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**Datasheet for the decision  
of 14 September 2022**

**Case Number:** T 1657/18 - 3.4.03

**Application Number:** 11184242.3

**Publication Number:** 2544164

**IPC:** G09B9/02, G09B9/14

**Language of the proceedings:** EN

**Title of invention:**

Motion and vibration cuing system

**Applicant:**

Industrial Smoke & Mirrors, Inc.

**Headword:**

**Relevant legal provisions:**

RPBA Art. 12(4)  
RPBA 2020 Art. 13(2)  
EPC Art. 123(2), 56

**Keyword:**

Late-filed request - request as originally filed and withdrawn before the examining division without being part of the decision - admitted (no)  
Amendment after summons - exceptional circumstances (yes) - cogent reasons (yes) - admitted (yes)  
Amendments - allowable (yes)  
Inventive step - obvious combination of known features

**Decisions cited:**

T 0922/08, T 2278/08, T 1306/10, T 1311/11, T 2489/11

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
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Case Number: T 1657/18 - 3.4.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.4.03**  
**of 14 September 2022**

**Appellant:** Industrial Smoke & Mirrors, Inc.  
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**Representative:** Schmid, Wolfgang  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 6 February 2018  
refusing European patent application No.  
11184242.3 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** T. Bokor  
**Members:** J. Thomas  
S. Ward

## Summary of Facts and Submissions

- I. The appeal is against the decision of the examining division to refuse European patent application No. 11 184 242 on the grounds that the subject-matter of the then main request and then auxiliary requests 1 and 2 did not involve an inventive step within the meaning of Article 56 EPC.
- II. At the end of the oral proceedings held by video conference before the Board the appellant requested
- that the decision under appeal be set aside and
  - that a patent be granted according to,
    - as a main request, the documents filed on 7 October 2011,
    - or alternatively according to the auxiliary request filed during oral proceedings before the Board.
- III. The following documents are referred to:
- D1: WO 02/03352 A2  
D2: WO 80/00507 A1
- IV. Claim 1 of the main request (as originally filed on 7 October 2011) reads as follows:

*"Apparatus for simulating the motion of a vehicle including a frame assembly (18) and at least one motion seat (20, 22) mounted to said frame assembly (12), said at least one motion seat (20, 22) being operative to impart one or more of surge, sway, heave and roll movements to a user seated therein characterized by:*

*a number of frame actuators (24a-e) mounted to said frame assembly (18), said frame actuators (24a-e)*

*being effective to move said frame assembly (18) in such a way as to simulate vibratory motion and one or more surge, sway, heave, roll, pitch and yaw motions to the user seated in said at least one motion seat (20, 22), said frame actuators (24a-e) being operative in coordination with the movement of said at least one motion seat (20, 22)."*

- V. Claim 1 of the auxiliary request submitted during the oral proceedings before the Board reads as follows:

*"Apparatus for simulating motion in a flight simulator for an aircraft having a simulated cockpit including flight controls and wide-field outside-world visual systems, said apparatus including a frame assembly (18) and at least one motion seat (20, 22) mounted to said frame assembly (18), said at least one motion seat (20, 22) comprising a seat pan (30), a back pan (32) and a seat belt (36), characterized by:  
a number of frame actuators (24a-f) each having a shaft mounted to said frame assembly (18), each of said frame actuators (24a-f) being operated to extend and retract said shaft thereof to impart motion to said frame assembly (18) in order to simulate vibratory motion which is transmitted by said frame assembly (18) to the user seated in said at least one motion seat (20, 22), said frame actuators (24a-f) being effective to move said frame assembly (18) in such a way as to simulate vibratory motion and one or more surge, sway, heave, roll, pitch and yaw motions for the user seated in said at least one motion seat (20, 22), a number of seat actuators (126) coupled to said at least one motion seat (20, 22), said seat actuators (126) being operative to move said at least one*

*motion seat (20,22) in one or more of surge, sway, heave and roll motions; said frame actuators (24a-f) being further operated to move said frame assembly (18) in six degrees of freedom of motion, said frame actuators (24a-f) and said seat actuators (126) acting in coordination with one another using acceleration onset cuing [sic] in such a way as to simulate one or more of surge, sway, heave, roll, pitch and yaw motions produced during a maneuver of the aircraft in order to impart both tactile and visual sensations to the user seated in said at least one motion seat (20, 22) that result from said maneuver."*

VI. The appellant's arguments, insofar as they are relevant to the present decision, may be summarised as follows:

The appellant offered no argument relating to the admission of the main request into the proceedings.

