



Increasing the autonomy of an underwater ROV

Marko Vukšić, Tonko Kovacevic, Barbara Džaja, Predrag Đukić, Slaven Šitić,
Hai Nam Tran, Vincent Rodin, Laurent Lemarchand, Valérie-Anne Nicolas,
Alain Plantec, et al.

► To cite this version:

Marko Vukšić, Tonko Kovacevic, Barbara Džaja, Predrag Đukić, Slaven Šitić, et al.. Increasing the autonomy of an underwater ROV. Sea Tech Week, Sep 2022, Brest, France. hal-03778490

HAL Id: hal-03778490

<https://hal.univ-brest.fr/hal-03778490>

Submitted on 15 Sep 2022

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Marko Vukšić, Tonko Kovacevic, Barbara Džaja, Predrag Đukić, Slaven Šitić

Department of professional studies/University of Split (SOSS), Split, Croatia

email : marko.vuksic@oss.unist.hr

Hai Nam Tran, Vincent Rodin, Laurent Lemarchand, Valérie-Anne Nicolas, Alain Plantec, Stéphane Rubini, Frank Singhoff

Lab-STICC UMR CNRS 6285/University of Brest, 29200 Brest, France

email : firstname.lastname@univ-brest.fr

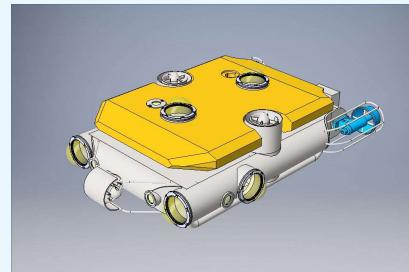
1 – Original ROV

- Very usable, lightweight, maneuverable underwater Remote Operated Vehicle (ROV)
- Diving down to 150 m depth
- Inspection of underwater electrical installation
- Umbilical cable is used to transfer data and electrical power
- Control by PS2 joystick console
- Developed by students and professors of the SOSS



2 – ROV under development

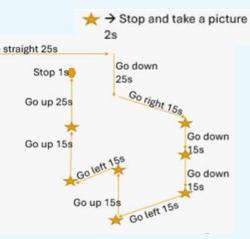
- Completely autonomous system (without cable)
- Battery powered - 2 x 625 Wh 36VDC
- Central control unit - ARK-1551-S6A1
- Dive control autopilot - Pixhawk 1
- Surface control system - computer, joystick, tether interface and screen
- Advanced communication to surface – Visible Light Communication (VLC) and ultrasound



3 – Optimizing energy footprint

- Embed alternative hard/soft components for specific ROV mission achievement

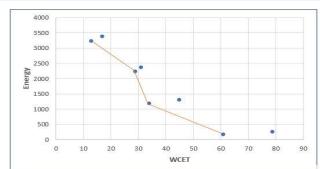
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GPS	Periodic	cput1	ad1	2	10	0	1	0
data_encrypt	Periodic	cput1	ad1	5	10	0	1	0
data_send	Periodic	cput1	ad1	5	10	0	1	0
down1	Scheduling	cput1	ad1	25	50	50	1	0



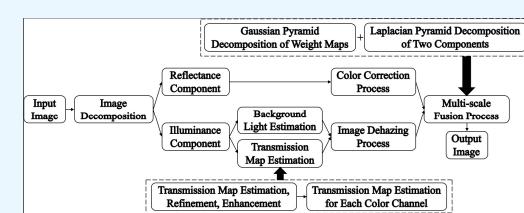
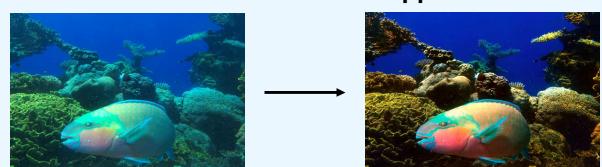
- Design Space Exploration : find trade-offs between schedulability (WCET) and energy for designs.

example of DSE options: lights, object recognition, DVFS

- Use a multi objective optimization tool (PAES) coupled with an architecture simulator (Cheddar) for DSE of tasks scheduling



- Underwater images are highly degraded
- Underwater vehicles need sight for auto positioning
- Five algorithms for underwater image restoration are compared and the best one is optimized
- Minimal execution time for real time applications



- Implementation of 360° VR view in real time

This poster described the TARO project, a project funded by the ANR «Investissements d'avenir» number ANR-19-GURE-0001 in the framework of the ERASMUS+ SEA UE consortium



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