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Datasheet for the decision of 17 January 2023

Case Number: T 0297/20 - 3.5.03

Application Number: 09780007.2

Publication Number: 2419803

IPC: G05B23/02, G05B15/02

Language of the proceedings: EN

Title of invention:
Power grid visualization

Applicant:
Hitachi Energy Switzerland AG

Headword:
Power-grid GUI/HITACHI

Relevant legal provisions:
EPC Art. 56
RPBA 2020 Art. 13(2)

Keyword:
Inventive step - main request and first to sixth auxiliary requests (no): presentation of information on a GUI - "GAMBRO test" not passed
Admittance of requests submitted after summons - seventh and eighth auxiliary requests (no): at least no clear allowability

Decisions cited:
G 0001/19, T 0001/80, T 0115/85, T 1802/13, T 0336/14, T 2271/18

Catchword:
The mere change, by an operator, of the degree of abstraction of a graphical view ("condensation") of a power grid does not credibly assist a user in performing a technical task by means of a continued and/or guided human-machine interaction process within the meaning of T 336/14 and T 1802/13 and thus cannot bring about a technical effect (see points 3.2 to 3.6 of the Reasons).

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Case Number: T 0297/20 - 3.5.03

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 17 January 2023

Appellant: (Applicant)	Hitachi Energy Switzerland AG Bruggerstrasse 72 5400 Baden (CH)
Representative:	AWA Sweden AB Box 45086 104 30 Stockholm (SE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 10 July 2019 refusing European patent application No. 09780007.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	K. Bengi-Akyürek
Members:	K. Peirs
	F. Bostedt

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division to refuse the present application on the basis of a main request and two auxiliary requests. The main request and the first auxiliary request were deemed not to be allowable for lack of inventive step (Article 56 EPC). The second auxiliary request was not admitted into the proceedings (Rule 137(3) EPC).

II. The board summoned the appellant to oral proceedings and issued a communication under Article 15(1) RPBA 2020 which included its negative preliminary opinion concerning inventive step (Article 56 EPC), having regard to the following prior-art document:

D1: US 2009/0030556 A1.

III. Oral proceedings before the board were held on 17 January 2023.

As its final requests, the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims of a **main request**, or, in the alternative, according to the claims of one of **eighth auxiliary requests**.

The appellant filed the main request and the second to sixth auxiliary requests with the statement setting out the grounds of appeal. The first auxiliary request is identical to the one underlying the decision under appeal. The appellant filed the seventh and eight auxiliary requests with a written reply to the board's communication after notification of the summons to oral proceedings.

At the end of the oral proceedings, the board announced its decision.

IV. Claim 1 of the **main request** reads as follows (board's feature labelling):

A. "Method of enabling an operator to obtain a better overview of a presentation of electrical power transmission control stations connected to power lines in a power transmission or distribution system (10), comprising the steps of:

(a) - presenting (49) graphical objects (a, b, c, d, e, f, g, h, i, j, k, l) representing the electrical power transmission control stations together with graphical objects representing the power lines on an operator terminal display (34), and

(b) - changing the degree of abstraction of the presentation based on an operator or operator terminal selection,

- wherein

(c) - a change from a lower to a higher degree involves moving (42) a group of graphical objects including graphical objects representing control stations towards a condensation point (C1, C2, C3, C4, C5) provided on a graphical object representing a power line that is common for this group, and

(d) - a change from a higher to a lower degree involves moving (44) the group away from the condensation point provided on the graphical representation of said common power line,

(e) - where the power lines are of a first and a second type and if one control station is connected to two power lines of different types, the movement of the graphical object representing this control station in relation

to the condensation point of the graphical object representing the power line of the first type has priority over movement in relation to the condensation point of the graphical object representing the power line of the second type."

