

Unlocking the Secrets of the Ocean

Life in Malta is intimately linked to the sea that surrounds it.

Throughout the years, countless Maltese poets have immortalised its beauty in verse. Dun Karm Psaila described it as the one constant on our ever-changing island: 'Fuq wiċċek biss, ja baħar, / żaġħżuġħ ta' dejjem, jgħaddu s-snin bil-mija, / bl-eluf u bl-ġħaxart elef, / u qatt ma jonqxu l-ġħelma tax-xjuhija.' But for **PROF. ALDO DRAGO**, the sea is anything but steady. As Malta's leading expert in the field of Operational Oceanography, he explains exactly why this force of nature must become a top priority in scientific study on our island





Cassi Camilleri

As the archetypal island nation, Malta has long held the potential to unlock the many secrets of the sea. And it has done so to great effect over the years, not for the sake of discovery alone, but as a way of improving life on our island. At its core, this is the mission behind operational oceanography, and the mission of Professor Aldo Drago.

Introducing Drago is no easy task. Listing the numerous influential boards across Europe which he is involved in is an undertaking itself, starting from the Intergovernmental Oceanographic Commission (IOC/UNESCO), to the International Commission for the Scientific Exploration of the Mediterranean (CIESM). He is also the Executive Secretary of MedGOOS (the Global Ocean Observing System for the Mediterranean). However, before embarking on his journey to bring Operational Oceanography to the mainstream, Drago's beginnings were much more humble. As a secondary school physics teacher, he sought to encourage younger generations to pursue science as a career. However, his passion for the

sea kept him always on the lookout for a way to marry that passion with his career. His golden opportunity came when he joined forces with the Malta Council for Science and Technology. The Council agreed to help him pursue a Ph.D. in Physical Oceanography at the University of Southampton.

It was 1991 and back then, there was no one in Malta working on Physical Oceanography (the systematic measurement of sea conditions). With the departure of the British from the Island after Independence, practically all ongoing research projects were dropped as most of those in charge departed. The gaping hole they left behind remained empty for decades, until Drago stepped up to the plate. A sea level gauge in Mellieħa Bay was his first experiment and attempt at establishing systems to gather data about the sea around Malta. The Physical Oceanography (PO) Unit was born. With the new PO Unit came new hopes. Drago wanted to uncover the Mediterranean's characteristics and understand its movements. He wanted to track those movements and map them for future use. This could only be possible through the harvesting of

vast amounts of data and that, in turn, meant Drago needed money—lots of it. With the Council backing him, Drago sought for help beyond home shores. 'Operational oceanography cannot be something we do on our own. When working on a map for a basic forecast for Malta, which includes values of sea currents and intensity, we need to create models. That means we need to link them to larger models. That is why the global community of researchers is so important.' Despite Malta not yet being a member of the European Union, the importance of what Drago was doing on the Island, and the data he was collecting, garnered him not just funding but the beginning of what would become widespread international recognition. That is not to say that the hard times were over. For many years, the PO Unit continued to be a one-man show. Not having a team meant the burden of the entire Unit weighed on his shoulders. Politics also became an obstacle. 'My work was not appreciated. There were times when I was almost suppressed,' says Drago.

In 1996, the change in government and subsequent replacement of board

What is operational oceanography?

Operational oceanography can be defined as the long-term, systematic measurement of meteo-marine conditions, such as the strength and direction of currents present, followed by their rapid interpretation and making them available to the public. This activity is not only crucial to our understanding of the Mediterranean Sea but also provides essential services.

Operational oceanography provides nowcasts, forecasts, and hindcasts which shed light on present, future, and past states of the sea. This data is then used to provide products such as warnings for coastal floods and storm impacts. It can also identify optimal sea routes for cargo ships, identify oil spills and create the appropriate response procedures.

These products are mainly targeted towards industrial users, government agencies, and regulatory authorities.

Physical Oceanography Unit

The PO Unit officially started in 1991 with Prof. Aldo Drago's doctorate studies in physical oceanography. Currently, the PO-Unit is part of the Faculty of Science.

