series of steps for:
- generating a model of unknown values of several rate series at specified times (claim 42),
 - generating a model of the dynamics of specified zero coupon rate series of one or more bond issuers at specified trading dates (claims 43 and 44),
 - generating a model of the dynamics of specified maturity-parameterised rate series at specified times (claim 46), and
 - detecting the known values, of several rate series at specified times, that are extreme (claim 45);

the methods are not required to be computer-implemented, although this limitation was present in the claims originally filed with the international application. The corresponding system claims each require a system comprising a computing device “configured to” carry out the operations corresponding to the method claims. The computer program product of claim 47 comprises a computer useable medium including a computer readable program which when executed on a computer causes the computer to carry out the corresponding operations. I do not think it is necessary for me to recite all these claims in full, but claims 1 and 42 are set out in an annex to this decision for illustration.

The law and its interpretation

- 7 The relevant parts of section 1(2) read (emphasis added to show the exclusions which are in issue):

“It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of –

- (a) a discovery, scientific theory or mathematical method;
- (b) ... ;
- (c) a scheme, rule or method for performing a mental act, playing a game or doing business or a program for a computer;
- (d) ... ;

but the foregoing provision shall prevent anything from being treated as an invention for the purposes of this Act only to the extent that a patent or application for a patent relates to that thing as such.”;

- 8 The determination of whether an invention is excluded under section 1(2) is now

governed by the judgment of the Court of Appeal in *Aerotel Ltd v Telco Holdings Ltd* and *Macrossan's Application* [2006] EWCA Civ 1371, [2007] RPC 7 (hereinafter "*Aerotel*"). The court reviewed the case law on the interpretation of section 1(2) and approved a new four-step test for the assessment of patentability, namely:

- 1) Properly construe the claim
- 2) Identify the actual contribution (although at the application stage this might have to be the alleged contribution)
- 3) Ask whether it falls solely within the excluded matter
- 4) Check whether the actual or alleged contribution is actually technical in nature.

- 9 The examiner's original objection and the applicant's response were argued on the basis of the case law prior to *Aerotel*. Although the examiner re-formulated his objection in accordance with *Aerotel* in his report dated 3 May 2007, the applicant has not made any further substantive response. I therefore emphasise that, although *Aerotel* is not expected to fundamentally change the boundary between what is and is not patentable in the UK (except possibly for the odd borderline case)¹, it is to *Aerotel* rather than earlier case law that I must now look to decide whether the applicant's arguments are persuasive.
- 10 The operation of the test is explained at paragraphs 40-48 of the judgment and one or two points will bear emphasis. Paragraph 43 confirms that identification of the contribution in the second step is essentially a matter of determining what it is the inventor has really added to human knowledge, and involves looking at substance, not form.
- 11 Paragraphs 46-47 explain that the fourth step of checking whether the contribution is technical may not be necessary because the third step should have covered the point, and that a contribution which consists solely of excluded matter will not count as a technical contribution. Accordingly if the invention falls at the third step, it will be excluded under section 1(2) and will not be revived by reference to a possible technical effect.² Therefore the applicant's argument that the invention solves a technical problem and has an additional technical effect over and above the fact that the invention may be implemented by computer will not necessarily decide the matter.

Principles of interpretation

- 12 The applicant drew attention in its submissions to Pumfrey J's anxiety that the section 1(2) exclusions ought not to be given too wide a scope (see paragraph 187 of *RiM v Inpro Licensing SARL* [2006] EWHC 70 (Pat), [2006] RPC 20). In

¹ See paragraph 17 of the Office notice at <http://www.patent.gov.uk/patent/p-decisionmaking/p-law/p-law-notice/p-law-notice-subjectmatter.htm>

² See paragraph 10 of the above notice, and *Oneida Indian Nation's Application* [2007] EWHC 0954 (Pat) at paragraphs 10-11

consequence it urged a narrow interpretation of them.

- 13 That submission of course pre-dated *Aerotel* which, as the examiner pointed out, explained that the exclusions were positive categories of things not to be regarded as patentable rather than exceptions to patentability to be construed narrowly in accordance with general principles of statutory interpretation.³ I note also that in *Aerotel* (see paragraph 22) the court took Pumfrey J's comment not as inclination towards patentability in the case of computer programs, but merely as a sensible warning not to exclude an invention merely because it involved the use of a computer program.
- 14 I do not therefore see anything which mandates me to take a narrow view of the excluded categories. This is a matter of law which I should decide in accordance with the principles in *Aerotel*. As paragraph 5 of the judgment explains, it does not now suffice for the applicant to show that the invention merely arguably covers patentable subject-matter.

Arguments and analysis

- 15 The examiner maintains objection under the mathematical method, computer program and business method exclusions, but no longer objects under the mental act exclusion. I shall consider the objection in accordance with the four-step *Aerotel* approach.

Step 1 – construction of the claims

- 16 The construction of the claims is not in issue, and does not to my mind present any problems. However, for the avoidance of doubt, I confirm that I agree with the examiner that the term “rate” in the claims is to be construed as relating to financial instruments.

Step 2 – the contribution of the invention

- 17 Although the applicant has not directly addressed this in *Aerotel* terms, it believes that the invention reduced to its simplest form solves a problem of how to model the line of a graph where there is a gap which cannot be completed on the basis of known data in a field of activity. The applicant states that, although the invention was developed for use in rate modelling, it is applicable to any field of activity where similar mathematics can be used to fill in the missing data. It sees the problem as one of graphics, image processing or geometry which merely has application in the financial world.
- 18 Working on the basis of *Aerotel*, the examiner reaches a similar conclusion. In his view, the methodology of the invention is not restricted to zero coupon modelling and essentially allows gaps in data to be filled.
- 19 I think these analyses are broadly correct, although the lack of conciseness in the

³ See *Aerotel* at paragraph 12 and *NEC Corporation's Application* (BL O/050/07) at paragraph 9

claims makes it difficult to discern the precise scope of the invention. Thus I note that not all the claims are directed to modelling unknown values, claims 30/45 being concerned with whether known values are extreme. However, it seems to me that the contribution underlying all the claims is the use of a mathematical technique to model unknown data values or to detect known data values which are too extreme to be relied on.