V. Claim 1 of the **first auxiliary request** differs from claim 1 of the main request in that features (a) and (b) are replaced respectively by features (f) and (g), where (amendments vis-à-vis claim 1 of the main request underlined by the board; board's feature labelling):

(f) "- presenting (49) graphical objects (a, b, c, d, e, f, g, h, i, j, k, l) representing the electrical power transmission control stations together with graphical objects representing the power lines on an operator terminal display (34) at a default abstraction degree based on the zoom level of the view on the display, and",

(g) "- changing the degree of abstraction of the presentation based on an operator activity performed in the presentation, which operator activity is a selection of a layer of objects,".

VI. Claim 1 of the **second auxiliary request** differs from claim 1 of the first auxiliary request in that feature (c) is replaced by the following feature (amendments vis-à-vis claim 1 of the first auxiliary request underlined by the board; board's feature labelling):

(h) "- a change from a lower to a higher degree involves moving (42) a group of graphical

objects including graphical objects representing control stations and power lines towards a condensation point (C1, C2, C3, C4, C5) provided on a graphical object representing a power line that is common for this group, and".

VII. Claim 1 of the **third auxiliary request** differs from claim 1 of the first auxiliary request in that features (c) and (e) are replaced respectively by features (i) and (j), where (amendments vis-à-vis claim 1 of the first auxiliary request underlined by the board; board's feature labelling):

(i) "- a change from a lower to a higher degree involves moving (42) a group of graphical objects including graphical objects representing control stations towards a condensation point (C1, C2, C3, C4, C5) provided on a graphical object representing a power line that is common for this group and where a condensation point can be reached by a control station via more than one power line, and";

(j) "- where the power lines are of a first and a second type and if one control station is connected to two power lines of different types, the movement of the graphical object representing this control station in relation to the condensation point of the graphical object representing the power line of the first type has priority over movement in relation to the condensation point of the graphical object representing the power line of the second type comprising moving the graphical object of the

control station towards or from the condensation point reached via the least number of power lines and if the number of power lines leading to the two condensation points are equal prioritizing the condensation point of the first type over the condensation point of the second type.".

VIII. Claim 1 of the **fourth auxiliary request** differs from claim 1 of the first auxiliary request in that the following feature is added at its end (board's feature labelling):

(k) "- further comprising the step of receiving protection and control related data from one of the control stations, where the operator terminal selection of the change in presentation of at least this control station is an own selection of at least this control station made in dependence of the received protection and control data, the operator terminal selection of the change in presentation involves stopping the graphical symbol of this station from being moved towards a corresponding condensation point".

IX. Claim 1 of the **fifth and sixth auxiliary requests** differs from claim 1 of the second and third auxiliary requests respectively in that feature (k) is added at its end.

X. Claim 1 of the **seventh auxiliary request** differs from claim 1 of the main request in that feature (a) is replaced by the following feature (amendments vis-à-vis claim 1 of the main request underlined by the board; board's feature labelling):

(l) "- presenting (49) graphical objects (a, b, c, d, e, f, g, h, i, j, k, l) representing the electrical power transmission control stations together with graphical objects representing the power lines, with power transmission data coded into the graphical objects representing the power lines, on an operator terminal display (34), and".

XI. Claim 1 of the **eighth auxiliary request** differs from claim 1 of the seventh auxiliary request in that feature (c) is replaced by feature (h).

Reasons for the Decision

1. *Technical background*

1.1 The present application concerns the presentation of information on a visual display regarding control stations and power lines of a power grid for a "Supervisory Control And Data Acquisition" (SCADA) system. Such a system is typically used for supervising, monitoring and controlling the power grid. The power grid of a country or state notoriously comprises dozens or hundreds of power lines and stations. This may render it difficult for an operator to see "the big picture" when presented with an overview of the power grid on a screen.

The present invention tries to avoid that the operator feels "overwhelmed" by the amount of information provided by the overview. To this end, a balance is sought between the amount and the accuracy of the visually represented information.

