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**Datasheet for the decision
of 14 February 2024**

Case Number: T 1762/21 - 3.2.02

Application Number: 09760415.1

Publication Number: 2352431

IPC: A61B6/02, A61B6/03, A61B6/00,
H01J35/14, H05G1/52

Language of the proceedings: EN

Title of invention:

METHOD AND SYSTEM FOR CONTROLLING X-RAY FOCAL SPOT
CHARACTERISTICS FOR TOMOSYNTHESIS AND MAMMOGRAPHY IMAGING

Patent Proprietor:

Hologic, Inc.

Opponent:

Siemens Healthcare GmbH

Headword:

Relevant legal provisions:

EPC Art. 54, 56, 87(1), 88, 89, 100(a), 100(b), 100(c), 123(2)

Keyword:

Priority - validity of priority date (yes) - basis in priority document (yes)

Grounds for opposition - added subject-matter (no) - insufficiency of disclosure (no) - novelty (yes) - inventive step (yes)

Amendments - intermediate generalisation - extension beyond the content of the application as filed (no)

Decisions cited:

G 0001/93, G 0002/98, G 0002/10

Catchword:

For assessing an intermediate generalisation in an amended claim for compliance with Article 123(2) EPC it has to be established whether, because of this generalisation, the subject-matter of the claim extends beyond what was, be it explicitly or implicitly, directly and unambiguously disclosed to the person skilled in the art using common general knowledge in the application as filed. This is the "gold" standard for assessing any amendment for its compliance with Article 123(2) EPC (G 2/10, point 4.3 of the Reasons).

If an amended claim comprises only some features of an originally disclosed combination and the features left out of the claim were understood, by the person skilled in the art, to be inextricably linked to the claimed ones, the claim includes subject-matter extending beyond the application as filed. This is the case if the person skilled in the art would have regarded the omitted features to be necessary for achieving the effect associated with the added features. In such a situation the amended claim conveys the technical teaching that the effect can be obtained with the claimed features alone, which is in contrast with and extends beyond the original disclosure that the whole combination of features was needed.

The criteria for assessing the validity of a priority for the subject-matter of a claim as set out in G 2/98, no matter whether or not the claim includes intermediate generalisations, correspond to the "gold" standard for assessing any amendment for its compliance with Article 123(2) EPC. In view of Article 88(4) EPC, it is not required that this subject-matter be disclosed in the form of a claim or in the form of an embodiment or example specified in the description of the application from which the priority is claimed. In the passage in point 4 of the Reasons of G 2/98 these items, as derived from the expression "in particular", are simply listed as exemplary parts of the application documents.

(Reasons, points 2.4 and 3.2).



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Case Number: T 1762/21 - 3.2.02

D E C I S I O N
of Technical Board of Appeal 3.2.02
of 14 February 2024

Appellant: Siemens Healthcare GmbH
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 5 August 2021
rejecting the opposition filed against European
patent No. 2352431 pursuant to Article 101(2)
EPC**

Composition of the Board:

Chairman M. Alvazzi Delfrate
Members: D. Ceccarelli
C. Schmidt

Summary of Facts and Submissions

- I. The opponent appealed against the Opposition Division's decision to revoke the European patent.
- II. Oral proceedings took place on 14 February 2024.

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

It also requested remittal to the Opposition Division if the respondent's auxiliary requests had to be considered, and that the following questions be referred to the Enlarged Board of Appeal:

1. "Sind für die Wirksamkeit einer Priorität für einen Patentanspruch dieselben Kriterien heranzuziehen wie für die Beurteilung der Zulässigkeit von Änderungen im Hinblick auf eine Zwischenverallgemeinerung (Art. 123(2) EPÜ)?"
2. "Welcher Maßstab ist für die wirksame Inanspruchnahme einer Priorität heranzuziehen, wenn für eine abstrahierte Anspruchsformulierung mehrere getrennte Ausführungsbeispiele zusammengefasst werden, keines der Ausführungsbeispiele aber die Gesamtheit aller Anspruchsmerkmale aufweist?"
 - (1. "Do the same criteria have to be considered for the validity of a priority for a patent claim as for the assessment of the allowability of amendments with regard to an intermediate generalisation (Art. 123(2) EPC)?"

2. "What is the criterion for assessing the validity of a priority claim if an abstract formulation of a claim combines a number of separate embodiments but none of the embodiments comprises the totality of the features of the claim?"

- Translation provided by the Board).

The respondent requested that the appeal be dismissed (i.e. that the patent be maintained as granted - main request) or that the patent be maintained on the basis of one of the first to seventh auxiliary requests, filed with the reply to the statement of grounds of appeal on 19 April 2022.

It also requested remittal to the Opposition Division if the patent could not be maintained as granted and that the appellant's request for referral be rejected.