As to the auxiliary request the appellant held that document D1 presented a suitable starting point for an inventive step argumentation. It disclosed all features apart the following ones:

- The entire motion seat comprising seat back, seat pan and seat belt were moved all together by the seat actuators.
  - The simulation was of the type of "acceleration onset cueing".
  - The control of the frame actuators was coordinated with the control of the seat actuators.
  - The frame actuators imparted not only accelerations but also vibrations.
  - A wide field outside-world visual system was used.
- When formulating and discussing the problem-solution-approach the appellant focused on the differentiating

features which were accepted by the Board (see point 3.2.1 below). The problem to be solved was seen in the provision of a more realistic vibrational sensation of the whole body of the person using the flight simulator. Even if the skilled person could modify the flight simulator known from document D1 to implement the differentiating features, there was no hint in document D1 that would prompt them to do so. Thus the modifications according to the differentiating features would not have been obvious to the skilled person, so that the claimed subject-matter was inventive.

The appellant's arguments as to inventive step will be dealt with in more detail below.

## **Reasons for the Decision**

### **1. Main request - admission into the proceedings (Article 12(4) RPBA 2007)**

1.1 The claims of the main request are the claims as originally filed (filed on 7 October 2011). They are not part of the decision of the examining division since during the course of the first instance proceedings the applicant (now appellant) replaced them by amended claims. The present main request is therefore a resubmission of a request withdrawn during the examination proceedings.

1.2 According to established case law (see Case Law of the Boards of Appeal, 10th Edition, 2022, V.A.5.11.4 c)), the Boards of Appeal have the power not to admit requests that were withdrawn during the first instance proceedings (e.g. T 922/08); if the Board were to admit such a request, it would be contrary to the main

purpose of *ex parte* appeal proceedings, which are primarily concerned with examining the contested decision, i.e. with providing the applicant with the opportunity to challenge the decision on its merits and to obtain a judgment as to whether the first-instance decision was correct (see also T 2278/08, T 1306/10, T 1311/11, T 2489/11).

1.3 The appellant has not put forward any argument in favour of the admittance of the main request into the proceedings.

1.4 In view of the facts that

- the present main request corresponds to a request withdrawn during the first instance proceedings,
- the impugned decision is not based on this set of claims,

and taking into account the considerations under points 1.1 to 1.2 above, the Board does not admit the main request into the proceedings (Article 12(4) RPBA 2007 which applies here pursuant to Article 25(2) RPBA 2020).

**2. Auxiliary request - admission into the proceedings  
(Article 13(2) RPBA 2020)**

2.1.1 The present auxiliary request was submitted for the first time during the oral proceedings before the Board replacing the preceding auxiliary request then on file. This happened in response to an objection under Article 123(2) EPC raised by the Board for the first time during the oral proceedings.

According to Article 13(2) RPBA 2020, which here applies since the auxiliary request was submitted after notification of the summons to oral proceedings, the



Board shall not take any amendments to a party's appeal case into account unless there are exceptional circumstances, which have been justified with cogent reasons.

In its preliminary opinion the Board stated that "*[a]t present the Board has no objections under Article 123(2) EPC*". However, following the discussion during the oral proceedings, the Board became aware that an objection under Article 123(2) EPC had to be raised. The Board considers that the appellant should be given an opportunity to respond to an objection that it could not have reasonably expected, given that the objection under Article 123(2) EPC was never raised before. Moreover, the new auxiliary request is considered to overcome the Board's objection, as the amended features which gave rise to the objection have been deleted. The Board is satisfied that the circumstances of the present proceedings represent an exceptional circumstance. Consequently, the late filing of the request is justified by cogent reasons (Article 13(2) RPBA 2020), and the Board is fully aware of these reasons. Therefore, the Board admits the new auxiliary request under Article 13(2) RPBA 2020 into the proceedings.

