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Datasheet for the decision of 13 December 2021

Case Number: T 0184/19 - 3.2.04

Application Number: 11716807.0

Publication Number: 2556249

IPC: F03D7/04

Language of the proceedings: EN

Title of invention:
A WIND TURBINE

Patent Proprietor:
Vestas Wind Systems A/S

Opponents:
Siemens Gamesa Renewable Energy GmbH & Co. KG
ENERCON GmbH

Headword:

Relevant legal provisions:
EPC Art. 108, 54, 56, 84, 123(2), 111

Keyword:
Admissibility of appeal - appeal sufficiently substantiated (yes)
Novelty - main request (no)
Inventive step - auxiliary requests (no)
Claims - clarity - auxiliary request (no)
Amendments - intermediate generalisation
Appeal decision - remittal to the department of first instance (no)
Prohibition of reformatio in peius - not applicable

Decisions cited:
G 0003/14

Catchword:
Reasons 6.2 to 6.4

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Case Number: T 0184/19 - 3.2.04

D E C I S I O N
of Technical Board of Appeal 3.2.04
of 13 December 2021

Appellant: (Patent Proprietor)	Vestas Wind Systems A/S Hedeager 42 8200 Aarhus N (DK)
Representative:	Inspicos P/S Kogle Allé 2 2970 Hørsholm (DK)
Appellant: (Opponent 2)	ENERCON GmbH Dreekamp 5 26605 Aurich (DE)
Representative:	Eisenführ Speiser Patentanwälte Rechtsanwälte PartGmbB Postfach 10 60 78 28060 Bremen (DE)
Party as of right: (Opponent 1)	Siemens Gamesa Renewable Energy GmbH & Co. KG Beim Strohhause 17-31 20097 Hamburg (DE)
Representative:	Aspacher, Karl-Georg Siemens Gamesa Renewable Energy GmbH & Co. KG Otto-Hahn-Ring 6 81739 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 12 November 2018 concerning maintenance of the European Patent No. 2556249 in amended form.**

Composition of the Board:

Chairman	A. de Vries
Members:	S. Oechsner de Coninck
	T. Bokor

Summary of Facts and Submissions

I. The proprietor and the opponent 2 both appeal against the interlocutory decision of the Opposition Division concerning maintenance of the European Patent No. 2556249 in amended form.

II. In its written decision the Opposition Division held that granted claim 1 according to the auxiliary request 2A met the requirements of the EPC, having regard in particular to the following documents:

D4: US 2004/0067134 A1

E1: Barlas et al. "Review of state of the art in smart rotor control research for wind turbines", Progress in Aerospace Sciences, 46 (2010), 1-27, Elsevier, 15 September 2009

III. Oral proceedings were held on 13 December 2021 by mixed-mode videoconference.

IV. The appellant proprietor requests that the decision under appeal be set aside and the patent be maintained as granted (main request). Auxiliarily they request to maintain the patent in an amended form on the basis of one of the auxiliary requests 1 or 2 filed with the grounds of appeal dated 22 March 2019. Further auxiliarily they request the dismissal of the appeal of the opponent 2, i.e. to maintain the patent in an amended form as upheld by the Opposition Division (auxiliary request 2A), or further auxiliarily to maintain the patent in an amended form on the basis of one of the auxiliary requests 3, 3A, 4 to 6, also filed with the grounds of appeal, re-filing earlier requests.

The appellant opponent 2 requests that the decision under appeal be set aside and the patent be revoked.

The opponent 1 as respondent to the proprietor's appeal and also as party as of right requests that the proprietor’s appeal be dismissed.

V. The wording of claim 1 of the relevant requests is as follows:

Main request
"A wind turbine (30), the wind turbine comprising: a rotor (36) having a plurality of blades (38); and a controller (100), wherein the controller (100) is arranged to control independently one or more components (44) of each blade (38) in order to increase a driving moment of each blade independently of other of the blades when the speed of wind acting on the wind turbine is below a rated wind speed (Vr) of the wind turbine wherein the driving moment provided by each blade (38) is varied by varying the effective shape of the blade facing the wind acting on the blade; and wherein the effective shape of each blade (38) is varied by at least one moveable aerodynamic device (44)."

