

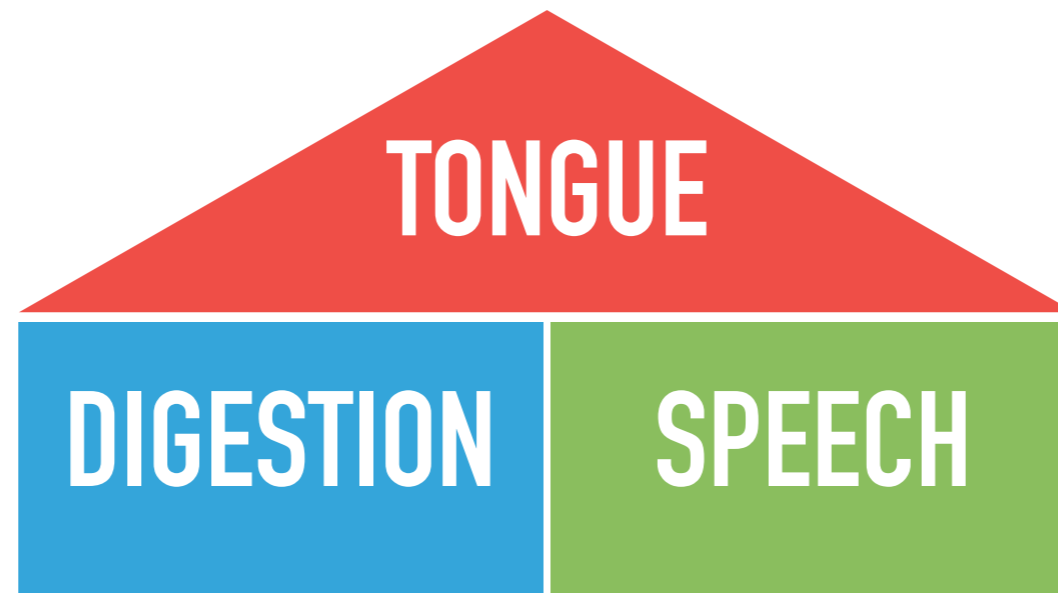


UNIVERSITY
OF BRESCIA

NEWTONGUE

**LOW POWER WIRELESS SYSTEM TO MONITOR
TONGUE PRESSURE AND POSITION ON THE
PALATE**

THE IMPORTANCE OF THE TONGUE



The tongue is fundamental for two main activities:

- **Digestion:** its contribution to the first part of the digestive phase is fundamental, it helps the chewing and the swallowing.
- **Speech:** correct speaking is directly linked to the right use of the tongue.

These activities contribute to the wellness of a person.

TONGUE DISORDERS: THE CAUSES



There are lots of causes that could affect the tongue standard functionalities.

Tongue dysfunctions will then lead to other clinical manifestations, which in some cases could cause other serious pathologies.

HOW CAN WE TRY TO RECOVER TONGUE STANDARD FUNCTIONALITIES, PREVENTING THE WORSENING OF THE HEALTH STATUS?

TONGUE DISORDERS CAUSED BY AGEING

Studies reported a correlation between ageing and the reduction of tongue strength in healthy adults.

Fei, T.; Polacco, R. C.; Hori, S. E.; Molfenter, S. M.; Peladeau-Pigeon, M.; Tsang, C.; Steele, C. M. Age-related differences in tongue-palate pressures for strength and swallowing tasks. *Dysphagia* 2013, 28, 575-581

It is also proven that the dysphagia is constantly becoming a common problem through ageing.

Schindler, J. S.; Kelly, J. H. Swallowing Disorders in the Elderly. *Laryngoscope* 2002, 112, 589-602

UN estimated **1 billion** of people aged 65+ in 2030.