III. The following documents are mentioned in this decision:

D3: EP 2 262 480 AO (published as WO 2009/122328 A1)

D4: US 7,110,490 B2

D5: US 5,469,429 A

D6: US 6,252,935 B1

D11: "New x-ray tube performance in computed tomography by introducing the rotating envelope tube technology", Shardt P et al., Med. Phys. 31 (9), September 2004, published 27 August 2004

IV. Independent claims 1 and 7 of the main request read as follows:

"1. A breast tomosynthesis system (100), comprising an x-ray tube (110) a detector (160) and compression paddles (130, 135), wherein the x-ray tube (110) is

arranged to move during an exposure period comprising:

a cathode (112) for providing an electron stream; an anode (114) comprising a target for receiving the electron stream and generating a photon stream in response thereto;
a focusing cup which focuses the electron stream on the anode during the exposure period;
a port (120) for passing the photon stream out of the x-ray tube, wherein the cathode, anode and port together define a static focal spot (127) of the x-ray tube; and
a controller coupled to at least one of the anode, the cathode and focusing cup wherein, in a first operational mode, the x-ray tube moves in a first direction during an exposure period,
wherein the controller is arranged, in a first operational mode, to move the static focal spot (127) within the x-ray tube in a second direction, opposite from the first direction and generally synchronized with the directional movement of the x-ray tube, so that a resulting effective focal spot appears to be fixed in space, relative to one of the breast and/or the detector, in one position during the entire duration of the exposure."

"7. A method of acquiring a breast tomosynthesis x-ray image using a breast tomosynthesis system comprising a detector (160), compression paddles (130, 135) and an x-ray tube (110) comprising a cathode (112) for providing an electron stream; an anode (114) comprising a target for receiving the electron stream and generating a photon stream in

response thereto; a focusing cup which focuses the electron stream on the anode during the exposure period; a port (120) for passing the photon stream out of the x-ray tube, wherein the cathode, anode and port together define a static focal spot (1270) of the x-ray tube; and wherein the x-ray tube further comprises a controller coupled to at least one of the anode, the cathode and focusing cup, the method including the steps of:

moving the x-ray tube in a first direction while moving the static focal spot under the control of the controller, within the x-ray tube in a second direction, opposite to the first direction and generally synchronised with the directional movement of the x-ray tube, so that a resulting effective focal spot appears to be fixed in space, relative to one of the breast and/or the detector, in one position during the entire duration of the exposure."

- V. The appellant's arguments, where relevant to this decision, may be summarised as follows.

Extension of subject-matter

Claims 1 and 7 comprised several features from different embodiments relating to a general tomosynthesis system, but not to the breast tomosynthesis system according to Figure 1. Moreover several features, essential for the breast tomosynthesis system, had been omitted from the claims.

Paragraphs [0010], [0020], [0022], [0031] and [0062] to [0064] of the application as filed could not simply be combined, as they related to different embodiments. Paragraphs [0062] to [0064] related to a tomosynthesis

system, not to a breast tomosynthesis system. Paragraph [0031] specified that the focal spot appeared to be "fixed in space", while paragraphs [0062] to [0064] referred to the focal spot as remaining "relatively fixed in space". Also Figure 6 and Figure 8B related to different embodiments: paragraph [0050], which referred to Figure 8B, stated that "motion control unit 600" was added. Moreover the controller of Figure 8B was not coupled to either the anode or the cathode or the focusing cup. It followed that the problem of a non-allowable intermediate generalisation arose. According to the Guidelines for Examination in the EPO, H-V.3.2.1, an intermediate generalisation was only allowable if features were not related or inextricably linked and when the overall disclosure justified the introduction.

Claim 1 related to a breast tomosynthesis system. Such a system could only be based on paragraph [0010] together with paragraph [0020] and Figure 1. However, in paragraph [0020] several non-claimed features were mentioned, such as a scatter grid, the qualification of "upper and lower" for the compression paddles, the configuration of the anode, a filter and a collimator. As a consequence of the omission of these features, embodiments other than those disclosed in the application as filed fell under the scope of protection.

With regard to the expression "upper and lower compression paddles", such paddles and their position relative to the x-ray tube played an important role in imaging the breast. However, the person skilled in the art was aware of other systems for compressing the breast, which would fall under the scope of protection of the claim in an unjustified way.

Paragraph [0020] of the application as filed disclosed an anode mounted on a shaft and rotated by a motor. Such an anode was related to and inextricably linked to the remaining claim features because it influenced the imaging process. The anode with the rotating motor prevented overheating and allowed for higher x-ray density. However, a static anode would also be protected by claim 1.

The same arguments applied to the missing filter and collimator since these elements also had an influence on the imaging process.

There were further essential features which had been omitted from claim 1. According to paragraph [0021] and Figure 1 of the application as filed, a glass vacuum tube and the cathode in the form of a heated filament were essential for the functioning of the claimed system.

Claim 1 did not specify that the controller was for modifying at least one characteristic of the static focal spot. Instead, only the result to be achieved of the focal spot fixed in space was defined. However, the missing functional feature of the controller specified how the x-rays were focused. This omission was inadmissible, because the controller and the x-ray focusing could be interpreted more broadly in the claim. Moreover, according to the application as filed, the controller belonged to a device, not to a system.

