CLAIMS

1. Surgical simulation device (10), comprising:

- a computing unit (14),
- a real surgical instrument (12), and
- a virtual surgical instrument (22) connected to the computing unit (14),
- an electronic system (16) comprising an electronic card (18) and at least one sensor (20a, 20b, 21), the electronic system (16) connecting the real surgical instrument (12) to the computing unit (14), the electronic card (18) and the at least one sensor (20a, 20b, 21) being integrated into the real surgical instrument (12) by means of at least one specific interface part (30)

characterised in that

- the real surgical instrument (12) with the electronics (16) has substantially the same weight as the corresponding functional surgical instrument
- the real surgical instrument (12) corresponds to a functional surgical instrument, the functional surgical instrument being intended to be manipulated within the framework of a surgical operation, the functional surgical instrument comprising at least one functional element (26), the real surgical instrument (12) comprising the same functional element (26), the at least one functional element (26) being able to be activated according to at least two distinct operating states,
- the virtual surgical instrument (22) has the same geometrical characteristics as the real surgical instrument (12) and has a virtual functional element (42) similar to the functional element (26) of the real surgical instrument (12),
- the virtual functional element (42) of the virtual surgical instrument (22) is adapted to be activated in the same operating states as the functional element (26) of the real surgical instrument (12), and
- the operating state of the virtual functional element (42) of the virtual instrument (22) is adapted to be aligned, in real time, with the operating state of the functional element (26) of the real surgical instrument (12).

2. Surgical simulation device (10) according to the preceding claim, characterised in that the at least one sensor (20a, 20b, 21) of the electronic system (16) constitutes a functional element (26) of the real surgical instrument (12).

3. Surgical simulation device (10) according to any of the preceding claims, characterized in that the at least one sensor (20a, 20b, 21) of the electronic system (16) is for measuring a mechanical capacity of a functional element (26) of the actual surgical instrument (12).

4. Surgical simulation device (10) according to any of the preceding claims, characterized in that the at least one sensor (20a, 20b, 21) of the electronic system (16) is intended to measure a relative movement of a functional element (26) of the real surgical instrument (12) with respect to an original position.

5. Surgical simulation device (10) according to any one of the preceding claims, characterised in that the real surgical instrument (12) provided with the electronic system (16) has dimensions, shapes, and a centre of mass substantially identical to those of the functional surgical instrument.

6. Surgical simulation device (10) according to any of the preceding claims, characterised in that the electronic card (18), the at least one sensor (20a, 20b, 21) and the at least one specific interface piece (30) are integrated into the real surgical tool (12) in replacement of at least one electronic component of a set of electronic components of the functional surgical instrument.

7. Surgical simulation device (10) according to any of the preceding claims, characterised in that the virtual surgical instrument (22) is adapted to be viewed by the operator on a viewing device (24) connected to the computing unit (14).

8. Surgical simulation device (10) according to any of the preceding claims, characterised in that the real surgical instrument (12) is provided with a haptic device (H) so as to be able to simulate, for the operator, an interaction with a predefined body, of a nature and positioning determined by the computing unit (14).

9. Surgical simulation device according to claims 7 and 8, characterized in that a virtual equivalent of the predefined body is adapted to be visualized, by the operator, on the display device (24).

10. Surgical simulation device (10) for surgical simulation according to any of the preceding claims, characterised in that the real surgical instrument (12) is provided with a sound feedback system (S).

11. Surgical simulation device (10) according to any of the preceding claims, characterized in that the real surgical instrument (12) is provided with a spatial localization system (L) so that the computing unit (14) can determine, at each instant, the positioning of the real surgical instrument (12) in space with respect to a predefined origin.