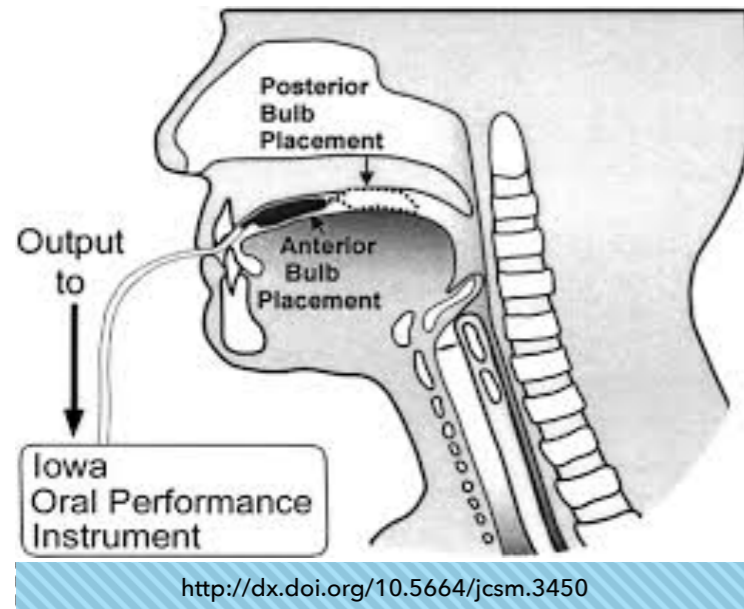
United Nations Probabilistic Projections of Population Aged 65+

Available online: <https://population.un.org/wpp/Graphs/Probabilistic/POP/65plus/> (accessed on Dec 4, 2018).

What will be the impact magnitude of tongue disorders on the global population in the next years?

TONGUE REHABILITATION – THRUST STRENGTH

The rehabilitation process for gaining or regaining the proper tongue movements is quite complex, and it must be done with the help of specialised personnel.



Today, the intra-oral devices used for the rehabilitation therapy require a cable to carry the signal outside the mouth to an external unit.

This will cause a discomfort for the user, and it also compromises the physiological tongue behaviour.



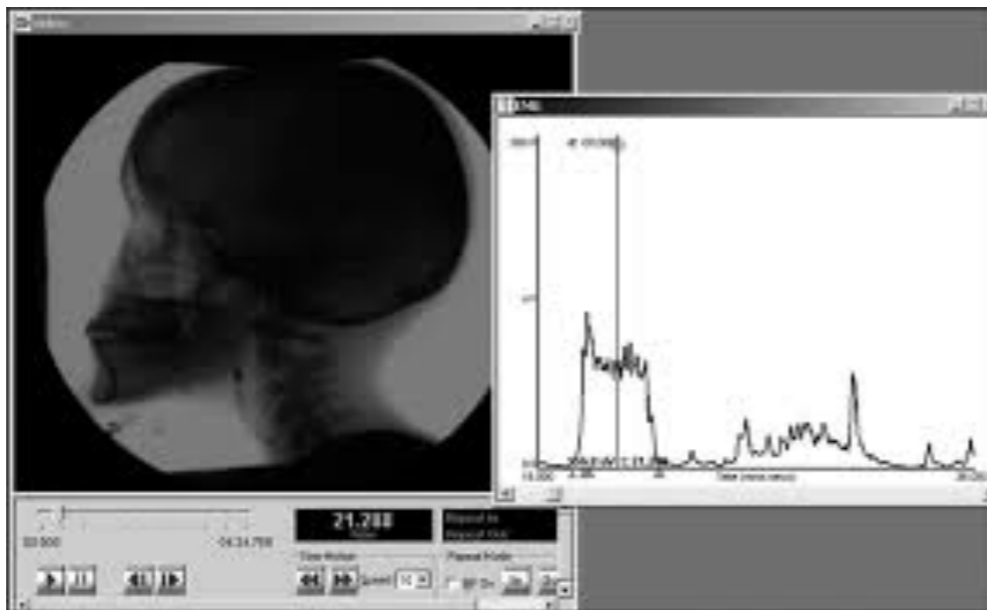
These devices are not able to give to the physiologist an accurate feedback on the position of the tongue, they only give the pressure level.

INTRODUCTION

TONGUE REHABILITATION – POSITION

Actually, the most used way to detect the position from the outside of the mouth is using x-rays.

It requires the patient to undergo sessions in unhealthy environments, and the use of very expensive machines.