Claim 1 did not specify that the controller was configured to compensate the movement of the x-ray tube by moving the static focal spot during the exposure period, as disclosed in paragraph [0031] of the application as filed. Instead, it defined the

controller as being "arranged to", which resulted in a scope of protection that had not actually been disclosed. The fact that the focal spot appeared to be fixed in space was inextricably linked with the controller being configured to compensate the movement, as it was a result of the latter. Hence, this omission was not allowable either.

Paragraph [0007] of the granted patent, which was also present in the application as filed, had not been adapted to claim 1 as it stated that the modification of the focal spot characteristics could be performed by approaches other than the movement of the static focal spot in a direction opposite to the direction of movement of the x-ray tube. When read in the light of this paragraph, claim 1 encompassed subject-matter which had not been disclosed in the application as filed.

The features of the focusing cup as described in paragraph [0022] of the application as filed were also missing in claim 1, which constituted an unallowable intermediate generalisation, because the subject-matter claimed was directed to a breast tomosynthesis system as disclosed in that paragraph. Moreover, the expression "focusing cup" without the definition of its function was unclear, which made it necessary to introduce the features of paragraph [0022] so as not to add subject-matter.

Validity of the priority claim

The validity of the priority claim could not be assessed by applying the same criteria as for the assessment of added subject-matter over the application as filed. The assessment of the validity of the

priority claim had to take place according to the principles set out in G 2/98. According to this decision, if a priority claim was to be acknowledged, the subject-matter of the claim had to be disclosed, be it explicitly or implicitly, in the application documents relating to the disclosure. The common general knowledge of the person skilled in the art had to be considered. However, this common general knowledge might change from the time the priority document was filed to the time the original application was filed. The subject-matter of the claim for which priority was claimed had to be clear. This was derived from point 4 of the decision in German, in which the term "deutlich" was used. Moreover, the subject-matter of the claim had to be disclosed in the form of a claim or in the form of an embodiment or example specified in the description of the application whose priority was claimed. The priority document did not contain any claims. Hence, the basis for a claim which could enjoy the priority could only be the specific embodiments shown in the figures. The only embodiment directed to a breast tomosynthesis system was described in paragraphs [0010] and [0020] in conjunction with Figure 1. This embodiment, however, contained a number of features which had not been incorporated in claim 1. Hence, the priority was not valid. G 2/98 did not consider intermediate generalisations, which were of importance only for the assessment of added subject-matter over the application as filed. Intermediate generalisations were the object of decision G 1/93, relating to a completely different legal situation (point 10 of the reasons of G 2/98).

The two questions had to be referred to the Enlarged Board of Appeal to clarify the different criteria to be adopted for assessing the validity of a priority claim

and the presence of added subject-matter over the application as filed.

Sufficiency of disclosure

Claim 1 of the main request specified that the effective focal spot was fixed in space while, at the same time, it defined a generally synchronised movement of the static focal spot in a direction opposite to the direction of movement of the x-ray tube. However, a generally synchronised movement of the static focal spot did not make it possible to fix the effective focal spot in space. The expression "generally synchronized" included synchronised and not synchronised. The person skilled in the art would not have been able to reproduce the invention over the whole scope, if the movement of the static focal spot was not synchronised with the movement of the x-ray tube. Moreover, a mammography system which was typically used for measuring breast density, as defined in claim 2 of the patent as granted, was not disclosed in the patent.

Novelty

The subject-matter of claims 1, 4 and 7 of the main request lacked novelty over D3.

D3 disclosed a focusing cup within the meaning of these claims. Using a focusing cup to focus an electron stream was typical. D3 did not disclose that the focusing was done in an atypical way. Moreover, according to the patent, the focusing cup was simply an arrangement for directing an electron stream to the anode. There was no requirement that the arrangement should be in the form of a cup. Paragraph [0020]

disclosed a focusing cup as a cylindrical element, paragraph [0022] defined the focusing cup as a separate control electrode, and Figure 6 did not disclose the form of a cup. It followed that the expression "focusing cup" in the claims and in the prior art meant any control electrode for focusing an electron stream.

Inventive step

Since the priority was not valid for the subject-matter of the claims of the patent as granted, D3 belonged to the state of the art according to Articles 54(1) and (2) EPC. The subject-matter of claims 1 and 7 was not inventive when starting from D3 in combination with other prior art documents.

Moreover, the subject-matter of claims 1 and 7 was not inventive when starting from D4 in combination with D5, D6 and/or D11.

D4 disclosed all the features of these claims except for the controller being arranged, in a first operational mode, to move the static focal spot within the x-ray tube in a second direction, opposite from the first direction and generally synchronised with the directional movement of the x-ray tube, so that a resulting effective focal spot appears to be fixed in space, relative to one of the breast and/or the detector, in one position during the entire duration of the exposure.

This feature minimised blur during image acquisition. However, D4 disclosed the same technical effect of improved image quality (column 3, line 2 and column 5, lines 17 to 34).

It followed that the technical problem solved by the distinguishing feature could only be seen as the provision of an alternative breast tomosynthesis system.

D4 (column 3, lines 3 to 7) taught shifting the focal spot of an electron beam. Each of D5 (column 8, lines 39 to 49 in conjunction with Figure 9), D6 and D11 (abstract and page 2704) disclosed the distinguishing feature, which the person skilled in the art would implement in the system according to D4 without exercising inventive skill.