1.2 The present invention achieves this by controlling the level or degree of abstraction with which the control stations and power lines are represented, namely as follows:

1.2.1 If the operator prefers maximum detail, power lines are shown according to the geography of the territory through which they run. The control stations are each represented individually.

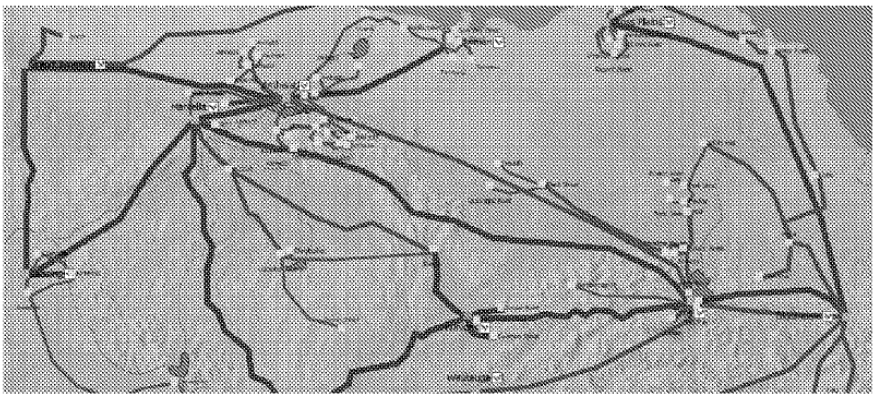

FIG. 4

1.3 By contrast, if the operator favours minimum detail, power lines are represented as straight lines and the control stations may be grouped together ("clustered"):

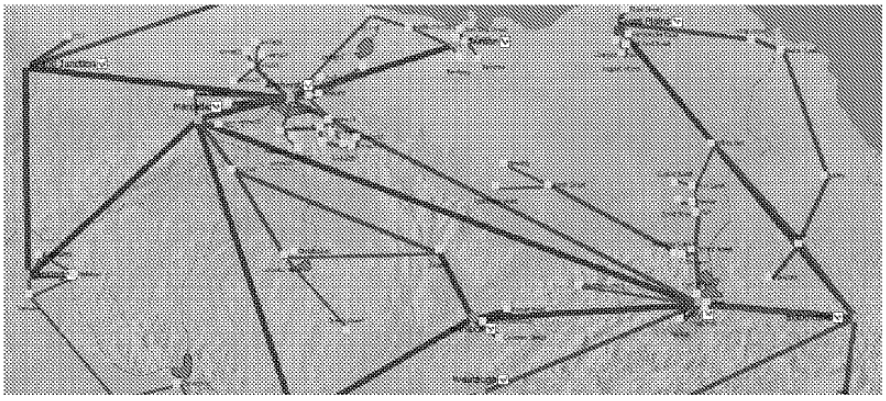

FIG. 5

1.4 The degree of "condensation", i.e. the amount of clustering, can be used as a measure of the "degree of abstraction". Figures 7A to 7C of the present application show an exemplary progression with an increasing amount of clustering of control stations and power lines around "condensation points" C1 to C5:

