INNOVATIVE TECHNOLOGIES DIV INSTRUMENTS AND DATA SONIFICATION FOR ENGAGING VOLUNTEERS TO PARTICIPATE IN MARINE ENVIRONMENTAL MONITORING PROGRAMS

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1. KdUINO : "DIY Electronic Secchi disc"



3. Citizen engagement



The buoy was designed to be "Do-It-Yourself". Workshops were developed in different high-schools. Students were very enthusiastic in developing their own scientific instruments. Their comments were very useful to improve the design and the manual. New KdUINO versions will be designed to engage more makers to build their own devices.

Namina





The KdUINO buoy was developed under the FP7 European project CITCLOPS www.citclops.eu



KdUINO is a Do-It-Yourself (DIY) buoy to provide continuous measurements of water transparency. Transparency is a simple parameter that can be used as an indicator of water quality changes in marine environmental monitoring programs. Data from the buoy can be retrieved with a dedicated smartphone application and automatically sent to the KdUINO servers.

2. Measurement principles

Light is measured with low cost sensors that convert light intensity into digital oscillations with characteristic frequency. Sensors at different depths will generate oscillations with different frequency, each one corresponding to the different levels of light intensity

the buoys



Engaging "Marine Communities" Makers can name their own buoys. They can easily follow their instruments in the maps provided by the KdUINO servers, which provide also access to the collected data. This is one of the rewards to their contribution.







The Secchi disk depth (SD) is one of the most extended parameters to estimate water transparency. KdUINO provides an alternative parameter: the diffuse light extinction coefficient (Kd). Kd \approx 1.7/SD so we may consider the KdUINO as an "electronic Secchi disk". In the example below, two different waters with different transparencies (i.e. different Secchi Depths), will have different line slope (the value of Kd) when we plot the depth versus the logarithm of the sensor outputs (frequency) One of the main goals is to engage different "marine communities". We are promoting the KdUINO use among seakayakers (photos above), sailors, snorkelers, scuba-divers, angle-fishers,

4. Making music with science: Data sonification



Making Art with KdUINO data

The "Musical Tentacle" is a



Different Kd (slopes)

Secchi disk measuring waters with different transparencies





project to create sounds and graphics from KdUINO sensors. The system artistically expresses scientific data used to measure the transparency of the water

KdUINO design and development Musical Tentacle collaborators Institut Image: Conserve co