IAHS-MOXXI and WMO HydroHub joint Workshop on Innovation in Hydrometry – from ideas to operation 4 - 5 December 2017, Geneva, Switzerland

GLOBAL SECURITY MONITORING AND SUSTAINABLE MANAGEMENT OF THE GROUNDWATER RESOURCES AND SUBSURFACE HAZARDS ON THE BASE GEOPHY SIC AL MONITORING BY SPACE TECHNOLOGY AND in situ GEOPHYSIC AL MEASUREMENT OF THE NEW GENERATION GEOPHYSICAL PRACTICE AND INSTRUMENT OF THE NEW INNOVATION SPACE TECHNOLOGY AND

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3D imaging subsurface :Tambov titanium-zirconium mining deposit – groundwater survey





Geophysical monitoring field sites

IAEA IIIUNESCO - IOC

SICILY ISLAND

GEOHYSICAL SURVEY OF THE SALT AND FRESH WATER INTERFACE AND SEA SPRING ZONE IN DONNALUCATA, MARINA DI RAGUSA AREA, SICILY, ITALY

Photo©Luigi Nifosì

Groundwater-Seawater Interactions and Pollution Control in the Coastal Zone of Taiwan

Ruey-Chy Kao Tainan Hydraulics Laboratory, National Cheng Kung University Evgeny A. Kontar, Leopold I.Lobkovsky P.P.Shirshov Institute of Oceanology, Russian Academy of Sciences Chung-Ho Wang Institute of Earth Sciences, Academia Sinica Yuriy R.Ozorovich Space Research Institute, Russian Academy of Sciences



Faiwan-Russia Bilateral R&D Project Proposal March, 2005



- 1- линия газопровода
- 2- магистральный кабель
- 3 локальные кабельные станции (ретрансляторы)
- 4 датчик с акустической передачей
- 5 датчики на локальных кабелях
- 6 промежуточные грузы
- 7 теряемый балласт
- 8 приопленные буи
- 9 локальные кабельные линии

EO-Risks Undersea echnology for Operative eophysical monitoring AAA

1

60

Taiwan-Russia Bilateral Scientific Cooperation



Tainan beach area. Primary results.

ROAD



Geophysical survey on Taiwan area, 2005



Magenta curve – measurement on Tainan beach area (point 2). Green curve – measurement near Tainan Hydraulic Laboratory. Blue and red lines shows layers' resistivity and thickness for models of studied areas (lab and beach respectively).

A SYSTEM APPROACH FOR MANAGING SALTWATER INTRUSION AND A GROUNDWATER SALINIZATION



As an example, the intrusion of seawater into coastal aquifers is an important process in Taiwan that leads to groundwater salinization to levels exceeding acceptable drinking and irrigation water standards.

Possibilities for future innovation activities in Groundwater-Seawater Interactions and

Subsurface Pollution Control in the Coastal Zone (2017-2025):

Geophysical survey system for natural ecosystem monitoring

 ✓ Mobile geophysical survey system based on airborne, balloon, helicopter or airship,drones.

✓Tsunami monitoring system:

seismic instrument

low frequency electromagnetic monitoring

•infrasound monitoring system.

Collaboration is a good way for a training programs for geoscience students and for the environmental exploration and geophysical studies based on such instruments. We offer to co-operate in developing instruments and in studying new techniques of environmental research and pollution monitoring.

The Aerostat Exploration System for sounding Mars and Venus for Geophysical Survey Natural Ecosystems into the Coastal Zone



Future Innovation Applications

Operative geophysical ground measurements on combination geophysical instrumentation and measuring In-Situ Hydraulic Properties
Satellite and Aircraft Remote Sensing Data Passive radiometry and active LF Radar for geo-monitoring natural ecosystems

• Small Satellites for organization national and regional telephone network

General Strategy for Development

•Developing regional advanced systems for geomonitoring

•Purchasing off-the-shelf the latest state-of-the-art systems which have not yet an established track record of successful use

•Purchasing those instruments that are highly capable and have a proven record of performance in a variety of field situations.



For more information please visit:

Space research Institute,Moscow-Stichting "InterECOS" (Moscow,Maastricht, Aachen) Yuri Ozorovich: interecos@gmail.com http://www.iki.rssi.ru/MARSES/english/info.htm DIGITAL FARMING: Possibilities for operative monitoring of the natural ecosystems (vineyard plants) by drone and robotic systems on the base new innovational technology and sensors

> Alain Fournier Sicre, Founder Yuri Ozorovich, IKI RAS

Forum In Vino Rotarys 2016 was held in Bordeaux September 16-17-18 The follow up Forum has taken place May 26-28 2017 in Tuscany.

• The international community present in Bordeaux has been further enlarged to new participants from other countries and followed by the media ready to travel for discovering the latest inventions which revolutionize this ancestral activity.

This original initiative of Rotary has succeeded in gathering the best invention talents in a friendly international atmosphere free of constraints

So this concrete dialogue which started in Bordeaux has continued in Tuscany the other famous mythical place for wine.

The forum 2018 will return to Bordeaux June 8-9-10



Rotary





So Friday 16th of September 2016 on our Forum gathered 70 participants, 23 of them coming from Italy, by plane by cars, engineers, vine growers, traders, agronomists, scientists, all related to vine practice experience and modernity.





The future is it to go backwards ?