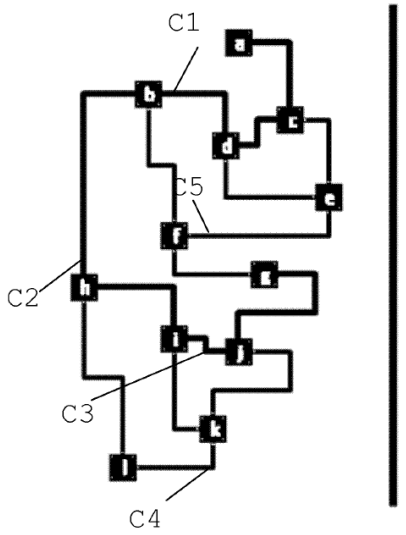

FIG. 7A

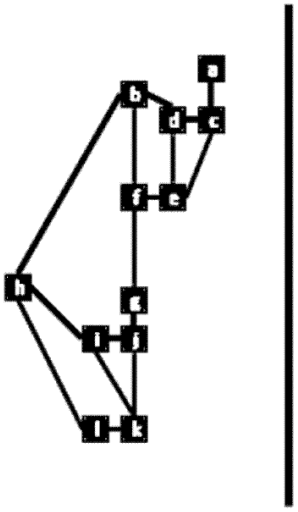

FIG. 7B

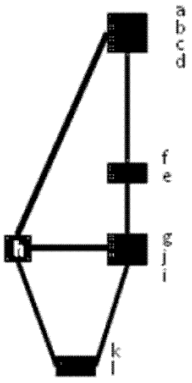

FIG. 7C

Condensation points C1 to C5 function as centering points when condensation is performed. They are typically provided at a particular power line between two control stations. When progressing from Figure 7A to Figure 7C, the individual control stations "a" to "l" are merged towards their associated condensation points C1 to C5. This merging is visualised in the presentation as a movement of graphical objects representing the control stations and power lines.

1.5 The graphical objects of the control stations will move towards that particular condensation point to which they are connected via the least number of power lines. For this movement it is relevant that the present application distinguishes between power lines of a

"first type", which carry high power levels, and those of a "second type", which carry low power levels. This distinction is important when a particular control station is connected to two different condensation points via the same number of power lines. Such a situation may lead to a conflict in that the station is torn towards *different* condensation points. To resolve this conflict, the movement towards the condensation point related to a power line of the first type is supposed to take priority.

2. *Main request: claim 1 - construction*

2.1 The "priority" attributed in accordance with **feature (e)** to the representation of the power line of the "first type" over that of the "second type" is not necessarily noticeable to the outside world. It could e.g. relate to an internal prioritisation of the calculations relating to displaying the movement of the graphical object according to feature (e) on the operator terminal display. This will then depend on how a processor performing these calculations is configured internally.

2.2 In the appellant's favour, the board will assume that the prioritisation in accordance with feature (e) relates to the way in which the clustering of the control stations takes place when moving from a presentation on the terminal display of feature (a) with a high level of detail to one with a lower level of detail. This is in agreement with lines 24 to 32 of page 20 of the application as filed.

2.3 Moreover, and again in the appellant's favour, the board will assume that the change in the level of detail in the presentation on the terminal display

resulting from this clustering corresponds to changing the "degree of abstraction" of **feature (b)**, which

- is reflected by moving the group of graphical objects according to **feature (c)** when this change results in less detail, and

- is indicated by moving the group of graphical objects according to **feature (d)** when this change results in more detail.

3. *Main request: claim 1 – inventive step*

3.1 In Reasons 2.1 of the appealed decision, document **D1** was taken as a starting point for the assessment of inventive step. As is apparent from the struck-through text in these Reasons 2.1, the examining division considered that D1 does not disclose **features (b) to (e)**. The appellant did not contest this and the board sees no need to do so either.

3.2 However, the board does not agree with the problem-solution approach as set out in Reasons 2.3 to 2.9 of the appealed decision. This is mainly because **features A and (a) to (e)** relate to the presentation of information for an operator on a graphical user interface. The examining division did not take into account the established jurisprudence of the Boards of Appeal regarding computer-implemented inventions (CII) in general and the assessment of features relating to presentation of information in particular. In fact, the effect considered in Reasons 2.4 of the decision under appeal, which reads "*improving visualisation of a possibly cluttered power control network on a geographic map [...] while taking into account protection and control data*" (board's emphasis), is not

necessarily a technical one. As a result, the problem considered in Reasons 2.5 of the appealed decision is not bound to be a *technical* problem.

3.3 The board recalls that a feature relating to the presentation of information may only contribute to an inventive step if it brings about an overall technical effect. Within the context of graphical user interfaces, this is the case if the feature credibly assists the user in performing a technical task by means of a continued and/or guided human-machine interaction process regarding both the type of the information presented, i.e. "what" is presented, and the manner in which it is presented, i.e. "how" it is presented (**T 336/14**, headnote; **T 1802/13**, Reasons 2.1.5).