Auxiliary request 1 (with amendments with respect to the main request underlined)

1. A wind turbine (30), the wind turbine comprising:
a rotor (36) having a plurality of blades (38); and
a controller (100),
wherein the controller (100) is arranged to control individually and independently one or more components (44) of each blade (38) in order to increase a driving moment of each blade individually and independently of all of the other ~~of the~~ blades when the speed of wind acting on the wind turbine is below a rated wind speed (Vr) of the wind turbine
wherein the driving moment provided by each blade (38) is varied by varying the effective shape of the blade facing the wind acting on the blade; and
wherein the effective shape of each blade (38) is varied by at least one moveable aerodynamic device (44).

Auxiliary request 2 ((with amendments with respect to the main request underlined)

1. A wind turbine (30), the wind turbine comprising:
a rotor (36) having a plurality of blades (38); and
a controller (100),
wherein the controller (100) is arranged to control independently one or more components (44) of each blade (38) in order to increase a driving moment of each blade independently of other of the blades when the speed of wind acting on the wind turbine is below a rated wind speed (Vr) of the wind turbine
wherein the driving moment provided by each blade (38) is varied by varying the effective shape of the blade facing the wind acting on the blade; and
wherein the effective shape of each blade (38) is varied by at least one moveable aerodynamic device (44),
wherein the controller (100) is arranged to:
determine (170) the driving moments (M_1, M_2, M_3) of the blades (38) in a rotor plane and to determine (171) optimum demands ($\Phi_{D1\ opt}$, $\Phi_{D2\ opt}$, $\Phi_{D3\ opt}$) that maximise the driving moments (M_1, M_2, M_3) of each one of the blades (38) in the rotor plane, wherein the determination of the optimum demands ($\Phi_{D1\ opt}$, $\Phi_{D2\ opt}$, $\Phi_{D3\ opt}$) is separate for each blade and independent of other of the blades (38), and
superimpose the optimum demands ($\Phi_{D1\ opt}$, $\Phi_{D2\ opt}$, $\Phi_{D3\ opt}$) on a common demand ($\Phi_{D\ comm}$) for all of the blades (38) to provide demands (Φ_{D1}, Φ_{D2}, Φ_{D3}) that are provided to respective actuators of each one of the blades (38) separately and independently.

Auxiliary request 2A (with amendments with respect to the main request underlined)

1. A wind turbine (30), the wind turbine comprising:
a rotor (36) having a plurality of blades (38); and
a controller (100),
wherein the controller (100) is arranged to control independently one or more components (44) of each blade (38) in order to increase a driving moment of each blade independently of other of the blades when the speed of wind acting on the wind turbine is below a rated wind speed (Vr) of the wind turbine
wherein the driving moment provided by each blade (38) is varied by varying the effective shape of the blade facing the wind acting on the blade; and
wherein the effective shape of each blade (38) is varied by at least one moveable aerodynamic device (44),
wherein the controller (100) is arranged to:
determine (170) the driving moments (M_1, M_2, M_3) of the blades (38) in a rotor plane and to determine (171) optimum demands ($\Phi_{D1\ opt}$, $\Phi_{D2\ opt}$, $\Phi_{D3\ opt}$) that maximise the driving moments (M_1, M_2, M_3) of each one of the blades (38) in the rotor plane, wherein the determination of the optimum demands ($\Phi_{D1\ opt}$, $\Phi_{D2\ opt}$, $\Phi_{D3\ opt}$) is separate for each blade and independent of other of the blades (38), and
superimpose the optimum demands (ΦD1 opt, ΦD2 opt, ΦD3 opt) on a common demand (ΦD comm) for all of the blades (38) to provide demands (ΦD1, ΦD2, ΦD3) that are provided to respective actuators of the at least one moveable aerodynamic device of each one of the blades (38) separately and independently.

Auxiliary request 3 (with amendments with respect to the main request underlined)

1. A wind turbine (30), the wind turbine comprising:
a rotor (36) having a plurality of blades (38); and
a controller (100),
wherein the controller (100) is arranged to control independently one or more components (44) of each blade (38) in order to increase a driving moment of each blade independently of other of the blades when the speed of wind acting on the wind turbine is below a rated wind speed (Vr) of the wind turbine
wherein the driving moment provided by each blade (38) is varied by varying the effective shape of the blade facing the wind acting on the blade; and
wherein the effective shape of each blade (38) is varied by at least one moveable aerodynamic device (44),
wherein the at least one moveable aerodynamic device (44) comprises at least one flap of the blade (38).