### **3. Auxiliary request - inventive step**

#### **3.1 Closest prior art**

The closest prior art is, as also suggested by the appellant, document D1 which deals with a flight simulator wherein a motion seat is mounted on a movable frame.

Document D1 discloses (the references in parentheses in the following paragraph refer to document D1) an apparatus for simulating motion in a flight simulator for an aircraft (page 1, lines 5 to 7, page 22, lines 4 to 8) ~~having a simulated cockpit including flight controls and wide-field outside-world visual systems.~~

The apparatus includes a frame assembly (page 18, lines 11 to 17) and at least one motion seat (11) mounted to said frame assembly (page 18, lines 11 to 17), said at least one motion seat (11) comprising a seat pan (Figures 1 and 5), a back pan (Figures 1 and 5) and a seat belt (page 10, lines 7 to 10), whereby:

a number of frame actuators (page 18, lines 11 to 17; actuators are part of a Stewart platform) each having a shaft mounted to said frame assembly, each of said frame actuators being operated to extend and retract said shaft thereof to impart motion to said frame assembly (these features are implicit for the actuators of a Stewart platform mentioned on page 18, lines 11 to 17) ~~in order to simulate vibratory motion which is transmitted by said frame assembly to the user seated in said at least one motion seat,~~ said frame actuators (page 18, lines 11 to 17) being effective to move said frame assembly in such a way as to simulate ~~vibratory motion and~~ one or more surge, sway, heave, roll, pitch and yaw motions for the user seated in said at least one motion seat (this is typically obtained from a Stewart platform), a number of seat actuators (20, 21, 22; Figures 1 and 5) coupled to said at least one motion seat (Figures 1 and 5), said seat actuators being operative to move said at least one motion seat in one or more of surge, sway, heave and roll motions (page 7, line 10 to page 8, line 4); said frame actuators being further operated to move said frame assembly in six degrees of freedom of motion

(page 18, lines 11 to 17; actuators are part of a Stewart platform), said frame actuators and said seat actuators (20, 21, 22) acting in coordination with one another (coordination of the different actuators is an implicit requirement in order to provide a realistic simulation) using acceleration onset cueing (page 18, line 24 to page 19, line 5; page 23, lines 10 to 13) in such a way as to simulate one or more of surge, sway, heave, roll, pitch and yaw motions (page 3, lines 22 to 25) produced during a maneuver of the aircraft in order to impart both tactile and visual sensations to the user seated in said at least one motion seat that result from said maneuver (page 1, lines 9 to 11).

### 3.2 Differentiating features

3.2.1 According to the feature analysis in the preceding paragraph, the subject-matter defined in present claim 1 differs from the flight simulator disclosed in document D1 by the following two differentiating features:

- The simulated cockpit includes flight controls and wide-field outside-world visual systems.
- The frame actuators impart motion to the frame assembly so that they not only simulate accelerated motions like surge, sway, heave, roll, pitch or yaw motions but also vibratory motions.

3.2.2 As regards the further features which the appellant considered to be allegedly differentiating features (see point VI. above), the Board takes the following position.

Claim 1 does not specify in detail how the seat actuators impart motion to the motion seat, it only states that the seat actuators move the seat in order

to move it in one or more of surge, sway, heave and roll motions. Document D1 discloses the same, namely that the seat is moved by seat actuators in order to produce a motion cueing, as for example surge (D1: page 7, line 10 to page 8, line 4). Moreover, the present application documents do not indicate that the entire motion seat comprising the seat back, the seat pan, the head rest and the seat belt are moved all together as a whole by the seat actuators. This is not defined in claim 1 and can also not be derived from the application documents as detailed in the following. Paragraph [0020] discloses that the seat comprises a seat pan, a seat back, a head rest and a seat belt, but how these parts are moved, if they are firmly fixed together in order to move the whole seat, remains unspecified in the description. On the contrary, the description (paragraph [0020]) states that "*[d]etails of the [seat] actuators and other structure for moving the motion seats 20, 22 form no part of this invention and are not discussed herein*". Also the figures do not even show the seat actuators, so that it cannot be deduced which parts of the seat are activated by the actuators. Even less can it be deduced that the entire seat is moved as one single unit. Contrary to the appellant's allegation, Figure 1 does not teach that the seat is a single unit. The back pan 32 is not necessarily fixed to the seat pan 30 and could well be movable separately from the seat pan 30. The same applies for the head rest 34 or the seat belt 36, as all these four units (30, 32, 34 and 36) are also shown as separate units in Figure 1. Since Figure 1 does not show the seat actuators, it remains unspecified how the actuators move the seat. Therefore, the argument that the seat actuators provide a joint motion of the whole seat in contrast to the seat actuators of the flight