VI. The respondent's arguments, where relevant to this decision, may be summarised as follows.

Extension of subject-matter

The totality of the patent and the application as filed related to a breast tomosynthesis system.

Paragraphs [0001] to [0003], [0062], [0064] and [0066] explicitly mentioned breast tomosynthesis. Where there was no explicit mention of the word "breast" in a particular paragraph, but rather to a tomosynthesis system in general, it was apparent from the overall disclosure that such system was, was suitable for, or could be a breast tomosynthesis system.

Paragraphs [0007], [0010], [0020] to [0023], [0026] to [0032], [0048], [0051], [0052], [0054], [0060], [0063] and [0064] of the application as filed provided a basis for the subject-matter of claims 1 and 7 of the main request.

The features of the scatter grid, the qualification of "upper and lower" for the compression paddles, the configuration of the anode, the filter and the

collimator disclosed in paragraph [0020] of the application as filed were not inextricably linked to the technical effect of the subject-matter of the claims. Hence, they could be omitted. The same applied to the glass vacuum tube and the cathode in the form of a heated filament as disclosed in paragraph [0021] of the application as filed. Paragraphs [0063] and [0064] of the application as filed provided a literal basis for the controller as defined in the claims. The result of having the effective focal spot appearing to be fixed in space was achieved by the controller being arranged to move the static focal spot with respect to the x-ray tube as defined in the claims.

The focusing cup according to claims 1 and 7 was disclosed in paragraph [0022] of the application as filed. The specifications of the focusing cup in that paragraph were not inextricably linked to the technical effect achieved by the claimed invention.

Validity of the priority claim

The validity of the priority claim should be assessed by applying the same criteria as for the assessment of added subject-matter over the application as filed. G 2/98 recited that the priority document as a whole, not only the claims, should provide an explicit or implicit basis. There was no difference for the assessment of intermediate generalisations either. G 1/93 was not relevant here. A referral to the Enlarged Board of Appeal was not justified.

The priority document contained the same description and figures of the application as filed. It followed that the priority claim was valid for the same reasons as for the assessment of added subject-matter.

Sufficiency of disclosure

The expression "generally synchronized" in claims 1 and 7 of the main request meant that the movement of the static focal spot should be synchronised with that of the x-ray tube as far as technically possible. Moreover, the claims specified that the generally synchronised movement had to be such that a resulting focal spot appeared to be fixed in space. Hence, there were no contradictory requirements in the claims, which could be put into practice by the person skilled in the art over the whole scope. Measuring breast density, as defined in claim 2 of the main request, was within the common general knowledge of the person skilled in the art.

Novelty

D3 did not disclose any focusing cup either explicitly or implicitly. There were alternative means for directing an electron beam at an anode, such as magnets and focusing anodes.

Inventive step

D3 did not constitute prior art with regard to assessing inventive step.

D4 did not disclose a controller being arranged, in a first operational mode, to move the static focal spot within the x-ray tube in a second direction, opposite from the first direction and generally synchronised with the directional movement of the x-ray tube, such that a resulting effective focal spot appears to be fixed in space, relative to one of the breast and/or the detector, in one position during the entire

duration of the exposure.

D5, D6 and D11 did not disclose this feature either, as explained by the Opposition Division in the impugned decision. Hence, the subject-matter of the claims of the main request was inventive.

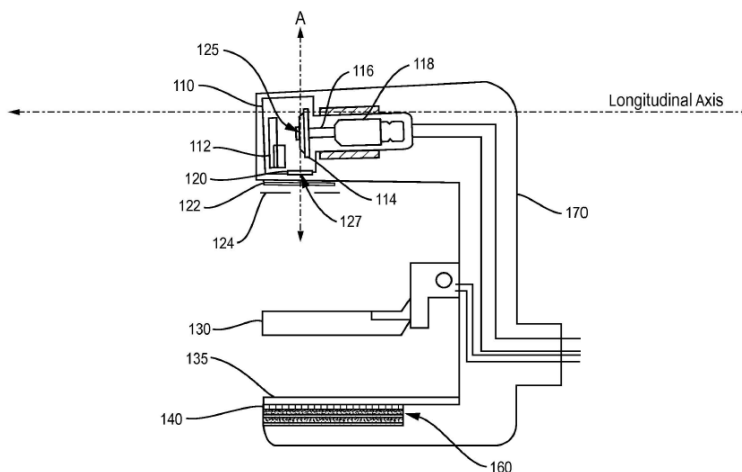
Reasons for the Decision

1. The patent

The patent relates to a breast tomosynthesis system.

Breast tomosynthesis is a three-dimensional imaging technology which acquires x-ray images of a stationary compressed breast at multiple angles during a short scan involving the movement of an x-ray tube. The individual images are then reconstructed into a series of thin high-resolution slices that can be displayed individually or as a dynamic film (paragraph [0001] of the patent).

A breast tomosynthesis system according to claim 1 of the main request is depicted in Figure 1 of the patent, reproduced below.



The system comprises an x-ray tube (110), a detector (160) and compression paddles (130, 135).