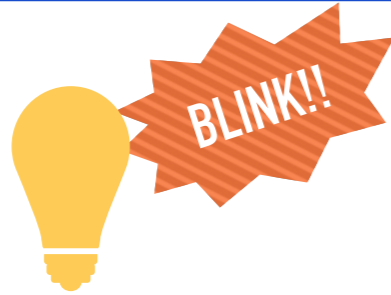
<https://jslhr.pubs.asha.org/article.aspx?articleid=1781747>



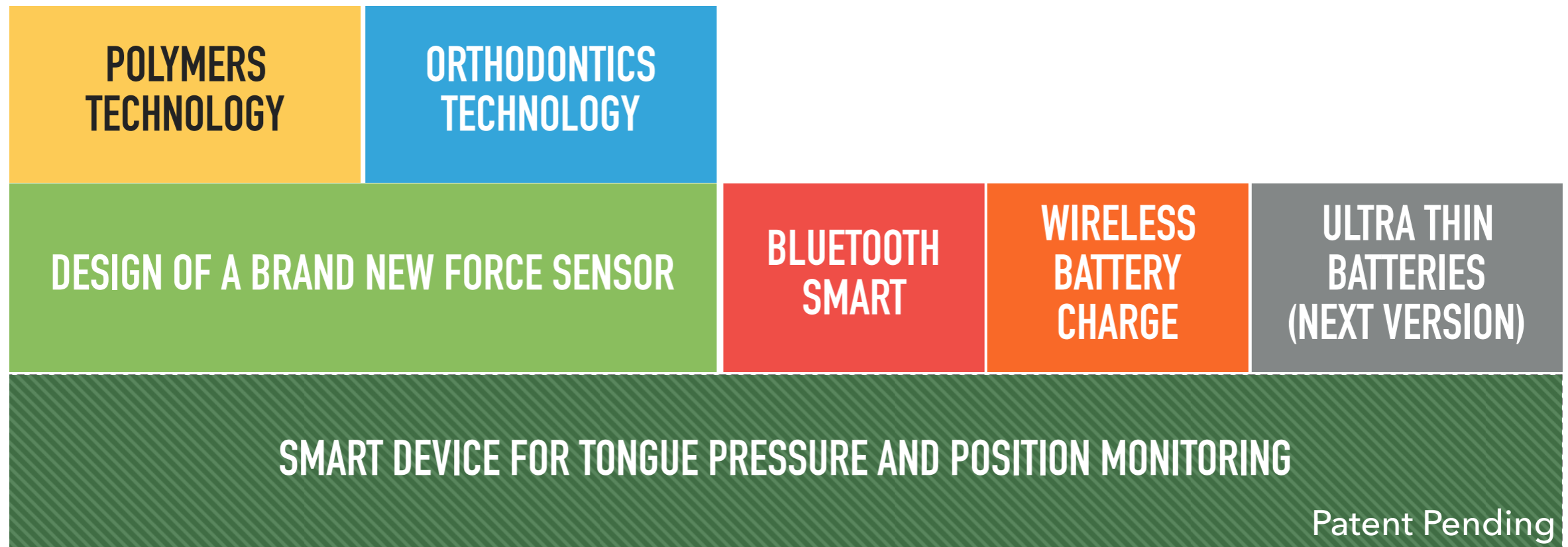
<http://aimtech.ru/en/catalog/101>

How can we help people, from the kids to the elderly, receiving the correct cares in a healthy and more accurate way, measuring both position and pressure level?

