

## Tool for obtaining data on a patient's breathing cycle

*A non-invasive system that makes it possible to obtain reliable and reproducible information about a patient's breathing cycle by the processing of a video sequence recorded by a thermographic camera.*

### Description and essential characteristics

There is sufficient evidence to prove that a multitude of respiratory pathologies give rise to alterations in inspired and expired air volumes, and in the respiration rate. The lack of relative synchrony between displacements of the thorax and abdomen, and air flow can be indicative of various respiratory pathologies.

The present technology involves a non-invasive tool that processes a thermographic video sequence, making it possible to obtain data about a patient's breathing cycle for the diagnosis of respiratory diseases.

To do so, the tool takes a video sequence recorded with a thermographic camera—a camera able to detect thermal emissions whose wavelength corresponds to a person's surface temperature range and that of the hospital room setting (25-40°C). The camera is targeted to the patient's region of interest (specifically, the thoracic region [TX], abdominal region [AB] and at least one nasal vestibule [NS]), and the video sequence is of a duration that can range from seconds to minutes, and includes a subsequent follow-up of the thermal map variations (in size, form, position and/or magnitude) in the mentioned regions of interest.

Data obtained about the breathing cycle are displayed as graphics (thorax, abdomen and nasal air flow curves) that enable users to identify the start and end moments of each phase of inspiration and expiration, as well as potential respiratory pauses, forced inspiration or expiration, and other respiratory abnormalities, and to calculate the lag angle between movements of the thorax and abdomen.

In this way, an accurate measurement of respiratory synchrony is obtained, which can determine the diagnosis of a respiratory disease.

### Competitive advantages

Systems currently used for obtaining data about a patient's respiratory cycle have a couple of significant disadvantages: they are very invasive and can have influence on the patient's breathing pattern. For example, in the case of elastic bands fitted with transducers around the patient's chest and abdomen, air flow sensors and masks equipped with pneumotacographs.

Furthermore, these systems are particularly unsuitable for taking measurements in children because they can feel uncomfortable and even become accidentally entangled in the cables and sensors being used.

The primary advantages provided by this new tool in comparison with the above systems are, first, the reliability and reproducibility of the information it provides about a patient's respiratory cycle, as it measures the breathing synchrony accurately, without virtually any instrumental lag. Second, the tool is non-invasive in nature.

### Type of collaboration sought

Cooperation is sought with any Party interested in partnering, licensing or investing in the technology, whether it be an investor to fund the project, a partner interested in getting involved in any of the various phases until its placement on the market, a patent licensee, etc. Organisations potentially interested in this technology are those devoted to the manufacture, commercialisation and/or distribution of healthcare products; as well as hospitals, healthcare centres, etc.

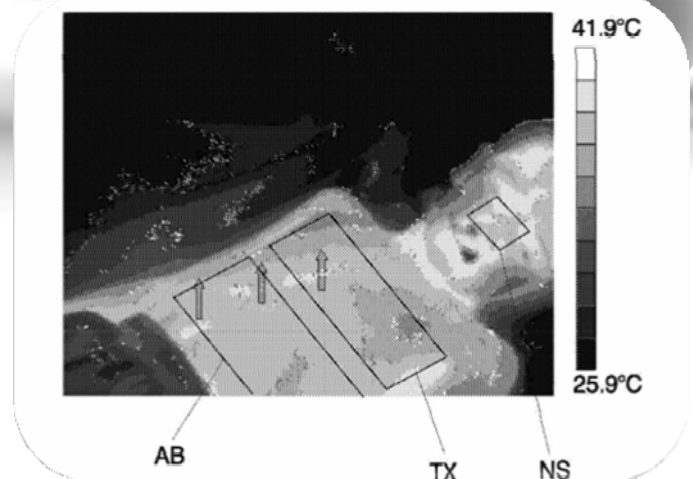
### Current stage of development

R&D Phase

### Current state of intellectual property

Spanish patent P201030927, granted in July 2013.

International patent application PCT/ES2011/070242.



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