The x-ray tube and the detector can be used for the acquisition of images, while the compression paddles are normally used for compressing the breast to achieve better image quality.

The x-ray tube is arranged to move during an exposure period and comprises a cathode (112), an anode (114), a focusing cup, a port (120) and a controller.

The cathode is for providing an electron stream, and the anode comprises a target for receiving the electron stream and generating, in response to the electron stream, a photon stream (i.e. the x-rays) to be passed out of the x-ray tube through the port directed towards the breast.

The cathode, the anode and the port define a static focal spot (127) of the x-ray tube.

The static focal spot is the area of the port at the x-ray tube, seen from the breast, through which the photon stream effectively passes out of the x-ray tube. The photon stream, after having passed through the breast, is detected by the detector to provide the tomosynthesis images.

The focusing cup focuses the electron stream on the anode during the exposure period. The controller is coupled to at least one of the anode, the cathode and the focusing cup to control the static focal spot.

When the x-ray tube moves in a first direction during an exposure period the controller is arranged, in a

first operational mode, to move the static focal spot within the x-ray tube in a second direction, opposite from the first direction and generally synchronised with the directional movement of the x-ray tube, such that a resulting effective focal spot appears to be fixed in space, relative to one of the breast and/or the detector, in one position during the entire duration of the exposure.

This avoids movement of the effective focal spot while permitting continuous movement of the x-ray tube during the exposure. As a result, image quality is increased (paragraphs [0004] and [0005] of the patent). Movement of the effective focal spot during the exposure would cause image blurring and artifacts, while stopping the x-ray tube at each imaging location would reduce image quality and increase acquisition time.

2. Added subject-matter

- 2.1 The subject-matter of claims 1 and 7 of the main request is mainly based on paragraphs [0063] to [0065] of the application as filed.

Paragraphs [0063] and [0064] read:

"Various embodiments of the invention include an x-ray tube arranged to move during an exposure period. The x-ray tube includes a cathode for providing an electron stream, an anode comprising a target for receiving the electron stream, the anode for generating a photon stream, a focusing cup which focuses the electron stream on the anode during the exposure period, a port for passing the photon stream out of the x-ray tube, wherein the cathode, anode and port together define an static focal spot of the x-ray tube, and a controller

coupled to at least one of the anode, the cathode and focusing cup for modifying a characteristic of the static focal spot during the exposure period by performing at least one of modifying a static focal spot location or size in relation to a movement of the x-ray tube.

The x-ray tube may move in a first direction during the exposure period and the controller may move the static focal spot in a second direction, opposite to the first direction, during the exposure period such that an effective focal spot remains relatively fixed in space relative to the breast and/or detector during the exposure period to reduce image blur. The static focal spot size may be increased to reduce the exposure period and resulting image blur."

Paragraph [0065] relates to a method of acquiring an x-ray image.

Claims 1 and 7 of the main request are directed to the alternative in paragraph [0063] according to which the location of the static focal spot is modified in relation to a movement of the x-ray tube.

- 2.2 Paragraphs [0063] to [0065] summarise the preceding disclosure of the application as filed with respect to the x-ray tube included in various embodiments. It follows that they concern breast tomosynthesis, which is the object of these embodiments. Moreover, paragraph [0064] explicitly mentions the breast. Hence, the appellant's arguments that paragraphs [0063] to [0065] do not relate to breast tomosynthesis are not convincing. For a person skilled in the art, the teaching of paragraphs [0063] to [0065] applies, in view of its general nature, to x-ray tubes disclosed in

preceding embodiments unless it is technically incompatible with them.

As regards the difference in wording in relation to the description of the static focal spot in paragraph [0031] ("appears to be fixed in space") and in paragraph [0064] ("relatively fixed in space"), this is purely linguistic and does not imply any technical difference or give rise to any incompatibility. Hence, the disclosure of paragraphs [0063] to [0065] applies to the embodiment described in paragraph [0031] and Figure 3B. The latter paragraph provides a literal basis for the movement of the focal spot being generally synchronised with the directional movement of the x-ray tube and for the effective focal spot appearing to be fixed in space during the entire duration of the exposure, as defined in claims 1 and 7 of the main request.

The disclosure of paragraphs [0063] to [0065] also applies to the embodiment described in paragraphs [0010] and [0020] and Figure 1, which relate to a breast tomosynthesis system including "an x-ray tube of the present invention" (paragraph [0010]). Paragraphs [0010] and [0020] provide a literal basis for the breast tomosynthesis system comprising an x-ray tube, a detector and compression paddles as defined in claims 1 and 7 of the main request.

- 2.3 The appellant's arguments relating to Figures 6 and 8B are of little relevance, as these figures and their description are not necessary for providing a basis for the subject-matter of claims 1 and 7 of the main request. Whether or not these figures disclose embodiments in accordance with the claimed subject-matter, due to a motion control unit being

added and the controller of Figure 8B not being coupled to any of the anode, the cathode or the focusing cup, is not decisive and does not need to be established for the assessment of added subject-matter. The same alleged ambiguity is present in the application as originally filed, as paragraph [0050] (describing Figure 8B) and paragraph [0063] are not presented as mutually exclusive.

