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Datasheet for the decision of 3 August 2023

Case Number: T 0030/22 - 3.2.04

Application Number: 16742008.2

Publication Number: 3291899

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Language of the proceedings: EN

Title of invention:
AMUSEMENT RIDE WITH SPEED TRIM SYSTEM

Patent Proprietor:
Vekoma Rides Engineering B.V.

Opponent:
ANTONIO ZAMPERLA S.p.A.

Headword:

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
Novelty - (yes)
Inventive step - (yes)

Decisions cited:
T 0495/91

Catchword:

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Beschwerdekammern

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Case Number: T 0030/22 - 3.2.04

D E C I S I O N
of Technical Board of Appeal 3.2.04
of 3 August 2023

Appellant: (Opponent)	ANTONIO ZAMPERLA S.p.A. Via Monte Grappa 15/17 36077 Altavilla Vicentina (VI) (IT)
Representative:	Gislon, Gabriele Marietti, Gislon e Trupiano S.r.l. Via Larga, 16 20122 Milano (IT)
Respondent: (Patent Proprietor)	Vekoma Rides Engineering B.V. Schaapweg 18 6063 BA Vlodrop (NL)
Representative:	EP&C P.O. Box 3241 2280 GE Rijswijk (NL)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 25 October 2021 concerning maintenance of the European Patent No. 3291899 in amended form.**

Composition of the Board:

Chairman	C. Heath
Members:	J. Wright
	C. Kujat

Summary of Facts and Submissions

I. The appeal was filed by the appellant (opponent) against the interlocutory decision of the opposition division finding that, on the basis of the auxiliary request 2, the patent in suit met the requirements of the EPC.

II. In particular, the opposition division decided that the subject-matter of this request (the main request in appeal) was novel and involved an inventive step.

III. Oral proceedings were held before the Board on 3 August 2023.

The appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed, or alternatively that the decision under appeal be set aside and the patent be maintained in an amended form on the basis of the first auxiliary request, refiled with its response to the grounds of appeal.

IV. The independent claims of the main request read as follows:

Claim 1:

"An amusement ride (1), such as a roller coaster, comprising:
- at least one passenger vehicle (4);

- a vehicle track (2), which vehicle track (2) comprises a vehicle track structure (3) for supporting the passenger vehicle (4) and which vehicle track structure (3) is configured for guiding the passenger vehicle (4) along the vehicle track in a direction of travel (5);
- a speed trim system (6) for reducing the speed of the at least one passenger vehicle (4) traveling along the vehicle track (2), characterized in that the speed trim system (6) comprises:
- a magnet arrangement (7) located on the at least one passenger vehicle (4), which magnet arrangement (7) comprises at least one row of magnets;
- at least one trim brake (10) located along the track (2), which trim brake (10) comprises:
- an induction blade (13), the induction blade (13) having an elongated braking edge (16) for passing closely along the at least one row of magnets of the magnet arrangement (7) of the passenger vehicle (4);
- an induction blade support (14), which induction blade support (14) pivotably supports the induction blade (13), such that the induction blade (13) can be pivoted about an induction blade pivot axis (17) between an active position, for trimming the speed of the passenger vehicle (2) while it passes the trim brake (10), and an inactive position; in which active position the induction blade (13) is supported with its braking edge (16) extending substantially parallel to the direction of travel (5) of the passenger vehicle (4) passing the trim brake (10), and with its braking edge (16) located in the trajectory of the magnet arrangement of the passing passenger vehicle (4); and in which inactive position the induction blade (13) is supported with its braking edge extending at an angle (27) to the trajectory of travel (5) of the passenger vehicle (4) passing the trim brake (10), and with its

braking edge (16) located outside the trajectory of the magnet arrangement of the passing passenger vehicle (4), wherein the blade support comprises an induction blade spacer arm (21), which induction blade spacer arm (21) has a support section (22) at one end, which support section is mounted to the induction blade (13), and a spacer section (23) at an opposite end, via which spacer section (23) the spacer arm (21) is pivotably supported such that part of the spacer section (23) extends between the induction blade pivot axis (17) and the elongated braking edge (16) of the induction blade (13) and the elongated braking edge (16) is thus in its longitudinal direction located at a spacer distance (26) from the induction blade pivot axis (17), and preferably wherein the spacer distance is at least 15 cm and/or is at least 15% of the length of the braking edge; and

