BESCHWERDEKAMMERN
DES EUROPÄISCHEN
PATENTAMTS

BOARDS OF APPEAL OF
THE EUROPEAN PATENT
OFFICE

CHAMBRES DE RECOURS
DE L'OFFICE EUROPÉEN
DES BREVETS

Internal distribution code:
(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision
of 25 April 2023

Case Number: T 2932/19 - 3.2.02

Application Number: 05740306.5

Publication Number: 1753359

IPC: A61B19/00, G06F19/00

Language of the proceedings: EN

Title of invention:
TOOL MEMORY-BASED SOFTWARE UPGRADES FOR ROBOTIC SURGERY

Applicant:
Intuitive Surgical Operations, Inc.

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes)

Case Number: **T 2932/19 - 3.2.02**

D E C I S I O N
of Technical Board of Appeal 3.2.02
of 25 April 2023

Appellant: (Applicant)	Intuitive Surgical Operations, Inc. 1266 Kifer Road Sunnyvale, CA 94086 (US)
Representative:	Forresters IP LLP Skygarden Erika-Mann-Straße 11 80636 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 22 May 2019 refusing European patent application No. 05740306.5 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. Alvazzi Delfrate
Members:	S. Dennler
	Y. Podbielski

Summary of Facts and Submissions

I.   This appeal was filed by the applicant ("appellant")
        against the decision of the Examining Division to
        refuse its patent application, *inter alia* on the ground
        that the subject-matter of independent claims 1 and 15
        of the main request did not involve an inventive step
        over the document US 6,331,181 Bl (D1).

II.   With its statement of grounds of appeal, the appellant
        resubmitted that main request, unchanged, and further
        filed auxiliary requests 1 to 4.

III.   The Board provided its preliminary opinion in a
        communication under Article 15(1) RPBA 2020, objecting
        to some of the dependent claims of the main request.

IV.   In response, with its submission of 13 March 2023 the
        appellant filed an amended main request in which the
        claims objected by the Board had been deleted and the
        remaining claims renumbered accordingly, and including
        an adapted description. This request constituted the
        appellant's new main request on appeal.

V.   The appellant requested that the decision under appeal
        be set aside and that a patent be granted on the basis
        of that new main request, or, alternatively, on the
        basis of one of the auxiliary requests 1 to 4 filed
        with the statement of grounds of appeal.

VI.   The application documents referred to in the following
        are those of the new main request. The independent
        claims, claims 1 and 13, are identical to independent
        claims 1 and 15 of the main request on which the
        decision under appeal was based, and read as follows:

"*1. A robotic system (500) comprising:*

a robotic arm (504) having a tool holder (508) and a signal interface;

a plurality of robotic tools (506), each tool receivable by the tool holder for manipulation by the robotic arm;

a processor (502) having a memory (516) and coupled to the robotic arm, the memory comprising robotic tool data associated with the plurality of tools and the processor directing movement of a robotic tool (512) received by the tool holder using associated tool data from the processor memory;

a first additional tool (514), the first additional tool having a memory with additional tool data or code (230), the first tool transmitting the additional tool data to the processor via the tool signal interface, characterised in that the processor is conditioned to store the additional tool data or code in the processor memory and is operable to direct movement of the robotic arm using the additional tool data or code after the first additional tool is removed from the tool holder."

"*13. A robotic method comprising:*

mounting a first robotic tool (514) to a robotic arm having a tool holder and a signal interface, the robotic arm coupled to and directed by a processor having a processor memory storing robotic tool data associated with a plurality of tools coupleable to the robotic arm;

transmitting update tool data or code from a memory of the first robotic tool via the signal interface to the processor memory;

and directing movement of the robotic arm by the processor using the update tool data or code after the first robotic tool is removed from the robotic arm."

VII.   This decision also refers to the document US 5,400,267
        (D2), which is also cited in the decision under appeal.

Reasons for the Decision

1.   **The invention**

       The patent application in suit relates to a robotic
       system as defined in independent claim 1, comprising a
       robotic arm having a tool holder and a plurality of
       robotic tools, each of which is receivable by the tool
       holder for manipulation by the robotic arm. For this
       purpose, the robotic system comprises a processor which
       has a memory containing robotic tool data associated
       with the plurality of tools and which directs movement
       of a robotic tool received by the tool holder using
       associated tool data from the processor memory.

