

SeaBIRD – An infrastructure for the selection and manipulation of the VIRTIS-VEX data

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VIRTIS (Visible and Infrared Thermal Imaging Spectrometer) is an experiment on board the ESA mission Venus Express. It has already performed more than 1520 orbits around Venus, collecting billion of spectra for a data amount of about 900 GB. In order to select and manipulate effectively this huge amount of data, we have developed a software and hardware infrastructure called SeaBIRD (Searchable and Browsable Infrastructure for Repository of Data). The flexibility we have introduced in the project is as high as possible and as such we have developed a description of a single pixel of VIRTIS-VEX data which represents a single point in our data space, what we call as "atomic space". In this space, the pixels are clustered in some dimensions, so that we defined a new space in which a single dimension, defined by a suitable surjective mapping, takes the place of the clustered dimensions, defining a "molecular space". We have translated this pixel description in a data model and we have generated a MySQL® database. To access the data, we developed, a complex but user-friendly web-based GUI (Graphical User Interface) able to return to the user not only the files containing the sought data, but also part of it in PDS format or a more general ASCII table format (CSV). SeaBIRD is also able to return to the user manipulated data using a set of well tested algorithm or user-defined functions. We can summarize the SeaBIRD prefixed goals in four points: 1) easy access to the data, or to part of it; 2) decrease of the data transfer volume; 3) solid and well tested procedures to the data access and manipulation; 4) decrease of computing power needed to the users for data elaboration, especially remotely by distributed computing. We have achieved these goals, and in addition we have built an infrastructure able to work with data from other instruments, in addition to the VIRTIS-VEX ones, and with laboratory measurements.