- an actuator (15), preferably a pneumatic cylinder, which can pivot the induction blade (13) between its active and its inactive position;
- one or more sensors (18) for measuring the speed of the passenger vehicle (4) approaching and/or passing the trim brake (10);
- a control system (19), which control system (19) is configured for receiving speed information from the one or more sensors (18) and for comparing the speed measurement with a reference speed, and for controlling the actuator (15) to pivot the induction blade (13) into and/or out of its active position to trim the speed of the passenger vehicle (4) passing the trim brake (10), to trim the speed of the passing passenger vehicle (4), preferably to trim the speed to a speed below the predetermined reference speed, more preferably to trim the speed to substantially the reference speed."

Claim 8:

"A trim brake module for mounting along a vehicle track (2) of an amusement ride (1) to trim the speed of a passenger vehicle (4) traveling along the track (2), preferably to be used in combination with one or more sensors (18) and a control system (19) to, in use, provide an amusement ride (1) according to one or more of the claims 1-8, wherein the trim brake module comprises a trim brake (10) having:
- an induction blade (13), the induction blade (13) having an elongated braking edge (16) for passing along at least one row of magnets of a magnet arrangement of the passenger vehicle (4);
- an induction blade support (14), which induction blade support (14) pivotable supports the induction blade (13), such that the induction blade (13) can be pivoted about an induction blade pivot axis (17) between an active position, for trimming the speed of the passenger vehicle (4) while it passes the trim brake (10), and an inactive position; and
- an actuator (15), preferably a pneumatic cylinder, which can pivot the induction blade (13) between its active and its inactive position; wherein the induction blade support (14) comprises a support base (20) which is configured to mount the trim brake (10) to a track structure (3) of the vehicle track (2) of the amusement ride (1) such that the induction blade (13), when in its active position, is supported with its braking edge (16) extending substantially parallel to a direction of travel (5) of the passenger vehicle (4) guided by the track structure (3) along the vehicle track (2), and thus along the trim brake (10) mounted to the track structure (3) of that vehicle track (2), such that the braking edge (16) of the induction blade (13), when in

its active position, is located in the trajectory of a magnet arrangement of the passenger vehicle (4) passing the trim brake (10) to interact with those magnets and generate a braking force; and such that the induction blade (13), when in its inactive position, is supported with its braking edge (16) extending at an angle (27) to the trajectory of travel (5) of the passenger vehicle (4) passing the trim brake (10), and with its braking edge (16) located outside the trajectory of the magnet arrangement of the passing passenger vehicle (4),
wherein the blade support further comprises an induction blade spacer arm (21), which induction blade spacer arm (21) has a support section (22) at one end, which support section is mounted to the induction blade (13), and a spacer section (23) at an opposite end, via which spacer section (23) the spacer arm (21) is pivotable mounted to the support base (20), and wherein part of the spacer section (23) extends between the induction blade pivot axis (17) and the elongated braking edge (16) of the induction blade (13) and the braking edge (16) is thus in its longitudinal direction located at a spacer distance (26) from the induction blade pivot axis (17), and preferably, wherein the spacer distance is at least 15 cm and/or is at least 15% of the length of the braking edge".

V. In the present decision, reference is made to the following evidence:

D4.1: Zach Clarke "Cheetah Hunt", Busch Gardens, Tampa Bay, USA, 8 April 2015, YouTube https://www.youtube.com/watch?v=mwQfeAaaI4k

VI. The appellant-opponent's arguments can be summarised as follows:

D4.1 takes away novelty of the independent claims of the main request. Amongst other things, it discloses a spacer arm having a spacer section such that the elongate braking edge of the induction blade is located at a spacer distance from the pivot axis in the longitudinal direction. Starting from D4.1, if the differing feature were the spacer section/distance feature, then a technical effect of faster switching is not achieved over the whole scope of the claim, because various blades of different geometries with and without spacer sections could have the same switching speed. Therefore, it is an inappropriate problem for assessing inventive step. Starting from D4.1, a spacer section could be realised by cutting away a front part of the blade, so the problem can be formulated as one of reducing the weight and material of the blade. In solving this problem the skilled person would apply their general knowledge to arrive at the missing spacer feature as a matter of obviousness.