simulator shown in document D1, wherein only the seat pan is moved, cannot convince the Board.

The Board also holds that document D1 discloses the use of acceleration onset cueing in the simulation of acceleration. Acceleration onset cueing is commonly used in standard flight simulators, as indicated in the introductory portion of document D1 (page 1, lines 9 to 11; page 2, lines 9 to 11). In addition, document D1 discusses "acceleration onset cueing" not only in relation with the prior art, but also when talking about the used algorithms. On page 18, line 24 to page 19, line 9, the "brief cue" in combination with a "washout period" at the end of the movement can only be understood as representing the claimed "acceleration onset cueing". Also page 23, lines 10 to 13 provides a basis that document D1 relies on "acceleration onset cueing".

Finally, a coordinate control of the frame actuators together with the seat actuators is considered to be such an obvious procedure that it does not need to be discussed in any detail. The induced movements in a flight simulator inevitably must be controlled by a coordinated activation of the various actuators, otherwise no effective simulation could be produced and the very purpose of the flight simulators would not be achieved. Therefore, the coordinated control of both actuator types, the frame actuators and the seat actuators, is implicit in the apparatus disclosed in document D1.

### 3.3 Objective technical problem

The above-mentioned differentiating features (see point 3.2.1 above) solve the objective technical

problem of providing a more realistic vibration sensation for the whole body of the person using the flight simulator than was so far possible. The same objective technical problem was also formulated by the appellant.

### 3.4 Obviousness

3.4.1 The integration of the first differentiating feature in a flight simulator is considered obvious for the following reasons. Simulated cockpits with flight controls and wide-field outside-world visual systems were technically possible and known at the time of filing of the application. Therefore, this feature, if not already included implicitly in document D1, would be a standard and straightforward development of known flight simulators as indicated in document D1 (page 1, lines 5 to 11). Creating the most realistic environment was already an extremely important concern at the time of filing of the application and is only related to the ability of having sufficient computational power and financial support for its realisation. Moreover, document D2 (page 8, lines 8 to 16) also indicates the desire to achieve simulation conditions as realistic as possible. Hence, the inclusion of the first differentiating feature relates to a standard improvement without involving an inventive step.

3.4.2 The appellant did not object to this assessment of the Board and did not provide any argument against the obviousness of including the first differentiating feature in the claimed apparatus.

3.4.3 The second differentiating feature is also considered not to involve an inventive step for the following reasons. If the whole environment for the seated user

should be improved towards a more realistic simulated feeling, it is obvious that the skilled person would consider imparting not only motion in form of accelerations to the simulated airplane, i.e. the frame assembly, but also vibrations. If the frame on which the seat is mounted is simulating the airplane, a situation close to reality should be simulated for which it is obvious that vibrations are also to be considered. The skilled person would immediately consider that if vibrations in addition to accelerations should be simulated, the combined use of both types of motions can be simulated using corresponding actuators. This type of actuator, allowing the simulation of acceleration and vibration, is disclosed in document D1 (page 8, lines 6 to 11; page 18, lines 19 to 22; page 21, lines 15 to 18; page 23, lines 10 to 13). It would be obvious for the skilled person to consider actuators capable of simulating accelerations and vibrations, regardless of whether they were intended for frame or seat actuation. Hence, the skilled person would obviously select frame actuators which allow the simulation of vibrations and accelerations in order to obtain a more realistic vibrational sensation to the whole body from the flight simulator representing the airplane. Consequently, the skilled person would choose a similar type of frame actuator to that shown in document D1 for the seat actuators in order to solve the posed problem.