Auxiliary request 3A (with amendments with respect to the main request underlined)

1. A wind turbine (30), the wind turbine comprising:
a rotor (36) having a plurality of blades (38); and
a controller (100),
wherein the controller (100) is arranged to control independently one or more components (44) of each blade (38) in order to increase a driving moment of each blade independently of other of the blades when the speed of wind acting on the wind turbine is below a rated wind speed (Vr) of the wind turbine
wherein the driving moment provided by each blade (38) is varied by varying the effective shape of the blade facing the wind acting on the blade; and
wherein the effective shape of each blade (38) is varied by at least one moveable aerodynamic device (44),
wherein the at least one moveable aerodynamic device (44) comprises at least one flap of the blade (38), and wherein the controller (100) is arranged to:
determine (170) the driving moments (M1, M2, M3) of the blades (38) in a rotor plane and to determine (171) optimum demands (ΦD1_opt, ΦD2_opt, ΦD3_opt) that maximise the driving moments (M1, M2, M3) of each one of the blades (38) in the rotor plane, wherein the determination of the optimum demands (Φ_{D1_opt}, Φ_{D2_opt}, Φ_{D3_opt}) is separate for each blade and independent of other of the blades (38), and
superimpose the optimum demands (Φ_{D1_opt}, Φ_{D2_opt}, Φ_{D3_opt}) on a common demand (Φ_{D_comm}) for all of the blades (38) to provide demands (Φ_{D1}, Φ_{D2}, Φ_{D3}) that are provided to respective actuators of the at least one moveable aerodynamic device of each one of the blades (38) separately and independently.

Auxiliary request 4 (with amendments with respect to the main request underlined)

1. A wind turbine (30), the wind turbine comprising:
a rotor (36) having a plurality of blades (38); and
a controller (100),
wherein the controller (100) is arranged to control independently one or more components (44) of each blade (38) in order to increase a driving moment of each blade independently of other of the blades when the speed of wind acting on the wind turbine is below a rated wind speed (Vr) of the wind turbine
wherein the driving moment provided by each blade (38) is varied by varying the effective shape of the blade facing the wind acting on the blade; and
wherein the effective shape of each blade (38) is varied by at least one moveable aerodynamic device (44),
wherein the controller (100) is further arranged to control independently each of the plurality of blades (38) and/or one or more components of each blade in order to reduce a mechanical load of each blade independently of other of the blades when wind force acting on the blades is above a cut-out wind speed (Vmax).

Auxiliary request 5 (with amendments with respect to the main request underlined)

1. A wind turbine (30), the wind turbine comprising:
a rotor (36) having a plurality of blades (38); and
a controller (100),
wherein the controller (100) is arranged to control independently one or more components (44) of each blade (38) in order to increase a driving moment of each blade independently of other of the blades when the speed of wind acting on the wind turbine is below a rated wind speed (Vr) of the wind turbine
wherein the driving moment provided by each blade (38) is varied by varying the effective shape of the blade facing the wind acting on the blade; and
wherein the effective shape of each blade (38) is varied by at least one moveable aerodynamic device (44),
wherein the controller (100) is arranged to control the wind turbine (30) at wind speeds above a cut-out wind speed (Vmax) to yaw the rotor (36) into or away from the direction of the wind, as measured by LIDAR, prior to lift provided by each blade (38) being controlled independently of control of other of the blades (38) in order to reduce the mechanical load of each blade (38) independently of other of the blades (38).

Auxiliary request 6 (with amendments with respect to the main request underlined)

1. A wind turbine (30), the wind turbine comprising:
a rotor (36) having a plurality of blades (38); and
a controller (100),
wherein the controller (100) is arranged to control independently one or more components (44) of each blade (38) in order to increase a driving moment of each blade independently of other of the blades when the speed of wind acting on the wind turbine is below a rated wind speed (Vr) of the wind turbine
wherein the driving moment provided by each blade (38) is varied by varying the effective shape of the blade facing the wind acting on the blade; and
wherein the effective shape of each blade (38) is varied by at least one moveable aerodynamic device (44),
wherein, at the occurrence of a load condition at which the wind turbine cannot align itself into the wind to reduce the experienced loads, the controller (100) is arranged to determine a yaw error of a nacelle (34) and an azimuth angle of each blade (38), and to provide a pitch angle for each blade (38) as a function of the yaw error, the azimuth angle, and a mean wind speed for alleviating the loads.