- 20 Having regard to paragraph 43 of *Aerote/I* I think that the contribution remains in substance a mathematical technique irrespective of whether the invention is presented in the form of a method, a system or a computer program product, or of whether the claims are limited to computer-implemented methods as originally.

Step 3 – is the contribution solely within excluded matter?

Mathematical method

- 21 The technique that I have identified as the contribution takes known data values and carries out a series of mathematical operations in order to model unknown values or decide which known values are too extreme to be relied on. I agree with the examiner that this is essentially an abstract concept: to my mind it merely prescribes how a calculation is to be made and does not involve the manipulation of anything to which the data corresponds. I consider this to be nothing more than a mathematical method, and it therefore follows that the contribution is solely within excluded matter.

Other categories of exclusion

- 22 I do not therefore need to consider, and do not propose to decide, whether the contribution is also within the computer program and business method exclusions as the examiner has maintained. However, I will comment briefly on some of the points raised in respect of these categories.
- 23 On the computer program exclusion, the applicant on the basis of the case law as it stood at the time submitted that the invention addressed the technical problem of processing data of a specific type in order to fill in gaps in the data, and therefore had a technical effect over and above the fact that the invention could be implemented by computer. However, as I have mentioned above, even if there is a technical effect I do not think that is now decisive of the matter.
- 24 Page 108 lines 13-18 of the original specification state that the invention “can be expressed as a computer program or software to cause a computer to perform the method”; it does not appear to be disputed that any computer hardware involved is entirely conventional. Although the wording at page 108 might be taken to suggest an optional aspect, I note that the original claims were limited to computer-implemented methods (with the possible exception of claim 93 which is to my mind not clear) and that the specific embodiments implement the modelling system in software. I am doubtful whether in practice it would be feasible to implement the invention other than by way of a computer program or software, but it is not a matter which I need to decide.

- 25 On the strength of Mann J's judgment in *Macrossan's Application* [2006] EWHC 705 (Ch) the applicant considers that the invention is not within the business method exclusion, being merely a facility which might be used in business rather than the underlying abstraction of a business method. Although *Aerotel* overruled Mann J on the scope of the business method exclusion and held at paragraphs 67-71 that the exclusion was not limited to abstract matters or completed transactions, I have some doubt whether the mere modelling and calculation of figures, which is what the contribution essentially amounts to, is enough to amount to a method for doing business – although I agree with the examiner that the rates mentioned in the claims relate to financial measures and the invention is concerned with the modelling of data which feeds into various commercial activities concerning the pricing and trading of financial instruments (such as are outlined in the final descriptive section of the specification entitled “Industrial Applicability”). Again however this is not a matter which I need to decide.
- 26 The examiner initially considered that the invention as defined in the method claims 42-46 was within the mental act exclusion as comprising steps suitable to be carried out mentally. However he did not in the end pursue this objection, believing the matter better dealt with under the above categories of exclusion. I do not see any need to pursue it either.

Step 4: is the contribution technical in nature?

- 27 The contribution having failed the third step, as explained above it is not necessary for me to consider whether it is technical in nature. However, even if some aspect could be considered to lie outside the exclusions of section 1(2), I do not think the contribution could be considered to be a technical one. Whilst I accept the applicant's view that the invention solves a problem of how to model missing data in a graph, I do not consider this to be a technical problem.

Conclusion

- 28 I conclude that the invention as presently defined in the independent claims is excluded from patentability under section 1(2) because it relates to a mathematical method as such. I can see nothing in the appendant claims or the description which could form the basis for an allowable claim, and I therefore refuse the application under section 18(3).

Appeal

- 29 Under the Practice Direction to Part 52 of the Civil Procedure Rules, any appeal must be lodged within 28 days.

R C KENNEL

Deputy Director acting for the Comptroller

ANNEX TO DECISION O/319/07

Claim 1

A system for generating a model of unknown values of several rate series at specified times for use in analyses based on the modelled unknown values, the several rate series having unconditional rate dynamics characterized by a parametric model type in several dimensions, each rate series having at least one known value, the system comprising at least one computing device configured to:

- receive input indicative of the parametric model type of the unconditional rate dynamics;
- receive input indicative of a known or unknown rate value for each rate series and for each specified time;
- generate the values of the known rate changes;
- generate an unconditional multidimensional probability distribution of the known and unknown rate changes;
- generate a multidimensional probability distribution of the unknown rate changes conditional on the known rate changes taking their known values; and
- provide an output constituting the model or values derived therefrom.

Claim 42

A method of generating a model of unknown values of several rate series at specified times for use in analyses based on the modelled unknown values, the several rate series having unconditional rate dynamics characterized by a parametric model type in several dimensions, each rate series having at least one known value, the method comprising:

- providing a parametric model type of the unconditional rate dynamics;
- providing a known or unknown rate value for each rate series and for each specified time;
- generating values of the known rate changes;
- generating an unconditional multidimensional probability distribution of the known and unknown rate changes;
- generating a multidimensional probability distribution of the unknown rate changes conditional on the known rate changes taking their known values; and
- providing an output constituting the model or values derived therefrom.

R C KENNEL
31 October 2007