       The robotic system further comprises a first additional
       tool having a memory with additional tool data or code.
       This additional tool data or code can be transmitted to
       the processor. The processor is conditioned to store
       the additional tool data or code in the processor
       memory and is operable to direct the movement of the
       robotic arm using the additional tool data or code
       after the first additional tool has been removed from
       the tool holder.

       In other words, the additional tool data or code
       transferred from the first additional tool persists in
       the processor memory and is used subsequently to drive
       the robotic arm, including to control other robotic
       tools. This allows the programming of the processor to
       be easily updated by shipping to the user of the
       robotic system new robotic tools containing updated

tool data or code (see first paragraph of page 3 and
penultimate paragraph of page 10 of the description).

The patent application also relates to a corresponding
method for updating a robotic system as defined in
independent claim 13.

2.   Inventive step starting from D1

2.1   As set forth in the decision under appeal and
         acknowledged by the appellant (points 31-35 of the
         statement of grounds of appeal), D1 discloses a robotic
         system comprising the features of claim 1 which are
         identified in point 2.1 on page 4 of the decision.
         Therefore, the subject-matter of claim 1 differs from
         the system of D1 only in that the processor is operable
         to direct the movement of the robotic arm using the
         additional tool data or code after the first additional
         tool has been removed from the tool holder. The Board
         also shares this view.

2.2   Considering D1 as the closest prior art, the Examining
         Division formulated the objective problem to be solved
         starting from this document as how to reduce the
         configuration time and delay when a tool is replaced
         with a tool of the same tool type.

         In the Examining Division's view, the person skilled in
         the art proceeding from D1 would have immediately
         realised that the tool-type data which is transmitted
         from a first tool coupled to the robotic arm is not
         specific to that particular tool but in fact is common
         to all other tools of the same tool type. Accordingly,
         an obvious measure to solve the above-mentioned
         technical problem would have been to store the tool-
         type data obtained from the first tool in the processor

memory and to re-use this data to control the robotic
arm after the first tool has been removed, for example
to drive a second tool of the same type subsequently
coupled to the robotic arm. The person skilled in the
art would thus have arrived at the claimed solution
without an inventive step.

The Board concurs with the appellant that this
reasoning is not convincing.

2.3   It is true that D1 is directed to reducing the delay
       associated with a tool change (column 2, lines 30-31).
       However, as put forward by the appellant, there is no
       disclosure or teaching in D1 that data transmitted from
       a tool coupled to the robotic arm can be retained as
       persistent data in the processor memory and be used
       after that tool has been removed. Instead, D1 merely
       focuses on increasing the efficiency of "each" tool
       change (ibid.), i.e. separately and independently of
       the subsequent coupling of any other tool.

2.4   Instead of each tool transmitting its entire tool-type
       data to the processor each time it is coupled to the
       robotic arm (column 15, lines 44-60), D1 discloses that
       alternatively, tool-type data for various predefined
       tool types can be contained in a look-up table stored
       in the processor memory and that a tool coupled to the
       robotic arm can transmit only a tool-type identifier
       referencing the relevant portion of data in the look-up
       table (column 16, lines 5-11). This indeed minimises
       the amount of data transmitted from the tool to the
       system, thereby reducing the configuration time
       associated with that tool change.

       D1 discloses that the look-up table is loaded in the
       processor memory and later updated by the system

manufacturer (column 16, lines 8-14). There is no hint
that the look-up table could be dynamically updated or
expanded with additional tool data or code from a tool
coupled to the robotic arm. On the contrary, D1
explains that coupling a tool of a type which is not
referenced in the table may "result in inadequate
robotic control" (column 16, lines 14-19). This implies
that the system is not configured to update the look-up
table with additional tool data or code that might be
transmitted from that tool.

Even accepting the technical problem formulated by the
Examining Division, the person skilled in the art
starting from D1 and seeking to solve this problem
would have had no reason, without the benefit of
hindsight, to deviate from the solution based on a
look-up table taught in D1. The Examining Division's
reasoning fails to convince for this reason alone.

2.5   The other data described in D1 which can be transmitted
       from a tool coupled to the robotic arm are also not
       stored and used for controlling the movement of other
       tools subsequently mounted to the robotic arm. This was
       not disputed in the decision under appeal.