VII. The respondent-proprietor's arguments can be summarised as follows:

The subject matter of claims 1 and 8 of the main request (as maintained) is new with respect to D4.1 because it does not disclose a spacer arm with a spacer section providing a spacer distance. It also involves an inventive step starting from D4.1 in combination with the skilled person's general knowledge. The objective technical problem is to modify D4.1 to increase switching speed. The skilled person would not know to solve this problem by providing a spacer arm as claimed from their general knowledge.

Reasons for the Decision

1. The appeal is admissible.

2. Background

The patent relates to an amusement ride where a vehicle travels along a track (such as a roller coaster), with a speed trim system (see title and paragraph [0001]). The patent explains (see paragraph [0003]) that on certain sections of track, the vehicle may need to have its speed reduced (trimmed). It is known to do this using eddy current braking (see paragraphs [0005] to [0007]), in which an [electrically conductive] fin-like stator, that is an induction blade, is inserted into a gap between two arrays of magnets that are located on the passing vehicle. The magnetic field produced by the arrays of magnets induces eddy currents in the induction blade which generate a counter magnetic field, thus slowing down the vehicle. According to the patent (see published patent specification, paragraphs [0020] to [0022] and [0029] and claims 1 and 9), the induction blade is pivotably supported so that it can be pivoted from an inactive position (induction blade is not in the gap between the magnet arrays) into an active position (induction blade is in the gap), for trimming the speed of the passing vehicle.

3. Formal aspects of the appellant-opponent's novelty and inventive step objections

In its appeal grounds, the appellant-opponent's only substantiated arguments were based on the video evidence D4.1. Therefore, the Board has disregarded the appellant-opponent's assertions of lack of novelty/

inventive step with regard to D4.2 to D4.4, D5 and D6, Article 12(3) RPBA 2020 with Article 114(2) EPC.

4. Main request (as maintained), claims 1 and 8, novelty with respect to D4.1

4.1 During the opposition proceedings, granted claim 1 was combined with granted claim 4 and granted independent claim 9 with granted claim 10. This resulted in the incorporation of a new feature in the independent claims (1 and 8) of the main request that concerns a *spacer arm*. The feature reads as follows:

"wherein the blade support further comprises an induction blade spacer arm (21), which induction blade spacer arm (21) has a support section (22) at one end, which support section is mounted to the induction blade (13), and a spacer section (23) at an opposite end, via which spacer section (23) the spacer arm (21) is pivotable mounted to the support base (20), and wherein part of the spacer section (23) extends between the induction blade pivot axis (17) and the elongated braking edge (16) of the induction blade (13) and the braking edge (16) is thus in its longitudinal direction located at a spacer distance (26) from the induction blade pivot axis (17), and preferably, wherein the spacer distance is at least 15 cm and/or is at least 15% of the length of the braking edge".

4.2 This feature plays a decisive role for the discussion of novelty and inventive step and the interpretation of certain of its terms has been disputed by the parties. Therefore, before looking in detail at novelty the Board finds it useful to interpret certain terms.

4.2.1 *Elongated braking edge*

The compound term *braking edge* does not appear to have an established technical meaning in the relevant field, nor have the parties argued to the contrary. In such a case, the skilled person will look to the published patent specification to interpret the feature. Paragraph [0023] explains that the braking edge is *that part of the induction blade that passes closely along the row of magnets of the passenger vehicle*, as it passes the activated trim brake. Thus, the patent gives a precise *own dictionary* definition of the term and it is this that the skilled person would use to interpret the feature. Since the magnets extend downwards parallel to the blade (see for example figure 7 of the published patent specification - rows of magnets 8 and induction blade 13), it follows that the braking edge has a corresponding depth along the blade. Therefore, the braking edge is a longitudinal region of the blade that extends down the blade as far as the juxtaposed magnets on the vehicle extend when the brake is active.

That it is elongated means no more than that it is longer than it is deep. Regardless of its shape, all of the blade (including its braking edge) extends parallel to the direction of travel, rather than just the part under the flat top of the blade as the appellant-opponent has argued. If this were not so, it could not be inserted in between the magnets on the passing vehicle. Thus the braking edge is the entire section of the blade that overlaps the magnets on the passing vehicle, regardless of any particular [non-rectangular] shape the blade might have.