The appellant's argument that paragraph [0007] of the granted patent, which was also present in the application as filed, had not been adapted to the claims as granted is not convincing either. The person skilled in the art understands that a system which is not adapted to modify a focal spot characteristic by the approach which includes moving the static focal spot during a tomosynthesis exposure does not fall within the scope of claims 1 and 7 of the main request because it goes against the express requirements of these claims. As a consequence, the person skilled in the art would not consider such a system for interpretation of the claimed subject-matter.

2.4 The appellant argued that a number of features essential for the breast tomosynthesis system, as defined in claims 1 and 7 of the main request, had been inadmissibly omitted from these claims. This amounted to an unallowable intermediate generalisation.

In its arguments, the appellant cited the Guidelines for Examination in the European Patent Office and argued that the missing features had been presented together with the claimed ones and were of importance for the functioning of a breast tomosynthesis system as defined in claims 1 and 7 of the main request.

When assessing the allowability of an intermediate generalisation, it has to be established whether, because of this generalisation, the claim presents technical information which extends beyond what was directly and unambiguously disclosed, be it explicitly or implicitly, to the person skilled in the art using common general knowledge in the application as filed. This is the "gold" standard for assessing any amendment for its compliance with Article 123(2) EPC (G 2/10, point 4.3 of the Reasons). G 1/93, referred to by the appellant, deals with the conflicting requirements of Article 123, paragraphs (2) and (3) EPC. It does not prescribe any special criteria for the assessment of intermediate generalisations for compliance with Article 123(2) EPC. The person skilled in the art is presented with subject-matter extending beyond the application as filed when an amended claim includes only some features of an originally disclosed combination and the features left out of the claim were understood, by the person skilled in the art, to be inextricably linked to the claimed ones. This is the case if the person skilled in the art would have regarded the omitted features to be necessary for achieving the effect associated with the added features. In such a situation, the amended claim conveys the technical teaching that the effect can be obtained with the claimed features alone, which is in contrast with and extends beyond the originally disclosed subject-matter that the whole combination of features was needed. The passage in the Guidelines H-V.3.2.1 concerning intermediate generalisations has to be understood in this context.

- 2.5 The invention as claimed in independent claims 1 and 7 of the main request is directed to a breast tomosynthesis system and a method of acquiring breast

tomosynthesis x-ray images with such a system. In the original disclosure, the features of these claims relate specifically to optimising the acquired images by acting on the focal spot. Features in the description concerned with other aspects of the system, such as the way the x-rays are generated or the way the breast is fixed in place on the detector, may be left out of the claims as long as they are not relevant to the optimisation, even if they contribute to the general functioning of the tomosynthesis system. The fact that claim 1 is directed to a tomosynthesis system and not a tomosynthesis device is irrelevant in this respect.

Against this background, the omission of a scatter grid, of the qualification of "upper and lower" for the compression paddles, of the anode being mounted on a shaft and rotated by a motor, of a filter, of a collimator, of a glass vacuum tube, of the cathode in the form of a heated filament and of the form of the focusing cup, as described in paragraphs [0020] to [0022] of the application as filed, is not problematic. The person skilled in the art would have recognised that the omitted features do not contribute to optimisation of the acquired images by acting on the focal spot, as correctly explained by the Opposition Division in the impugned decision (point 3.1.4 of the Reasons) and argued by the respondent. The appellant's argument that the anode "mounted on a shaft" and "rotated by a motor" influenced the imaging process is not convincing. These features of the anode are not concerned with optimising the acquired images by acting on the focal spot because they are irrelevant to the control of the position of the anode by the controller in order to act on the focal spot. The person skilled in the art would have been aware of several alternative

mechanical arrangements for such control and is thus not presented with technical information which was not directly and unambiguously derivable from the application as filed.

The alleged lack of clarity of the expression "focusing cup" is not relevant either. The focusing cup is for generating the x-rays, but does not contribute to the optimisation of the acquired images by acting on the focal spot.

The appellant argued that, as a consequence of the omission of the above features, embodiments other than those disclosed in the application as filed fell under the scope of protection. Whether or not this is the case is, however, of no relevance. Article 123(2) EPC, unlike Article 123(3) EPC, is not concerned with scope of protection, but rather with comparison of the information linked to the amendment under scrutiny with the information directly and unambiguously derivable from the application as originally filed.

- 2.6 The appellant's arguments that claims 1 and 7 of the main request did not specify that the controller was for modifying at least one characteristic of the static focal spot and was configured to compensate the movement of the x-ray tube by moving the static focal spot during the exposure period are not convincing either.

The definition of the controller being "arranged, in a first operational mode, to move the static focal spot (127) within the x-ray tube in a second direction, opposite from the first direction and generally synchronized with the directional movement of the x-ray tube, so that a resulting effective focal spot appears

to be fixed in space, relative to one of the breast and/or the detector, in one position during the entire duration of the exposure" implies the modification of one characteristic (the position) of the static focal spot and compensation of the movement of the x-ray tube (by a movement in an opposite direction) during the exposure period. Any difference in wording is purely linguistic and does not imply any technical difference or involve any added subject-matter.

