FAKÓS – ATENTS, EYES IN THE CLOUDS OF VENUS Ing. P. A. Duque Barón[1] (padb100895@gmail.com); Ing. J. F. Casadiego Molina[2] (ing.casadiego0711@gmail.com); D.Sc. G. Londoño Villamil[3]; Ing. M. Aldana Hernández[4]; MD. D. Concha[5]

Phosphine in the clouds of Venus: Alma and JCMT's Venus millimeter waveband spectra at 266.9445 GHz show an absorption line profile of PH3 against the thermal background of deeper, hotter layers of the atmosphere. Initial detection using the JCMT in 2017 suggested an abundance of ~20 ppb, initial follow-up detection using ALMA in 2019 suggested an abundance of ~7 ppb [1]. These data have generated certain hypotheses and debates in which it is highlighted whether Venus could host life as we know it or if it is in full evolution.

How to measure this compound: The "Fakós - Atents" intend to use the electrochemical method for the detection of the compound, since it is the most reliable system because they contain sensors with a system of electrodes, electrolytes, and a membrane; which, when it comes into contact with phosphine, generates a signal that allows its analysis [2]. in addition to being able to be implemented in an autonomous and remote system for the analysis of samples.

Fakós – Atents: This concept is based on the design, manufacture, and implementation of a group of miniaturized independent census systems, with a maximum volume of one liter and weight in the order of 1kg, intended for the detection of compounds and chemical elements in the environment present, mainly phosphine.

Electronics for its operation:

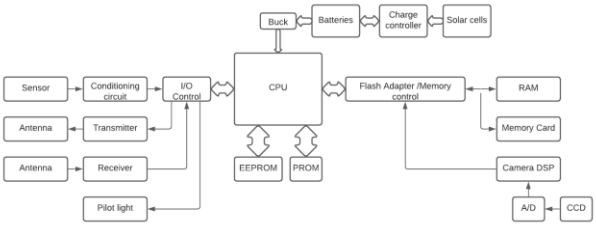

Figure 1. *Block diagram, embedded system Fakós – Atents. Source: Own elaboration.*

Power system: To supply energy to the batteries required by the electronics, flexible triple-junction solar panels with external protection will be implemented to prevent deterioration due to the acidic environment of the Venusian atmosphere.

Cloud lift: To be able to support the sensor "Fakós - Atents" at the level of the clouds of Venus, it is essential to use the Helium Gas inside the float, since it contributes to energy savings throughout its execution. In the table illustrated below, the equivalent in volume of gas is presented to achieve without problem to sustain the payload.

Concept			
Element	Mass	Requirement	Value
Payload	1 kg	Volume	1.107 $m^{3.}$

Table 1. *Gas for lift Fakós – Atents. Source: Own elaboration.*

Communication system: For the "Fakós - Atents" census systems that will move through the clouds of Venus, the use of dual-band transponders is proposed. These have an X-band transmitter, allowing you to send 8 GHz signals up to the communication relay, and you will also have another omnidirectional low-frequency system that will handle the 100 MHz frequencies for sending and receiving data between them regardless of the address [3].

References:

[1] R. A. M. S. B. W. R. P. B. S. H. C. D. L. S. S. P. J. J. S.-S. C. R. S. a. o. Greaves J. S., «Phosphine Gas in the Cloud Decks of Venus,» de *Nature Astronomy*, 2020, pp. 1-10.

[2] Acrobat, «Dosímetro Detectores Electroquímicos - FAX,» 2021. [En línea]. Available: http://www.faxsa.com.mx/Fosf_MT/Acrobat/Fosf_11.pdf.

[3] W. Stallings, Comunicaciones y redes de computadores, Granada: Prentice Hall, 2000.