4.3 Induction blade support comprises an induction blade spacer arm

The usual meaning of the word *spacer* (see Oxford English dictionary online (OED), definition 2.a is: An object or device used to make a space, interval, or division; (also) a mechanism that regulates or controls spacing. The skilled person will understand an arm in mechanical terms to be a part that resembles an arm, thus they will understand it to be an elongated element.

Since the the spacer arm is part of the blade support, the skilled person will also expect it to have the dual functions of supporting the blade and spacing it. The disputed claim feature defines this more precisely: The arm has two ends. At one of these is a *support section* which is mounted to the induction blade, at the other end is a *spacer section*, via which the spacer arm is pivotably supported. In the Board's view, the skilled person - who reads the claim with a mind willing to understand - will realise that the support and spacer sections are two distinct sections with different functions as their names imply. Thus the support section has a supporting function and because it is *mounted to the induction blade*, the skilled person will understand this section to support the blade.

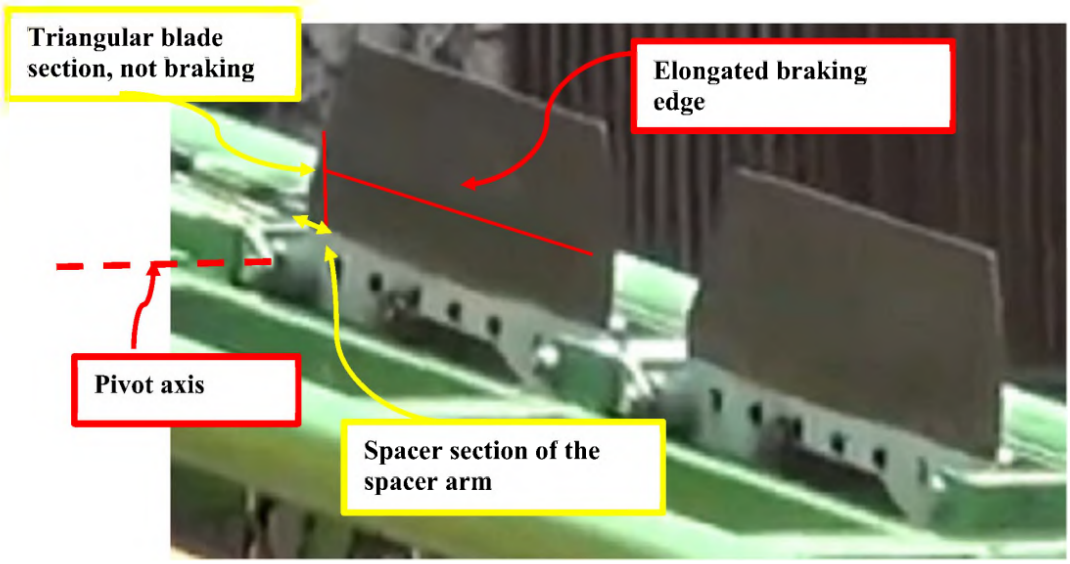
By the same token, the skilled person will understand the *spacer section* of the induction blade spacer arm (via which the blade is pivotably supported) to put a space between the blade and the pivot.

The skilled person would therefore exclude the possibility that the spacer section might be mounted to the induction blade in the same way as the support section, rendering the two parts indistinguishable, as the appellant-opponent has argued.

The spacer arm feature also defines that part of the spacer section extends [in the longitudinal direction] between the pivot axis and the elongated braking edge in such a way as to put a *spacer distance* between the elongated braking edge and the pivot.

4.4 Turning now to D4.1, it discloses a roller coaster amusement ride with a track structure that guides a passenger vehicle. These features can be seen throughout the video. It is not disputed that it also discloses a speed trim system with eddy current brakes. These brakes can be seen operating at various times in the video, for example at run-times 00:50 to 01:04 and at 03:34 to the end of the video.