VI. The appellant proprietor argued inter alia as follows:
- Their appeal is admissible.
- The subject-matter of claim 1 according to the main request and auxiliary request 1 is novel with respect to D4.
- Claim 1 of auxiliary request 2 is clear.
- The amendments of claim 1 according to auxiliary request 2A do not add subject-matter extending beyond the application as filed.
- The auxiliary requests 3,3A,4 to 6 are admissible, especially auxiliary requests 3 to 6, which were filed in opposition proceedings.
- concerning these requests, the subject-matter of claim 1 according to auxiliary requests 3 to 5 involves an inventive step. The amendments of claim 1 according to auxiliary request 6 do not add subject-matter extending beyond the application as filed.

VII. The appellant opponent 2 and the respondent opponent 1 argued inter alia as follows:
- The proprietor's appeal lacks substantiation vis-a-vis E3 and is thus inadmissible.
- The subject-matter of claim 1 according to the main request and auxiliary request 1 lacks novelty with respect to D4, while the wording of claim 1 of the auxiliary request 2 is unclear.
- The amendments of claim 1 according to auxiliary request 2A add subject-matter extending beyond the application as filed.
- The auxiliary requests 3, 3A, 4 to 6 should not be admitted as they are belated and diverge. Remittal is requested in case of admission.
- The subject-matter of claim 1 according to auxiliary requests 3 to 5 does not involve an inventive step.

The amendments of claim 1 according to auxiliary request 6 adds subject-matter extending beyond the application as filed.

Reasons for the Decision

1. The admissibility of the proprietor's appeal is contested in the opponent's reply to the grounds of 6 September 2019 with the argument that the proprietor failed to address the lack of novelty of the main request in respect of E3, that was discussed during the oral proceedings before the opposition division. In particular the minutes record that the opposition division "decided" that the main request and auxiliary request 1 lacked novelty over both D4 and E3.

1.1 However, the EPC does not provide for separate formal decisions in respect of different grounds of opposition, and therefore any decision in respect of novelty vis-a-vis a particular document announced during the oral proceedings is not a decision for the purposes of Article 108 EPC, and as such not separately appealable. It is only the final order announced at the end of the oral proceedings which represents the appealable decision, together with the written reasons. Therefore, in order to be admissible, the appeal needs only address the reasons taken up in the written decision. An appealing party cannot be expected to speculate about reasons which were not presented to it in the written decision.

1.2 In the present case, the minutes also record that the Chairman explained the findings on novelty (page 4, the paragraph following the break). Under these circumstances, the opposition division could have been expected to give reasons also in respect of E3.

Whatever was the cause for the omission of these reasons from the written decision, whether an oversight or a change of opinion, not addressing reasons missing in the written decision cannot be held against the appellant proprietor. As the written decision for the patent as granted is based only on lack of novelty over D4 and the appellant proprietor has given arguments in respect of lack of novelty with respect to D4, their appeal is properly substantiated.

Moreover, the Board sees no legal basis for the argument of the opponent 2, namely that the minutes must be considered to be part of the decision. This is only true to the extent that statements of the parties and the Board that directly develop a legal effect (requests, withdrawals, Board's order etc.) must be taken into account in the decision as well, given that the minutes must be considered to represent an authentic record of such statements. That the minutes record a further finding of the Opposition Division, which is not mentioned in the written decision, is immaterial. It is only the recorded reasons in the duly notified written decision that the proprietor needed to address in their appeal.

1.3 The Board thus concludes that the proprietor's appeal is admissible as it complies with the requirements of Art 108 and Rule 99(2) EPC in combination with Article 12(2) RPBA 2007.