During the oral proceedings before the board, the appellant referred to case **T 115/85** in support of its argument that giving a visual indication constitutes a *technical* problem. The board acknowledges that Headnote I of this decision states that "[g]iving visual indications automatically about conditions prevailing in an apparatus or system is basically a technical problem". However, the situation envisaged in T 115/85 where visual feedback on displayed operation states is provided for enabling a technical system's proper functioning has to be distinguished from the one where the information presented is exclusively aimed at the mental activities of the system user as the final addressee (cf. T 336/14, Reasons 1.2.4). The information presented in the former situation can be typically seen as "technical information" that credibly enables the user to properly operate the underlying technical system. In the latter situation, the presented information has no technical effect. Hence,

contrary to what the appellant seems to suggest, the mere provision of a visual indication does not automatically lead to the acknowledgement of a technical effect or an inventive step.

3.4 In the present case, even when construing features (b) to (d) in the appellant's favour (cf. points 2.2 and 2.3 above), the board cannot recognise any "continued and/or guided human-machine interaction process" associated with these features, let alone one that would assist the user in carrying out a technical task (i.e. a task with an underlying *credible* technical effect). This conclusion applies to both the features relating to "what" is presented (i.e. feature (a)) and to "how" it is presented (i.e. features (c) to (e)). Instead, those features all relate to subjective factors, such as a user's personal taste or preference about how much detail should actually be presented. Such subjective factors are of a non-technical nature.

3.5 During the oral proceedings before the board, the appellant considered the objective problem to be "*how to change the level of focus of the view of a power grid while retaining the visual information of the structure of the power grid*". The board cannot see how this objective problem could lead to the acknowledgement of a technical effect and finally an inventive step. The reasons for this are as follows:

3.5.1 First, the board is not convinced that this objective problem can be credibly associated with features (b) to (e). These features do not necessarily require the retention of the visual information of the power-grid structure. The movement towards a condensation point according to feature (c) could in fact lead to a clustering of graphical objects to the extent that

individual control stations and power lines can no longer be discerned separately. This is illustrated in Figure 7C of the application (see point 1.4 above). There, as expressed in the sentence bridging pages 19 and 20 of the description as filed, individual control stations and power lines associated with a condensation point are condensed into a single graphical object.

3.5.2 Moreover, the board cannot identify any technical effect upon which the appellant's objective problem could credibly be based.

During the oral proceedings before the board, the appellant argued that the technical task which the claimed method enabled the operator to perform consisted of "supervising, monitoring and controlling a power grid". It emphasised that the present application addressed the well-known problem within the field of SCADA systems that the overview of the power grid on a visual display must be as broad as possible, while removing sufficient information to render the visualised overview intelligible. The appellant persistently stated that the invention achieved this by dispensing with the geographical reality of the power lines while retaining the connectivity between control stations and power lines in the visual representation. It highlighted in this respect the fact that the skilled reader would immediately understand that the only way in which features (c) to (e) could be implemented was by dispensing with the geographical reality of the power grid. In the appellant's opinion, this was particularly the case in view of the two different condensation points of feature (e). The appellant also specifically referred in this context to lines 10 to 15 of page 12 of the description as filed, from which it appears that "[v]isual emphasis is made

on clarity at the cost of geographic accuracy".

However, in the board's view, features (b) to (e) comprise no incentive for the operator to perform tasks such as "supervising, monitoring or controlling the power grid". Instead, the operator can simply observe the information that is visualised on the operator terminal display and do nothing else. Whether this visualised information dispenses with the geographical reality of the power lines is also not apparent from those features. This is especially so because no details are provided on how the movement of the group of graphical objects according to features (c) to (e) actually affects the graphical objects representing the power lines of feature (a).