The appellant-opponent has annotated a screen shot from D4.1 (taken at a run-time 03:35) in its letter of 6 July 2023, page 2, to show where it sees elements of the disputed (blade support spacer arm) feature in D4.1. The figure is reproduced below:



4.5 Whilst two induction blades are shown, only the left one has been annotated and so it is to this one that the Board will refer. The blade can be seen above the track with a horizontal upper edge that is parallel to the track. In this position, magnets located on the chassis of the passing vehicle will pass close by at least its upper part, so the blade has a braking edge and an active position as claimed. The blade is supported on an arm (with its row of bolts for mounting it to the blade). At the left end of the arm is a bushing, via which the arm is pivotably supported (see the appellant's annotation *pivot axis*). As seen elsewhere in the video, the blade can pivot into an inactive position (below the track).

4.6 However, contrary to how the appellant-opponent has argued, the Board does not consider that D4.1 directly and unambiguously discloses the arm to have a spacer section as claimed.

4.6.1 This is firstly because, as the photograph shows, the entire length of the arm - that starts at the bushing - appears to be attached to the induction blade, including the part the appellant-opponent has identified as a spacer section. In other words, the arm's entire length has a support function, rather than it being made up of distinct *support* and *spacer* sections as claimed.

4.6.2 Secondly, the part of the blade the appellant-opponent has identified as a spacer section (though the Board sees none) neither *extends between the pivot and the braking edge*, nor provides a *spacer distance* between the pivot axis and the braking edge as the disputed feature requires the spacer section to do:

Since the braking edge is the entire part of the blade that overlaps the magnets on the passing vehicle, how far down it extends depends on the depth of the magnets. It is not in dispute that D4.1 does not directly and unambiguously disclose this depth. Therefore, the appellant-opponent's long annotation line parallel with the top of the blade does not necessarily represent the lower boundary of the braking edge. Whilst it may well be that the braking edge will not extend all the way to the bottom of the blade, it may approach it. Consequently, it may extend further than the annotation suggests to include at least part of the induction blade shown at the far left, where its edge is perpendicular to the track. Since this part of the blade appears to be located right above the pivot axis, D4.1 does not directly and unambiguously disclose there to be a section of the arm which extends *between the pivot and the braking edge*, nor therefore one that creates a *spacer distance* between these two.

4.7 Therefore, the Board holds that the opposition division correctly decided that the subject matter of claims 1 and 8 of the main request (auxiliary request 2 in opposition) is new.

5. Main request, claims 1 and 8, inventive step starting from D4.1 in combination with the skilled person's general knowledge

5.1 In accordance with well established jurisprudence (see Case Law of the Boards of Appeal, 10th edition, 2022 (CLBA), I.D.4.2.2 and for example **T 495/91**, reasons 4.2), the objective definition of the problem to be solved by the invention should normally start from the problem described in the contested patent. Only if examination shows that the problem disclosed was not solved [...], is it necessary to investigate which other problem objectively exists.

5.2 In the present case, the technical effect associated with the differing features (support arm with spacer section providing a spacer distance between braking edge and pivot) is explained in paragraph [0063] of the published patent to be that, the angle over which the induction blade should be pivoted to move it, more in particular its braking edge, between the active and the inactive position is reduced, which enables fast switching between the active and inactive position of the trim brake and allows for a compact trim brake.

5.2.1 Leaving aside the question as to whether a spacer distance as claimed makes for a more compact trim brake, the Board considers that, for a given induction blade and a given angular speed of rotation, a spacer distance between the braking edge and the pivot will

always increase the speed with which the brake moves between its active and inactive positions. In particular, each point on the braking edge of a pivotably supported induction blade is constrained to trace a circular arc as it rotates about the pivot. For a given point, the length of an arc segment Δs moved when the arm pivots through an angle Δθ is governed by the equation:

$\Delta s = \Delta\theta . r$

where r is the distance between the point on the blade and the pivot, in other words its radius.

5.2.2 It follows from the irrefutable rules of geometry that if the induction blade is supported on an arm with a spacer section providing a spacer distance, the radius r will be greater than if there were no spacer distance for each and every point of the induction blade, including the last point of the braking edge to leave the trajectory of the magnet array on the passing vehicle, that is the critical point defining the blade's transition from its active to its inactive position, (cf. published patent specification, paragraph [0022]).

5.2.3 This means that if a given arm is supported on a spacer arm with a spacer section/distance and moved at a given angular speed, the speed with which this critical point moves will inevitably be greater than if the spacer section/distance were absent, whatever the blade's geometry. Therefore, the technical effect explained in paragraph [0063] (*faster switching*) applies across the whole scope of the claim.