2. Main request - Novelty

2.1 D4 discloses a dynamically reconfigurable wind turbine blade. Each blade 20 is provided with an embedded actuator 30 in the form of piezo-electric fibers of shape memory alloy (SMA) for reconfiguring the flexible

blade shape (paragraph 031). A blade load sensor 36 and wind speed sensor 38 provide signals representative of the current wind conditions and current configuration and speed of the blade to a control computer 34, that controls a power regulator 32 acting to reconfigure the blade shape (paragraph 032).

2.2 It is disputed that D4 discloses blades that are controlled independently of other blades and that a movable aerodynamic device is provided that varies the blade's shape in the sense of claim 1.

2.3 D4 consistently describes the dynamic reconfiguration in relation to a single blade. Thus, paragraph 031 in reference to figure 3 is meant to show schematically the self-contained, closed control scheme for each blade, with control effected in response to signals from the load sensor of the particular blade concerned and general wind speed. The reference sign 20 concerns an individual blade which is depicted to include the whole control system necessary for its individual active control. The actuator 30 of the blade is connected to the local power regulator 32 itself receiving signals from a blade control computer 34 that receives signals representative of the blade load via sensor 36 embedded in the blade (paragraph 037) indicating the amount of deflection and a wind speed sensor 38. Paragraph 033 describes how the corrective signals are then developed from the configuration of "the blade" in addition to outputs of sensors 36,38 and which are specific to the concerned blade that receives corrective control signals tailored to the concerned blade. In case of a plurality of blades as mentioned in paragraph 021, or three blades as disclosed in paragraph 034, the same type of on blade individual actuation logic is expected to be provided for each one

of the plurality of blades. Also in that case a blade receives individual control signals and is thus controlled individually and separately from other blades.

2.4 The Board also considers the SMA elements to be a movable aerodynamic device designed to vary the effective shape of the blade as specified in claim 1. The SMA 40 comprises piezoelectric fibers, see paragraph 036 and figures 4 and 5, that are located within a portion of the blade profile as also schematically depicted in Figure 3 as a surface within the current blade 20. As such they form a sub-assembly thereof that drives the twist and camber of the blade, paragraphs 0031, 0043, and thus the effective shape of the blade facing the wind. This allows optimal blade angles of attack, and thus driving moment to be optimized, paragraph 0017, so as to maximize performance especially at lower wind speeds, paragraph 008. Thus the SMA elements and corresponding parts of the blade that are reconfigured to change its twist and camber, belong to the family of movable aerodynamic devices that are designed to vary the effective shape of the blade of claim 1.

2.5 The Board reads the term "movable aerodynamic device" in a broader sense to include any of a wide variety of mechanisms that vary blade shape. A definition of sorts is given in paragraph 021 of the patent specification, where the term appears in brackets following "individual pitching and/or on-blade control devices" that are used to maximise or improve rotor power in (low) wind speeds. Flaps and tabs appear to be mentioned only as illustrative examples, see specification paragraph 018 and dependent claims 9 and 10 (claim 11 still retains the example of individual

pitching). Nor is the Board able to infer from the use of the terms "movable" and "device" that a movable aerodynamic device must refer to separate structures movably mounted on a blade. It suffices in the Board's understanding that there is some device or mechanism associated with the blade that is movable and so changes the aerodynamic properties of the blade. In this regard the Board refers to further E1, a paper reviewing the state of the art, which in chapter 4.1 (first line) refers to "aerodynamic control surfaces or devices" and which describes various types of known devices including camber control and active twist such as in D4, see chapter 4.1.3 and 4.1.4. The Board thus sees E1 as confirming that the skilled person would consider camber and twist control devices as in D4 to be aerodynamic control devices.

2.6 D4 may not expressly indicate that driving moment is increased below rated wind speed. However, this will be immediately clear to the skilled person from paragraphs 018 and 044 of D4, read in context, which explain that the general purpose of the dynamic blade twist is to assist the wind turbine to "start at *lower* wind speeds" (emphasis added) so "extending the range of wind speeds at which wind turbines practically produce energy". This means that, in reference to figure 1 of the patent, in D4 energy production is shifted to a lower *cut-in wind speed* (where energy production starts), well below rated speed (where energy production plateaus). Thus, it is exactly in the part load region that energy production is extended and increased. This is only possible if in that region driving moment is also increased.