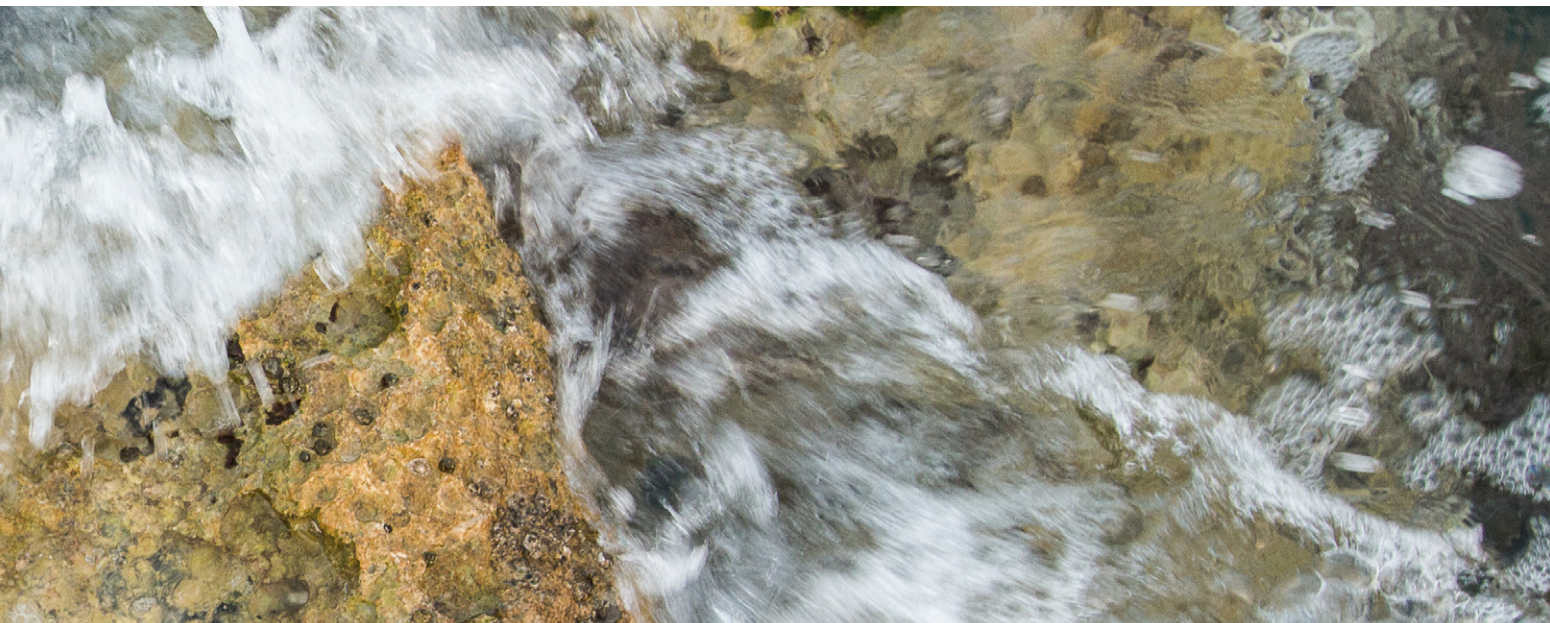
The PO Unit dedicates itself to research in coastal meteorology, hydrography (the study of water bodies and how they change over time), and physical oceanography, with particular focus on the study of the Mediterranean's hydrodynamics (forces acted on and exerted by fluids) in the vicinity of the Maltese Islands.

Available within the PO Unit are gathering, processing, analysis, and management facilities for physical oceanographic observations. A dedicated portal has also been created in the form of CapeMalta (www.capemalta.net) which provides users with meteo-marine observations and forecasts in real time.



members, meant attitudes towards Drago's work changed. It was no longer held at such high esteem as different priorities vied for supremacy. Conflicts emerged. At the time, he was working on a major proposal for a national Marine Station worth two million Maltese Lira (over four million Euro). The project would have brought Malta up to speed with its marine research in a big way. Sadly, he had no choice but to watch on as years of work was wasted, deemed unimportant by those in power at the time. 'The Marine Station would have made a huge change. But we missed the boat in a big way,' says Drago.

Work went on and in 1999, when Prof. Drago finished his Ph.D., a major shift saw the PO Unit move from the Malta Council to the University of Malta. Now, the unit has grown to four members of staff. More importantly, the measurements of the waters around Malta continue to be taken. 'Our experience is a very positive one. The number of projects we have undertaken are unmatched by other faculties at University,' Drago states. More importantly, the work being done does not stop with the project. The real world applications they have mean that they are upheld and continued for as long as resources



last. The *Calypso* and *MyOcean* projects are two perfect examples of this.