3.5.3 Even if one were

- to acknowledge that the technical task that the operator "supervises, monitors and controls the power grid" can be credibly associated with features (b) to (e)

and

- to agree that these features somehow convey that the geographical reality of the power lines is dispensed with,

it would still not be credible that such dispensing would help the operator fulfil their alleged technical task. Some operators, regardless of their training level, may indeed prefer *more* rather than *fewer* details in the visualisation. Moreover, the intelligibility of a visual representation depends not only on the operator's mental abilities but typically also on the

size and resolution of the operator terminal display in question and the number of control stations and power lines that are displayed. None of these elements are specified in claim 1 of the main request. Furthermore, contrary to the appellant's suggestion that, according to the invention, the geographical reality of the power lines can be dispensed with, some aspects of "supervising, monitoring or controlling the power grid" may very well require specific details on the geographical area concerned. Such aspects could, for instance, relate to the secure operation of control stations and power lines running close to a lake, a river or a transform boundary of the Earth's surface.

3.6 In the absence of any credible technical effect, features (b) to (e) cannot be taken into account in the assessment of inventive step (cf. **G 1/19**, Reasons 49).

3.7 Hence, the subject-matter of claim 1 of the main request does not involve an inventive step (Article 56 EPC).

4. *First to sixth auxiliary requests: claim 1 - inventive step*

4.1 The board acknowledges that some features of claim 1 of the first to sixth auxiliary requests indeed relate to the provision of a human-machine interaction. This is particularly the case for **feature (g)** which concerns the operator interacting with the underlying graphical user interface to change the degree of abstraction. Moreover, **feature (j)** may be construed such that the priority has an effect on the outside environment (cf. point 2.1 above) in the sense that it influences the movement of a graphical object on the operator terminal display. Also, **feature (k)** can be seen to imply that

the movement of the graphical symbol of a particular control station may be controlled by the machine executing the claimed method rather than by means of an operator activity as specified in feature (g).

By contrast, the remaining features of claim 1 of the first to sixth auxiliary requests do not relate to any kind of human-machine interaction. Rather, they merely specify details regarding the visual representation itself, namely

- **feature (f)** concerns a default abstraction level of the representation of the graphical objects;

- **feature (h)** indicates that the group of graphical objects that is moved also comprises graphical objects representing power lines;

- **feature (i)** expresses that a condensation point can be connected to a control station via more than one power line.

4.2 Regardless of any potential human-machine interaction which the added features (g), (j) and (k) may relate to, the board holds that added **features (f) to (k)** do not necessarily involve a human-machine interaction that is *continued* and/or *guided*.

4.3 During the oral proceedings before the board, the appellant emphasised that the stopping of the graphical symbol's movement according to **feature (k)** might indicate something that corresponded to an alert or an alarm for the operator. In the appellant's view, this feature is to be seen as a feedback leading to a continued and/or guided human-machine interaction and particularly assists the operator in their technical

task of "supervising, monitoring and controlling the power grid".

The board is not convinced by this argument. Even when the term "graphical symbol" is equated with the term "graphical object", feature (k) provides the skilled reader with no further information regarding the "stopping" of the graphical object's movement: it is silent about any underlying reason, meaning or purpose. The board can in particular see no indication of any alert or anything worth noting as a cause for stopping the movement. Feature (k), therefore, merely amounts to an arbitrary rule which cannot contribute to the technical character of claim 1.

4.4 Features (f) to (k) can, as a result, not alter the conclusion drawn in point 3.7 above for claim 1 of the main request.

4.5 Hence, the subject-matter of claim 1 of the first to sixth auxiliary requests does not involve an inventive step either (Article 56 EPC).

5. *Seventh and eighth auxiliary requests: admittance into the proceedings*

5.1 The seventh and eighth auxiliary requests have been filed after notification of the summons to oral proceedings (cf. point III above). Their admittance into the proceedings is at the board's discretion (Article 13(2) RPBA 2020).