2.7 Hence the Board confirms the opposition division's conclusion in point 12 of the decision, that the subject-matter of claim 1 as granted lacks novelty with respect to D4.

3. Auxiliary request 1

3.1 Claim 1 of this request further requires to control individually and independently each blade. This further term does not change the interpretation of D4 concerning the fact that each blade receives an individual electric signal for adjusting its individual shape, independently from the others. Thus, claim 1 of this request also lacks novelty over D4.

4. Auxiliary request 2

4.1 Claim 1 according to this request further specifies in functional terms how optimal control for each blade is achieved.

4.2 Auxiliary request 2 was held to lack clarity in point 15 of the impugned decision because the actuators could not be associated with the devices they had to operate, and thus needed not necessarily relate to the movable aerodynamic device. The Board firstly observes that by adding features from original page 13 of the description as filed in a granted claim, these amendments may be examined for clarity under Article 84 EPC, see G 3/14 (OJ EPO 2015, 102).

4.3 The actuators are defined for the first time as the last feature of claim 1 without antecedent. It is therefore not clearly apparent that they operate on each movable aerodynamic device that varies the blade's shape. It may well be, as argued by the appellant

proprietor, that this lack of clarity could possibly be resolved contextually by relating the calculated demand to the variation of driving moment obtained by the movable aerodynamic device as claimed in claim 1 as granted. However, this does not change the assessment that the amendment in question is unclear.

4.4 Thus the Board confirms the decision's finding that claim 1 of the auxiliary request 2 lacks clarity.

5. Claim 1 according to auxiliary request 2A adds to granted claim 1 the following functional limitations of the controller: the controller (100) is arranged to determine (170) the driving moments of the blades (38) in a rotor plane and to determine (171) optimum demands that maximise the driving moments of each one of the blades (38) in the rotor plane, wherein the determination of the optimum demands is separate for each blade and independent of other of the blades (38), and superimpose the optimum demands on a common demand for all of the blades (38) to provide demands that are provided to respective actuators of the at least one movable aerodynamic device of each one of the blades (38) separately and independently.

5.1 This operation of the controller is derived from the description, in particular pages 13 and 14 in reference to figure 7, describing superimposition of optimum pitch angle demand to maximize the driving moment in the rotor plane for each blade (determined in steps 170 and 171) with a common pitch angle demand determined for all the blades (step 173) to provide a pitch demand angle to the pitch actuator 174 of each blade. Page 14, lines 18 to 22, goes on to state that figure 7 may have been described to maximize the driving moment through individual pitching of the blades but that "the driving

moment can also be maximised through the use of flaps and therefore, steps 170 and 171 can be adapted to control flap angles on the blades to increase the driving moment for each blade."

5.2 Firstly, page 14, lines 18 to 22, does not refer to movable aerodynamic devices in general but only mentions flaps. Moreover, the passage only mention steps 170 and 171 in connection with control of the flap angles of the blades to increase the driving moment for each blade. This makes perfect sense for individual flap angle as it can be optimized for maximum driving moment in a manner analogous to steps 170 and 171. However, for steps 173 and 174, which are not mentioned in this passage, this is less so. In the Board's understanding these latter steps are specific to pitch control : they involve the typical speed control of a wind turbine setting rotational speed of the rotor as a whole depending on a corresponding common pitch angle.

The passage on page 10, lines 26 to 31, relied upon by the appellant proprietor only deals with the steps of maximising individual driving moment for each blade by either pitching or actuating flaps corresponding to steps 170 and 171. There is no suggestion here to then combine with or superimpose on a common demand signal, whether for pitch-, flap-, or tab angle or for a demand parameter of a movable aerodynamic device in general.

5.3 The Board concludes that claim 1 of auxiliary request 2A contains subject-matter extending beyond the application as filed and therefore does not meet the requirements of Article 123(2) EPC. Thus contrary to the decision's positive finding for that request, the Board considers it unallowable. Regardless of the

question of admissibility, this finding applies also to claim 1 of auxiliary request 3A, which includes the same amendment.

6. Auxiliary requests 3, 4 to 6

6.1 Admissibility of these requests is contested by appellant opponent 2 with the argument that they were not discussed in the impugned decision and are not convergent with the auxiliary request 2A upheld, as they do not include all of the features added to claim 1 of that request. These requests were filed with the proprietor's statement of grounds of 22 March 2019.