Calypso was a 2-year project coordinated by Drago, working together with a consortium of partners from Malta and Sicily. Its goal was to set up a permanent and fully operational HF (High-Frequency) radar observing system which would monitor and record surface currents in the Malta Channel. In real time the radars, of which there were three located in Malta, Gozo, and Pozzallo, would record their direction and intensity on an hourly basis.

Ultimately, the collected data, combined to numerical models, served to support tangible applications. In the case of oil spills, the models help improve intervention scenarios. They also proved to be viable tools for search and rescue, security, safer navigation, improved metro-marine forecasts, and monitoring of sea conditions in critical areas close to ports. The data provided better management of the straits between Malta and Sicily.

This work was expanded upon through the *MyOcean* project. Currently in its third phase, the idea behind this project is to bring all the data acquired from satellite observation and site observation together as one open

“
Operational oceanography is not just about research but also about business”



resource. This information will be made accessible to everyone. If people can use the data and apply it effectively, it could help boost the Maltese economy.

And that is where the Masters in Applied Oceanography comes in. The course is one of the first of its kind in Europe, offering students the chance to focus on operational oceanography and find their place within the network of roles available, a very wide spectrum of disciplines.

The broad aim is to train the next generation of professionals and see them make their way into a field which is now desperate for the injection of bright new minds, both on a local and an international level. The time has come to exploit the opportunities provided by marine research and technology.

Operational oceanography is not just about research but also about business. Drago sees budding entrepreneurs engaging with oceanography data in the future. ‘Their fresh perspectives will see them finding new applications for it, ones that those currently engaged in the field have not even dreamt of’, he says. When this happens, operational oceanography will finally access its own potential. Jobs will be created which would benefit the Maltese economy and

complement its service driven nature. It would tap into that natural inclination that people in Malta already have, one that Drago is certain the country would excel at.

Of course, operational oceanography becoming more mainstream does not guarantee success to every endeavour. The *Blue Ocean Energy* project is a case in point.

Because Malta is a country with practically no natural resources, the prospect of using the power of the sea to generate power is attractive even to the untrained eye. With *Blue Ocean Energy*, the project was created to quantify the wave resource potential around the Maltese islands, to determine if wave farms are viable locally. This could have revolutionised Malta and its operations. The major partner, Dexawave Energy, saw potential in using their converters to harness energy from waves.

But as the project ran its course, the results took a turn. While it emerged that there are areas in the South West of Malta which could be exploited for wave energy, the cost for photovoltaic energy plummeted. Everyone jumped on board and solar energy became a dominant trend. Wave energy was no longer a sustainable option. Its economic feasibility suddenly became unattractive, according to Dexawave's report.

Prof. Drago finds the silver lining in every project. With *Blue Ocean Energy* it lies in the fact that if in the future another group wants to tackle wave energy once more, a considerable amount of work has already been carried out.

The future looks bright for the field and new opportunities continue to arise. While the proposal for the Marine Station was scrapped in the 90s, Drago is now working with MEPA (Malta Environment Planning Authority) to make that long-overdue project a reality. Dr Alan Deidun, who lectures at the PO Unit, echoes the dire necessity of such a facility. His published research



emphasises how the Mediterranean Basin is lagging behind in the implementation of crucial marine policies, despite the various ecological, socio-economic, and geopolitical conflicts at play. As a result, he says, 'this situation has also had a negative impact on national legislation in the various littoral states [zone between sea and land] as regulation [...] has remained piecemeal and fragmented.'

This situation needs to change. As a member of the European Union, Malta now has to get in line with the Marine Strategy Framework Directive. The country needs to monitor the environment and ensure the health of its coastal seas. While MEPA do not have the means to carry out these operations, the PO Unit and its work will make it possible to kick-start the endeavour. Planning is firmly under way to set up the much-needed infrastructure.

Additionally, while the *Calypso* project may have officially ended in October 2013, the work done has been duly noted. As a result, there is a possibility that a boost in funding could

see the project being revived. Another High-Frequency radar could possibly be added in Sicily, bringing the total number of radars to four and increasing geographical coverage for surface current measurements, meaning there will be more data available for maps and modelling.

Drago likens the current state of this field to the computer's early days. 'When the computer was first invented, nobody knew how many applications it would have, how important and how entrenched it would become in our day-to-day lives. I believe the same can be said for Operational Oceanography'. ●

FURTHER READING

- Deidun, A. , Borg, S. and Micallef, A.(2011) 'Making the Case for Marine Spatial Planning in the Maltese Islands', *Ocean Development & International Law*, 42: 1, 136 — 154