- 3.4.4 The appellant did not dispute that document D1 disclosed actuators which are able to impart accelerations and vibrations as such. However it argued that no hint was given in document D1 that the frame actuators should be replaced in order to impart a coordinated movement of vibrations and accelerations. These were at best indicated as "*caus[ing to perform]*"

*physical displacements or rotations within a limited range"* (D1: page 18, lines 11 to 17). In document D1, actuators which allow the simulation of accelerations and vibrations were only used for the seat actuators. Document D1, page 18, lines 11 to 17 hinted even away from selecting actuators being able to impart both types of motion. Therefore according to the appellant, there was no hint to the skilled person to use frame actuators imparting both types of motions.

- 3.4.5 In the Board's view, as argued under point 3.4.3 above, no explicit hint is needed in document D1 that the frame actuators should be replaced by actuators similar to the seat actuators. The hint to consider the simulation of not only accelerations but also vibrations for the frame derives from general knowledge of the skilled person that not only the seat of the user but also the airplane itself, i.e. the frame of the flight simulator, is submitted to accelerations and vibrations. To enable even more realistic flight simulations, it would therefore be obvious to subject the entire structure, i.e. the frame structure, not only to accelerations but also to vibrations. This would be easily achieved with actuators providing both types of motion.

Moreover, contrary to the appellant's allegation, the two paragraphs in document D1, page 18, lines 11 to 22, are not interrelated, and do not teach away from the selected solution that the frame actuators should impart vibrations and accelerations.

The first of these two paragraphs (D1: page 18, lines 11 to 17) indicates the standard characteristics when mounting the fixed platform (18) of the seat to a Stewart platform. The mounting of the fixed platform on a Stewart platform is mentioned only briefly in



document D1, and the skilled person would therefore understand that the type of frame actuator to be used is not central to the teaching of document D1. The second of these two paragraphs (D1: page 18, lines 19 to 22) refers to the advantageous seat actuators, which are extensively discussed in document D1.

Therefore, for a further development of the flight simulator known from document D1, the skilled person would consider the advantages of the seat actuators also for the frame actuators. There is no indication why the skilled person would refrain from replacing the frame actuators of the Stewart platform by more sophisticated actuators.

In addition, document D2, which also deals with a flight simulator, discusses the combined motion induced in a frame structure like a Stewart platform (D2: Figure 1). It mentions the use of hydraulic actuators (D2: abstract; page 4, line 16 to page 5, line 2; page 11, lines 11 to 19), which allow the simulation of motions within a large bandwidth, thereby including not only accelerations ("normal motion cues") but also vibrations (D2: page 11, line 11 to page 12, line 4). Considering the publication date of this document, it is concluded that it is well-known that a realistic simulation of movements of the frame assembly comprise both types of motion, vibrations and accelerations. Therefore, the Board concludes that the skilled person would consider the use of sophisticated frame actuators imparting both types of motion, acceleration and vibration for a further development of the flight simulator known from document D1.

3.4.6 Finally, the Board is of the opinion that the technical implementations of the two discussed differentiating

features are completely independent. The features are not interrelated and do not, when provided together, result in any synergistic effect. However, the overall perception of a flight as perceived by a seated user becomes even more realistic if the entire frame assembly vibrates, i.e. if the vibrations of the whole aircraft are simulated, so that the visual system (whether of the claimed type or any other type) vibrates together with the frame. This consideration additionally supports the argumentation presented above that the skilled person would consider simulating vibrations in addition to accelerations for the whole frame assembly, i.e. for the entire airplane structure.

3.4.7 Therefore, the Board concludes that the subject-matter defined in claim 1 is obvious on the basis of the teaching of document D1 taking into account the common general knowledge in the art as for example also shown in document D2. Consequently, the subject-matter defined in claim 1 of the auxiliary request does not involve an inventive step (Articles 52(1) and 56 EPC).

#### **4. Conclusion**

Since the main request is not admitted into the proceedings and claim 1 of the auxiliary request is not allowable, none of the requests succeed and the appeal must fail.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



S. Sánchez Chiquero

T. Bokor

Decision electronically authenticated