Auxiliary requests 3,4,5 and 6 correspond to the like numbered auxiliary requests filed shortly before the oral proceedings in opposition but which were not examined. The Board can see no reason why these requests that were re-filed in appeal should not be admitted under the applicable rules of procedure, Article 12(4) 2007. They appear to be fair and appropriate alternative attempts at overcoming novelty objections raised in opposition. That they might not converge is immaterial for requests filed with the grounds of appeal; that criterion normally applies only in the later stages of an appeal when considering complexity and the need for procedural economy in application of Article 13(1) RPBA 2007.

Therefore the Board in exercising its discretion refrained from not admitting these requests into the proceedings, Article 12(4) RPBA 2007.

6.2 Opponent 1 requests remittal, should these requests be admitted, as they could not have been prepared to discuss these requests.

6.3 Firstly, the Board notes that the appellant proprietor and opponent 1 have both in fact made substantive submissions for these requests, and that in principle they could be discussed within that framework. The fact that a party, as in this case the appellant opponent 2, has refrained from commenting on the substance of requests, though they had ample opportunity, carries little weight in deciding to remit or not. Indeed, in the present case where the version as upheld by the opposition division fails, it can be expected that undecided lower ranking requests that are clearly not inadmissible, for example because they were duly filed in opposition, will most likely need to be examined by the Board for the first time. These circumstances do not constitute special reasons for remittal.

The Board further decided to exercise its discretion under Article 111(1) EPC together with Article 11 RPCR 2020 not to remit the case, and instead to discuss these requests within the facts that were presented in the parties' written submissions.

6.4 As noted the opponent 1 as party as of right has made submissions on the substance of the auxiliary requests 3 to 6 that follow the version upheld. These arguments were presented with their reply dated 24 July 2019 to the statement of grounds of the proprietor. The appellant proprietor has argued that the principle of prohibition of reformatio in peius bars opponent 1 as non appealing party from doing so.

The Board is unconvinced. The principle of prohibition of reformatio in peius acts to protect a party from a worse outcome than that of the decision they are appealing if they are sole appellant. That is not the

case here as opponent 2 also appealed the interlocutory decision. It may be that opponent 1 as non-appealing party cannot formally request a decision which would put the proprietor in a worse position, but it is not formally precluded from bringing arguments in support of an admissible request of another party to the proceedings. Moreover, in the present case it is more than questionable if the reformatio in peius principle is applicable at all. These auxiliary requests are not narrower than the auxiliary request 2A upheld as their claim 1 does not include the critical features added to claim 1 of that request. As correctly stated by the respondent opponent 1, for the purposes of the reformatio in peius principle, the requests must be judged on their substance, and not according to their procedural ranking after the upheld request.
As moreover the opponent 1 filed their arguments in due time as part of their complete case 1, the Board sees no reason for not admitting these arguments pursuant to Articles 12(2) and (4) RPBA 2007.

7. Auxiliary request 3

7.1 This request adds to granted claim 1 that the at least one movable aerodynamic device comprises at least one flap of the blade. Thus instead of a portion of the blade comprising SMA as in D4, the claim requires the provision of a flap.

7.2 As concerns the advantage of individualized control expressed in paragraph 031 of the patent to better match the aerodynamic performance of an individual blade, the Board observes that this effect is identified for both pitching or using flaps. In the Board's view it appears to be an effect associated with individualized control in general and thus applies also

to the control of an individual blade already provided by the SMA of D4. The objective technical problem must therefore be reformulated less ambitiously. Instead of the problem of better adapting the aerodynamic control of each blade to individual conditions, for which D4 already provides a solution, the Board considers the problem of providing an alternative to the SMA to vary the blade shape as submitted by the respondent opponent 1.

7.3 The appellant's proprietor submission that the teaching of the different movable devices in E1 in chapter 4.1 would be made in the context of load reduction instead of maximising a driving moment does not convince the Board in the light of the recognition in E1, see chapter 5.5, that smart blade control concepts (discussed in section 4.1) can also be used to regulate rotor torque and thus power. Here rotor torque is understood to be synonymous to driving moment. Indeed the second paragraph of chapter 5.5 refers to research where power output was improved by 2% below rated wind speed for a trailing edge flap concept. That other research produced different results does not take away from the fact that E1 already suggests that in some circumstances smart flap control rather than smart pitch control may be of benefit. The Board concludes that in the light of E1 the skilled person would as a matter of obviousness consider the use of flaps as an alternative for its individualized blade twist/camber control.