5.2.4 In reaching this result the Board has not been persuaded of the relevance of comparing how fast blades

of differing shapes and geometries, with and without spacer arms, might transition between their active and inactive positions (cf. the appellant-opponent's letter of 6 July 2023, pages 5 and 6). This is because, in developing the technical problem *objectively*, the Board must examine the technical effect of the sole differing feature (spacer section/distance) by comparing *like for like.* Amongst other things, this means considering its effect in the context of the *same* induction blade. Thus it is irrelevant that the induction blade of D4.1 could be modified by removing the part of it that reaches from the pivot to an imaginary line extending vertically down from the start of its flat upper edge and that both D4.1's blade and such a modified blade would transition from the active to the inactive position at the same time (being determined in both cases by when the unchanged position of the start of the flat upper edge left the trajectory of the vehicle's magnets). This modification would not be to simply add a spacer section to D4.1's blade, displacing all of it away from the pivot, but rather to make a different and smaller blade, thus one with a reduced braking effect, albeit mounted on an arm with a spacer section.

5.3 From the above, the Board considers that the objective technical problem associated with the differing feature (spacer arm with spacer section/spacer distance) can be formulated as: How to modify D4.1's trim brake arrangement to provide faster switching between its active and inactive positions.

5.4 Following the approach outlined above (see section 5.1), it is appropriate to examine inventive step based on this objective technical problem (switching speed), and the Board need not investigate any other problem

not disclosed in the patent but which might objectively exist. However, for the sake of completeness, the Board notes that the claims' only differing feature (spacer section/distance) would not influence the blades weight or the amount of material it contained. Therefore, the problem suggested by the appellant-opponent (which is not disclosed in the patent) of *how to modify D4.1's induction blade to save weight and material* is not objectively solved by the differing feature and the Board has given it no further consideration.

5.5 Turning to the question of obviousness, the appellant-opponent has argued in its appeal grounds (see points 57 to 62) that, based on the objective technical problem of faster switching, the skilled person would find guidance in D4[.1] itself to distance the braking edge from the pivot axis, that is to create a spacer distance as claimed, because its front part is chamfered (triangular in comparison to a rectangular blade). Moreover, so the argument continues, it would be obvious for the skilled person to apply their general knowledge to create a spacer distance by modifying [which can but mean to remove] part of D4.1's induction blade between the pivot axis and the braking edge, whereby, according to the appellant-opponent, such a modification would be a mere design choice.

5.6 The Board does not find these arguments convincing. Firstly, the appellant-opponent has not explained why the shape of D4.1's blade might lead the skilled person to the idea of introducing a spacer section/distance to solve the problem of increased switching speed. Nor does the Board see why this might be so: Although the D4.1 video shows eddy current brakes being deployed, it does not discuss any problem that might be associated with them, let alone disclose a need to increase the

speed at which the brake transitions between its active and inactive positions. Nor has the appellant-opponent explained why, in the absence of hindsight, the skilled person would arrive at the (spacer section/distance) idea from their general knowledge. This is all the more true given that there would be other ways of solving the objective technical problem, such as implementing measures to make its actuator operate faster.

5.7 As to the argument that introducing a spacer section/ distance is merely a design choice, and thus devoid of inventive step, this boils down to the idea that what is claimed would merely be an alternative to D4.1's arrangement achieving no different technical effect. However, as has been explained, the differing feature has a technical effect across the whole scope of the claim (faster switching speed). Even a spacer section/ distance of a short length, as the appellant-opponent has speculated it could have, would provide a small increase in switching speed. Therefore, the argument is moot.

5.8 Thus, the appellant-opponent's inventive step arguments are not persuasive.

6. It follows that the arguments of the appellant-opponent have not convinced the Board that the opposition division was wrong to find that the subject matter of the main request was new with respect to D4.1 amongst other prior art, Article 54(1) EPC (see impugned decision points 75 to 80) and that it involved an inventive step starting from D4.1 in combination with the skilled person's general knowledge, Article 56 EPC (see impugned decision, points and 83 to 86).

Therefore, the Board must dismiss the appeal.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Magouliotis C. Heath

Decision electronically authenticated