5.2 The appellant argued that this filing was prompted by "exceptional circumstances" within the meaning of Article 13(2) RPBA 2020. This was because the board had deviated from the "standard 'problem-solution' approach

of T 1/80" as adopted by the examining division. Instead, the board had, for the first time, raised an objection regarding non-technical subject-matter in its preliminary opinion. The appellant stated that this had precluded it from relying on features for which the examining division had acknowledged novelty over document **D1**. It emphasised that *different* ways of reasoning underlying an objection motivated substantially *different* replies: the approach of the examining division had prompted an amendment which further distanced the claimed invention from D1, whereas the board's reasoning required an amendment to introduce further technical features and/or to clarify the technical implementation of the claimed invention.

However, in its preliminary opinion, the board assessed inventive step in view of the same features, namely features (b) to (e), which the examining division had acknowledged as not being disclosed in D1 (cf. point 3.1 above). Only the reasoning underlying this assessment was changed. Such a change was necessary because, for the reasons set out in point 3.2 above, the problem addressed by the examining division was not a *technical* one in the sense of **T 1/80** (Headnote I). A lack of accuracy in the appealed decision's reasoning cannot automatically give the appellant the possibility to amend their appeal case, certainly not at a very late stage in the appeal proceedings. The same applies to the level of detail which is entailed by the board's preliminary opinion (cf. **T 2271/18**, Reasons 3.3). According to the appellant's logic, in order for the board to be not confronted with new sets of claims at oral proceedings, the board can only reiterate (or agree with) the examining division's inventive-step reasoning or grant a patent on the basis of one of the claim sets on file. However, a board is not limited to

such an approach. Instead, the appeal proceedings has the aim of performing a complete and conclusive review of the decision under appeal. The board is also not convinced that a difference in reasoning underlying an inventive-step objection as regards a particular feature would necessarily change the nature of the reply that is required. In the present case, both approaches could have been addressed, for instance, by introducing a suitable further technical feature. As a result, the appellant has not provided "cogent reasons" justifying "exceptional circumstances" to admit the seventh and eighth auxiliary requests into the proceedings.

5.3 Moreover, the amendments underlying claim 1 of the seventh and eighth auxiliary requests do not fulfil the provision of Article 13(1) RPBA 2020 because they are not clearly allowable under Article 56 EPC. The reasons for this are as follows.

5.3.1 Regarding **feature (l)**, no specifics are provided as to *how* the power transmission data are coded into the graphical objects representing the power lines. From page 14, line 10 to page 15, line 7 of the application as filed, it appears that this coding may be done by varying the thickness, colour, colour nuance or transparency of the graphical representation of the power lines. This means that the coding according to feature (l) relates, again, simply to the presentation of information which is dictated by which settings an operator likes best. There is no indication of any continued and/or guided human-machine interaction.

5.3.2 The appellant argued that the objective problem associated with feature (l) was now to be regarded as "*how to change the level of focus of the view of a*

power grid while retaining the visual information of the transmission flow in the power grid".

Regardless of whether this objective problem is based on a technical effect, the board does not deem it to be credibly associated with feature (l) in view of the lack of details provided by this feature as to the content of the power transmission data. This content does not necessarily reflect a "transmission flow" but could, for instance, relate to time stamps or thresholds that are relevant for the power transmission over the power grid. Even if the power transmission data were to reflect a transmission flow, **features A, (b) to (e) and (l)** do not necessarily require the visual information of the transmission flow to be retained (see also point 3.5 above). The amendment underlying feature (l) is therefore not suitable to resolve the issue regarding inventive step raised by the board regarding claim 1 of the main request.

5.3.3 The amendment underlying **feature (h)** is also not suitable to resolve this issue. The reasons for this are set out in point 4.1 above.

5.4 Hence, the seventh and eighth auxiliary requests have not been admitted into the proceedings under Article 13(2) RPBA 2020.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

B. Brückner K. Bengi-Akyürek

Decision electronically authenticated