7.4 Therefore the subject-matter of claim 1 according to auxiliary request 3 lacks an inventive step.

8. Auxiliary request 4 adds to granted claim 1 the additional features of dependent claim 15 that concerns the further independent control of the blade pitch or component to reduce mechanical loads above cut-out speed. This is disclosed in paragraph 019 of D4 which explicitly discloses decreasing the lift of the blade at high speed using the same SMA control. Thus, the subject-matter of this claim also lacks inventive step.

9. Auxiliary request 5 adds to granted claim 1 that the controller is arranged to control the wind turbine at wind speeds above a cut-out wind speed (Vmax) to yaw the rotor into or away from the direction of the wind, as measured by LIDAR, prior to lift provided by each blade being controlled independently of control of other of the blades in order to reduce the mechanical load of each blade. In short, LIDAR induced yawing precedes individualized blade control.

9.1 The appellant-proprietor acknowledges that using a LIDAR to detect wind gusts is known, for example from E1, section 4.3.3, as is yawing the nacelle into or away of the wind to reduce mechanical load at high wind speeds. They however argue that LIDAR induced yawing above cut-out wind speed *before* individually controlling the blades improves the high wind response, which is not taught in the prior art.

9.2 The Board does not concur with the proprietor's view. Firstly, D4 considers individualized blade control both at low (below rated) and high wind speeds, see paragraph 013, the latter in particular to minimize dynamic loading, paragraphs 034 and 038. As yawing is a well known measure to protect a wind turbine from very high wind speeds, the question is how the skilled person would then as a matter of obviousness realize

this well known measure in the blade control concept of D4. As argued by opponent 1 there are only a limited number of options: they would discard simultaneous yawing and individual blade control off hand as too complex, leaving only yawing *before* or *after* blade control as the only two feasible options. Either can therefore be considered obvious. As yawing is an emergency measure, it would be all the more obvious to do that first.

Therefore the subject-matter of claim 1 according to auxiliary request 5 lacks an inventive step starting from D4 and considering common general knowledge.

10. Auxiliary request 6 adds to claim 1 as granted that at the occurrence of a load condition at which the wind turbine cannot align itself into the wind to reduce the experienced loads, the controller (100) is arranged to determine a yaw error of a nacelle (34) and an azimuth angle of each blade (38), and to provide a pitch angle for each blade (38) as a function of the yaw error, the azimuth angle, and a mean wind speed for alleviating the loads.

10.1 The additional control of the pitch angle of each blade as a function of a yaw error and azimuth angle is derived from the sentence bridging pages 11 and 12 of the application as published. However the original disclosure is more specific in that it requires reading a value of the pitch angle from a lookup table as a function of a 10 minutes mean wind speed. According to the previous sentence this controlled operation is required to take place when the yaw mechanism is unavailable due to grid loss. Contrary to the proprietor's opinion this specific disclosure establishes a functional relationship between grid

loss, offline choice of the pitch angle in that such a manner of dealing with extreme gusts only makes technical sense in this specific disclosed context, and no possible use in other circumstances is directly derivable. Thus claim 1 is generalized beyond this original specific disclosure.

10.2 Therefore claim 1 of auxiliary request 6 contains subject matter extending beyond the application as filed and therefore does not meet the requirements of Article 123(2) EPC.

11. The Board confirms the impugned decision's finding that the main request and auxiliary request 1 are not allowable for lack of novelty. Contrary to the decision, however, the Board finds that taking into account the amendments made in the remaining request, the patent does not meet the requirements of the EPC, either for lack of clarity (auxiliary request 2), added subject-matter (auxiliary requests 2A, 3A and 6), or lack of inventive step (auxiliary requests 3, 4 and 5). The Board must therefore revoke the patent pursuant to Article 101(2) and (3)(b) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

G. Magouliotis A. de Vries

Decision electronically authenticated