OUR IDEA



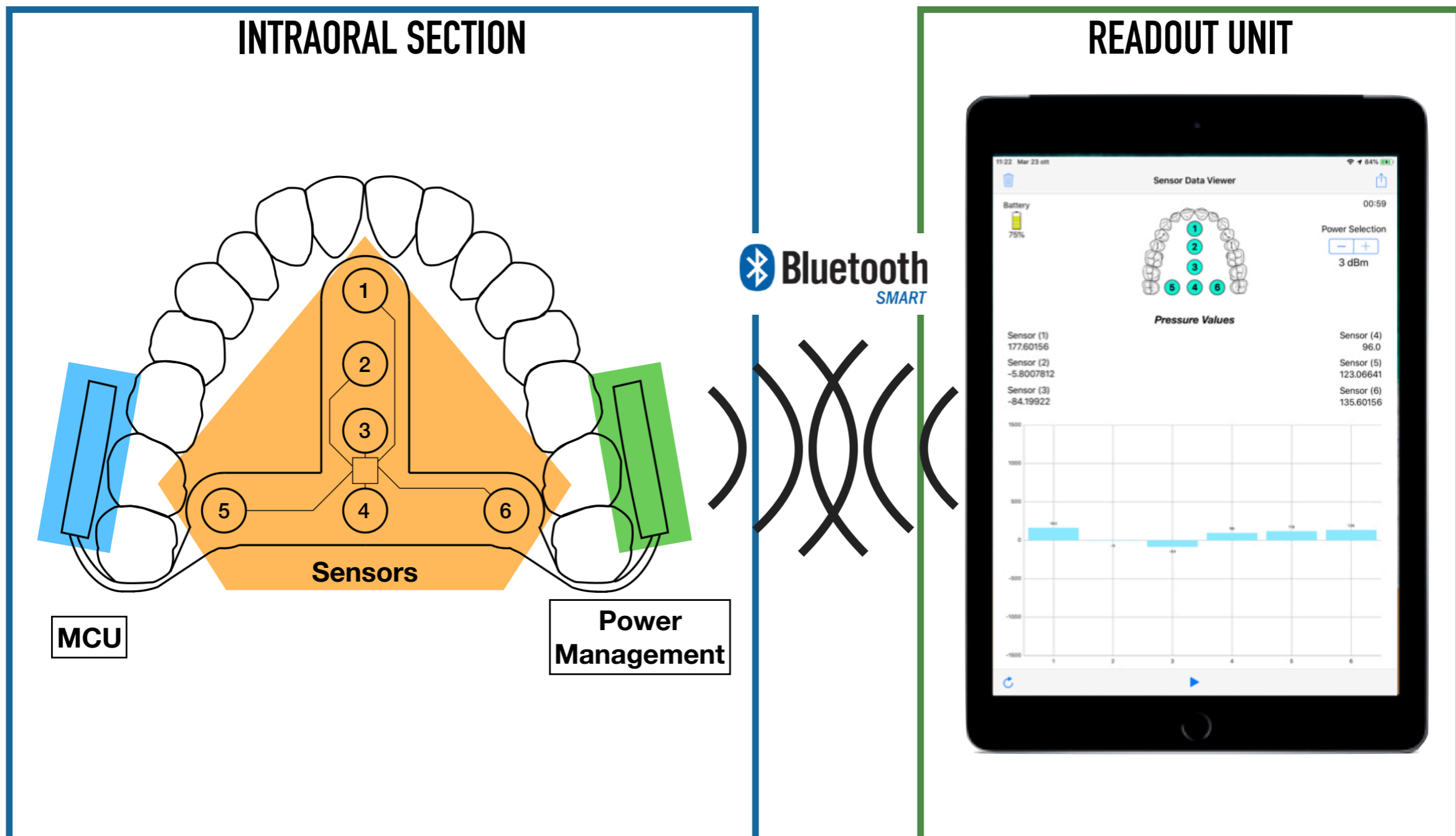
How to import the touch-sensing technologies into a safe mouth-placed device?



A mix of innovative and state-of-the-art technologies, helps making a thin and small device, completely placed in the mouth. It will not affect the physiological behaviour of the tongue.

WHERE IS IT PLACED?

There are two different sections, one placed into the mouth to monitor the tongue, and one outside to show the measurement data.



THE FABRICATED DEVICE

MCU Board



Power Management Board



Sensor Board

CONCLUSIONS

FURTHER INFORMATION

- ▶ The vestibular boards are 24x12x5÷10 mm.
- ▶ The sensor electronic board is 56x43 mm, the bite depends from the user's mouth.
- ▶ Approx. battery duration when working is 7 hours.

CONTACTS

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