2.5.1 Tool-specific data (such as calibration data, tool life
       and use information, measured misalignment or offset;
       column 16, lines 20-41) is specific to a particular
       tool and is therefore of no use to any subsequently
       mounted tool. D1 also makes no mention of storing and
       using this data to control the movement of other tools.

2.5.2 Tool compatibility data indicates the compatibility of
       the mounted tool with the robotic system and is also of
       no use to any subsequently mounted tool.

In one embodiment, this tool compatibility data may be
a unique identification data string stored in the tool
memory which, once transmitted to the processor, is
compared to a table, provided in the processor memory,
containing the identification data strings of all known
compatible tools. D1 does teach that this table could
be updated each time additional tools are developed or
obsolete tools are retired (column 17, lines 5-22).

However, there is no hint in D1 that this table could
be dynamically updated using data transmitted from a
tool coupled to the robotic arm. On the contrary, in
order to avoid continuously updating such a compatible
tool table, D1 instead teaches that tool compatibility
could alternatively be checked using an encryption
mechanism implemented in the processor to verify a
verification data string stored in the tool memory and
transmitted to the processor in addition to the tool
identification data string (column 17, lines 22-45).

2.6   In fact, as put forward by the appellant, the
        distinguishing feature of claim 1 does not merely
        result in an acceleration of the tool change process.
        It amounts to using the first additional tool as a
        software distributor to effect a lasting configuration
        of the processor by transmitting persisting additional
        update tool data from the tool memory to the processor
        (see first paragraph of page 3 and penultimate
        paragraph of page 10 of the description). In this way,
        the processor can make use of the additional update
        data and take advantage of it whenever another robotic
        tool is subsequently coupled to the system. Hence, this
        feature also increases the accuracy, functionality and
        safety of the robotic system by ensuring that the
        system relies on the most recent update data available
        to control the robotic tools.

2.7   As the appellant argued, the implementation of this
        feature in the system of D1 would result in added
        complexity and thus increased delay when changing
        tools. Not only would this be contrary to the teaching
        of D1 that the delay associated with each tool change
        should be reduced, and therefore counter-intuitive to
        the person skilled in the art starting from D1. But it
        would also require substantial modifications of the
        system of D1, which would go beyond the kind of
        modifications that the person skilled in the art would
        consider without exercising an inventive step.

2.8   D2, the other prior art document cited in the decision
        under appeal, does not provide any hint or motivation
        toward this feature either, as further argued by the
        appellant. This document was cited in the decision only
        in respect of dependent claims (point 2.5 on page 6).

2.9   The Board therefore concurs with the appellant that the
        person skilled in the art starting from D1 would not
        have arrived at the subject-matter of claim 1 in an
        obvious manner. It follows that the subject-matter of
        claim 1 involves an inventive step over the prior art
        cited in the contested decision, contrary to the
        Examining Division's conclusion.

2.10   Independent claim 13 defines a corresponding method for
        updating the processor of a robotic arm based in
        essence on the same distinguishing feature as claim 1.
        The same considerations as discussed above for claim 1
        therefore apply *mutatis mutandis*.

2.11   The remaining claims of the main request are dependent
        claims which depend on claims 1 or 13, respectively.

Hence, their subject-matter also involves an inventive step.

3.   Further points

3.1   Only inventive-step objections were substantiated in the decision under appeal to justify the refusal of the application. As discussed above, these inventive-step objections, as far as they apply to the present main request, are unfounded.

The Board does not have any further objections. In particular, the objections raised by the Board in its communication under Article 15(1) RPBA 2020 are not applicable to the main request since the claims objected to have been deleted.

3.2   Furthermore, the Board is satisfied that the description of the main request has been adapted to the claims, without introducing any subject-matter extending beyond the content of the application as filed.

Order

For these reasons it is decided that:

1.   The decision under appeal is set aside.

2.   The case is remitted to the Examining Division with the order to grant a patent in the following version:

▪ Description: pages 1, 2, 2A, 3 to 24 filed with the submission of 13 March 2023

- ▪ <u>Claims</u>: claims 1 to 21 filed with the submission of 13 March 2023

- ▪ <u>Drawings</u>: sheet 1/8-8/8 as published.

The Registrar: The Chairman:

A. Chavinier-Tomsic   M. Alvazzi Delfrate

Decision electronically authenticated