We are at present at the crossroads to make the choice between various methods of culture. Subjected to the pressure of the ecologists and the economic constraints the vine growers wonder about their future.



Preparation of drones to identify start of diseases

The priority is to find new ways for better managing the diseases of the vine and fighting them. To identify as quickly as possible the precursory signs of the appearance of these diseases is the main priority



Drones flying inside vineyard

The **drones** can fly at very low altitudes to shave the rows of vine and will be able very quickly to even evolve inside the rows.



Multi-spectral camera to capture the invisible

UNIQUE, COMMERCIALLY VIABLE HYPERSPECTRAL IMAGING TECHNOLOGY

Equipped with multi spectrum cameras they can provide images making it possible to identify the diseases at first sight by experienced vine specialists which is sufficient at this stage.



Easy field mapping in the different optics range



Working with field

Integrated all necessary data about each field on the dashboards. All information from weather forecasts to crop rotation is available in one place. A simple interface quickly and easily facilitates routine operations to help assess the situation.

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12 2 Apr-Sep 17 21 k.\$ s' 12 do 4 1 5	Planned consumption 2 290 s/ton Actual consumption 3,1 min.\$ Actual consumption 94,2 k.5/ha	~ Equipment 🗐	
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Apr 15-Sep 16 6'12 00 4	Del 9 K.3 8 days Harrowing 19−25 June 2017 12,8 k.5 134,6 ha	Herbicide Output 800 L Total consumption 720 L	
+	Sowing 17-19 June 2017 38.7 k\$ 134.6 ha $\triangle 2 = 123 \cup 2 = 6 \pm 12$	Barrel Output 40 pcs	

Workflows NEW

Workflows constructor is an easy to use and flexible tool for fieldworks and cost planning that helps to define your budget and calculate profitability of your business.



Microlab autonomous optical measurements

On the finger tips of the vine grower a wide range of parameters e.g. SO2 (free, total), Acids (malic, lactic, acetic, tartaric, total),Sugar (glucose/fructose),Available nitrogen (NH4, NH2),PH, polyphenols (tannins, anthocyanes)



Sounding the invisible underground terroir

Soil analysis

Collect data about the underground 2m below directly from sensors without digging



MuCEP (Multi-Electrode Resistivity Profiler) avec ses quatre trains d'électrodes (AB, M1N1, M2N2, M3N3)

Electrical Resistivity measurements



Tomography & cultural profile

Results of electrical Resistivity measurements

A complex of electromagnetic devices developed by Yuri Ozorovich to study the planets during space missions can be used now to measure the composition of the sub-soil as well as the presence of water.



Quick Monitoring from above

Zone analysis

Multispectral satellite and drone imagery allows you to define zone analysis in the field. Using NDVI and vegetation maps you can effectively plan agricultural works and resources and optimize your expenses.



Cleaning Robots

robotic system for operative weeds cutting



Close Monitoring Robots in vineyard

robotic system for operative monitoring of the vineyard plants

For certain work in the vines very simple light **robots** can be used for not very complicated systematic tasks such as shearing of grass. It is proposed to use tracked vehicles equipped of simple tools for shearing which gently avoid the vine stocks.



weed killer (spacinov design)

PreTest in situ for the mechanical system June 2017

The side bats are avoiding stocks and gently coming back under the vine line. They will be equipped with heating bars to destroy the weeds.

The cost of this basic equipment must be very light and cheap to be accessible to all vine growers.



Carbon fiber drones smarter and stronger

The Group of Alessio Giusti has significantly increased the size of its drone made of carbon fibers, it works with a new camera.



Scientific approach at center of Forum 2017

During the course of the forum in Tuscany were addressed the scientific methods to measure the biological quality and the constitution of the terroir. Conclusion -less standards of appellations needlessly restrictive and more impartial observations substantiated by scientific measures.

Measurement of Constituents in plants using fluorescence technology



Excitation sous UV

FA-VENDANGE + FA-VIGOR ZONE

Combined maps of vigor and anthocyanins



VIGOR MAP

Vigor		
High	1 %	
Balanced	43 %	
Low	56 %	

ANTHOCYANIN MAP

Anthocyanins		
50 %	4170 mg/L	
50 %	3655 mg/L	
	nins 50 % 50 %	

IDENTIFY THE AERA WHERE THE WINE CAN BE THE BEST





Experience of Bordeaux Prestigious châteaux in Maremma Tuscany

They are recognized specialists representing top chateaux of Bordeaux and they have been captivated by the visits of vineyards in Tuscany and the round table discussions exchanging various concrete experiences.



Welcome in Bordeaux 8-9-10 June 2018

We are moving towards a flexible approach but supported by the latest inventions. These innovations provide the scientific foundation valuable for ensuring quality and preserving the environment.

By combining our experiences in all areas we develop all together a new creative approach and concrete tools on the path to perfection of "Haute Culture"

This next Forum which will take place in the vineyards in Bordeaux will be the opportunity to officially launch our movement in this direction.

Organizing Committee of Forum Rotary Alain Fournier-Sicre Marco Bisdomini Raykhana Dairbekova





Our deep gratitude to all participants, invention talents, vine growers, friends All our thanks as well to Governors D1690 Philippe Baumon & Chantal Guedon who chartered our e-Club. Congratulations to TV5, TV9 for their professional work covering this unique event.



All supporting "la Haute Culture de la Vigne"