2.7 In conclusion, the appellant's objections based on the ground for opposition of added subject-matter according to Article 100(c) EPC do not prejudice maintenance of the patent according to the main request.

3. Validity of the priority claim

3.1 Despite the appellant's arguments, the same considerations apply to assessment of the priority claim as to added subject-matter.

The disclosure of the description and the drawings of the priority document are identical to those of the application as filed. The priority document differs from the application as filed only in that it does not contain any claims. However, the claims of the application as filed are not required in order to provide a basis for claims 1 and 7 of the main request, as shown in the above explanation.

3.2 As the appellant argued, the criteria for assessing the validity of a priority claim were set out in G 2/98, the conclusion reading:

"The requirement for claiming priority of 'the same invention', referred to in Article 87(1) EPC, means

that priority of a previous application in respect of a claim in a European patent application in accordance with Article 88 EPC is to be acknowledged only if the skilled person can derive the subject-matter of the claim directly and unambiguously, using common general knowledge, from the previous application as a whole."

These criteria correspond to the "gold" standard for assessing any amendment, no matter whether or not it includes intermediate generalisations, for its compliance with Article 123(2) EPC, as set out in point 2.4 above.

Point 4 of the Reasons of G 2/98 referred to by the appellant does not imply any different criterion in the assessment of added subject-matter and the validity of a priority claim either. The relevant passage reads:

"It follows that priority for a claim, i.e. an 'element of the invention' within the meaning of Article 4H of the Paris Convention, is to be acknowledged, if the subject-matter of the claim is specifically disclosed be it explicitly or implicitly in the application documents relating to the disclosure, in particular, in the form of a claim or in the form of an embodiment or example specified in the description of the application whose priority is claimed, and that priority for the claim can be refused, if there is no such disclosure."

This passage is in line with and does not go beyond the order of G 2/98, as it states that, in order for a priority claim to be valid, a specific disclosure, be it explicit or implicit, has to be present in the application from which the priority is claimed. The term "deutlich" in the German version of the decision, which is a translation of the term "specifically" in

the English version, does not imply that only a clear claim may enjoy a priority claim. The term qualifies the disclosure in the application from which priority is claimed. This disclosure should be specific ("deutlich") in the sense that the subject-matter for which priority is claimed is to be derived from the disclosure in a direct and unambiguous way. Whether this subject-matter as such is unclear is not decisive as long as the same (unclear) subject-matter is directly and unambiguously disclosed in the application from which priority is claimed. In view of Article 88(4) EPC, it is not required that this subject-matter be disclosed in the form of a claim or in the form of an embodiment or example specified in the description of the application from which priority is claimed. In the passage in point 4 of the Reasons of G 2/98, these items, as derived from the expression "in particular", are simply listed as exemplary parts of the application documents.

Finally, whether the common general knowledge of the person skilled in the art may change in the time between the filing of a priority application and of the original application is of no relevance in the current case. The appellant has not pointed to any relevant effect on the disclosures of these applications of such a potential change and the Board does not see any either.

In conclusion, the appellant's objections against the validity of the priority for the subject-matter of claims 1 and 7 of the main request (Article 87(1) EPC) are not convincing. The priority for these claims is to be acknowledged for the same reasons as the ones set out with respect to added subject-matter in points 2.1 to 2.7 above. The appellant did not provide further

reasons why the remaining claims might not enjoy the priority. The Board does not see any either. Hence, the priority is considered valid for all the claims of the main request.

- 3.3 These conclusions provide a sufficient answer to the questions which the appellant proposed to refer to the Enlarged Board of Appeal for a decision to be reached in the current case on the basis of the EPC and of consistent case law. Hence, no decision on these questions is required by the Enlarged Board of Appeal. Consequently, the request for referral is rejected (Article 112(1) (a) EPC).

4. Sufficiency of disclosure

- 4.1 The appellant argued that a "generally synchronized" movement of the static focal spot with respect to the movement of the x-ray tube together with the focal spot being "fixed in space", as required by claims 1 and 7 of the main request, was not sufficiently disclosed because these were contradictory requirements.

This objection is based on a purely linguistic reading of the claims and disregards the fact that sufficiency of disclosure has to be assessed with regard to the description. It is clear from the description that the effective focal spot should be held substantially stationary to obtain better images (paragraph [0007], third sentence and paragraph [0021], for example). The general synchronisation of the movements of the static focal spot within the x-ray tube and the x-ray tube itself as defined in the claims does not encompass a synchronisation and a non-synchronisation, but is to be interpreted as meaning that the effective focal spot is kept substantially stationary so as to obtain better

images, as far as is technically possible for the person skilled in the art. The claims confirm this, as they specify a "generally synchronized" movement "so that a resulting effective focal spot appears to be fixed in space".

In conclusion, the invention as defined in claims 1 and 7 of the main request is sufficiently disclosed.

4.2 To the extent that the appellant's reference to a mammography system is to be understood as an objection of insufficiency against claim 2 of the main request, the person skilled in the art would have known how to determine breast density. The claim does not prescribe that this should be done with the defined breast tomosynthesis system, but rather it can be done independently of this system.

4.3 In conclusion, the appellant's objections based on the ground for opposition of insufficiency of disclosure according to Article 100(b) EPC do not prejudice the maintenance of the patent according to the main request.

5. Novelty

5.1 The appellant argued that the subject-matter of claims 1, 4 and 7 of the patent as granted was not novel over D3.

D3 is a European patent application published under the PCT after, but with a priority date before, the priority date of the claims of the patent. By virtue of Articles 89, 54(3) and 56 EPC, D3 forms part of the state of the art but must not be considered when

deciding whether there has been an inventive step.

- 5.2 D3 discloses a breast tomosynthesis system without focal spot motion during image acquisition (page 1, lines 10 to 15). The Opposition Division concluded that D3 does not disclose a focusing cup as defined in claims 1 and 7 of the main request. The appellant argued, in essence, that a focusing cup was implicitly disclosed in D3 not least because, according to the disclosure of the patent, a focusing cup did not have to have the form of a cup.

The Board does not share the appellant's view. The claims define a focusing cup for focusing the electron stream. This means that the electron stream is focused by an element which has to have the form of a cup. The description does not give this term a different meaning. The cup being described as "cylindrical in shape" does not change the fact that it has to have the form of a cup, for example in the form of a cylinder with a closed bottom.

The test for novelty of a feature is whether this feature is directly and unambiguously disclosed in a prior art document. D3 does not directly and unambiguously disclose a focusing element for the electrodes from the cathode onto the anode in the form of a focusing cup. As the Opposition Division and the respondent pointed out, such a focusing cup is not implicit for the production of x-rays. Although a focusing cup may be generally known in the art and shown in other prior art documents, alternative means for directing an electrode beam towards an anode, such as coils or magnets, can be employed.

It follows that the subject-matter of claims 1 and 7,

and hence also that of dependent claim 4, is novel over D3 by virtue of the defined focusing cup.

5.3 In conclusion, the appellant's objections based on the ground for opposition of lack of novelty according to Article 100(a) EPC do not prejudice the maintenance of the patent according to the main request.

6. Inventive step

6.1 The appellant argued that the subject-matter of claims 1 and 7 of the main request was not inventive starting from D3 or from D4.

6.2 As explained in point 5.1 above, the objections starting from D3 cannot be considered because the priority claim is valid for claims 1 and 7.

6.3 As regards the objections starting from D4, this document discloses a breast tomosynthesis system in which the X-ray tube moves following a non arc shaped path relative to the detector to improve the quality of the tomosynthesis images (sentence bridging columns 2 and 3).

It is common ground that D4 does not disclose a controller "arranged, in a first operational mode, to move the static focal spot within the x-ray tube in a second direction, opposite from the first direction [of movement of the x-ray tube] and generally synchronized with the directional movement of the x-ray tube, so that a resulting effective focal spot appears to be fixed in space, relative to one of the breast and/or the detector, in one position during the entire duration of the exposure".

6.4 This distinguishing feature addresses the objective technical problem of further improving image quality by providing the technical effect of eliminating the image artifacts resulting from the movement of the focal spot during image acquisition. The problem formulated by the appellant, namely providing an alternative to D4, is not accepted because it does not consider the technical effect of the distinguishing feature. Image quality can be improved in different ways.

6.5 The appellant referred to D5, D6 and D11. However, as also explained by the Opposition Division in the impugned decision (point 3.5.2 of the Reasons), these documents do not disclose the distinguishing feature.

D5 discloses a CT apparatus with adjusting means for the focal spot. A controller can keep the focal spot in a predetermined position (column 2, lines 12 to 26 and column 9, lines 35 to 38). There is no disclosure of synchronised movements of the x-ray tube and the static focal spot during an exposure as defined in claims 1 and 7 of the main request.

D6 discloses an x-ray apparatus with a deflection arrangement for deflecting the electron beam of the x-ray tube dependent on a control signal. This allows adjustment of the position of the static focal spot (column 4, lines 24 to 34). D6 does not disclose synchronised movements of the x-ray tube and the static focal spot during an exposure as defined in claims 1 and 7 of the main request.

D11 discloses a magnetic deflection system for controlling the focal spot of an x-ray device to keep it "quasistatic in time" ("C. Magnetic deflection system" on page 2704). D11 does not disclose

synchronised movements of the x-ray tube and the static focal spot during an exposure as defined in claims 1 and 7 of the main request.

6.6 Since none of the documents cited by the appellant discloses the distinguishing feature, let alone for the solution of the objective technical problem, the person skilled in the art would not have arrived at the subject-matter of claims 1 and 7 of the main request without exercising inventive skill.

6.7 In conclusion, the appellant's objections based on the ground for opposition of lack of inventive step according to Article 100(a) EPC do not prejudice maintenance of the patent according to the main request.

7. As a consequence, the appeal must be dismissed and there is no need to consider the respondent's auxiliary requests or the request for remittal.

Order

For these reasons it is decided that:

1. The appeal is dismissed.
2. The request for referral is rejected.

The Registrar:

The Chairman:



A. Chavinier-Tomsic

M. Alvazzi Delfrate

Decision electronically authenticated