

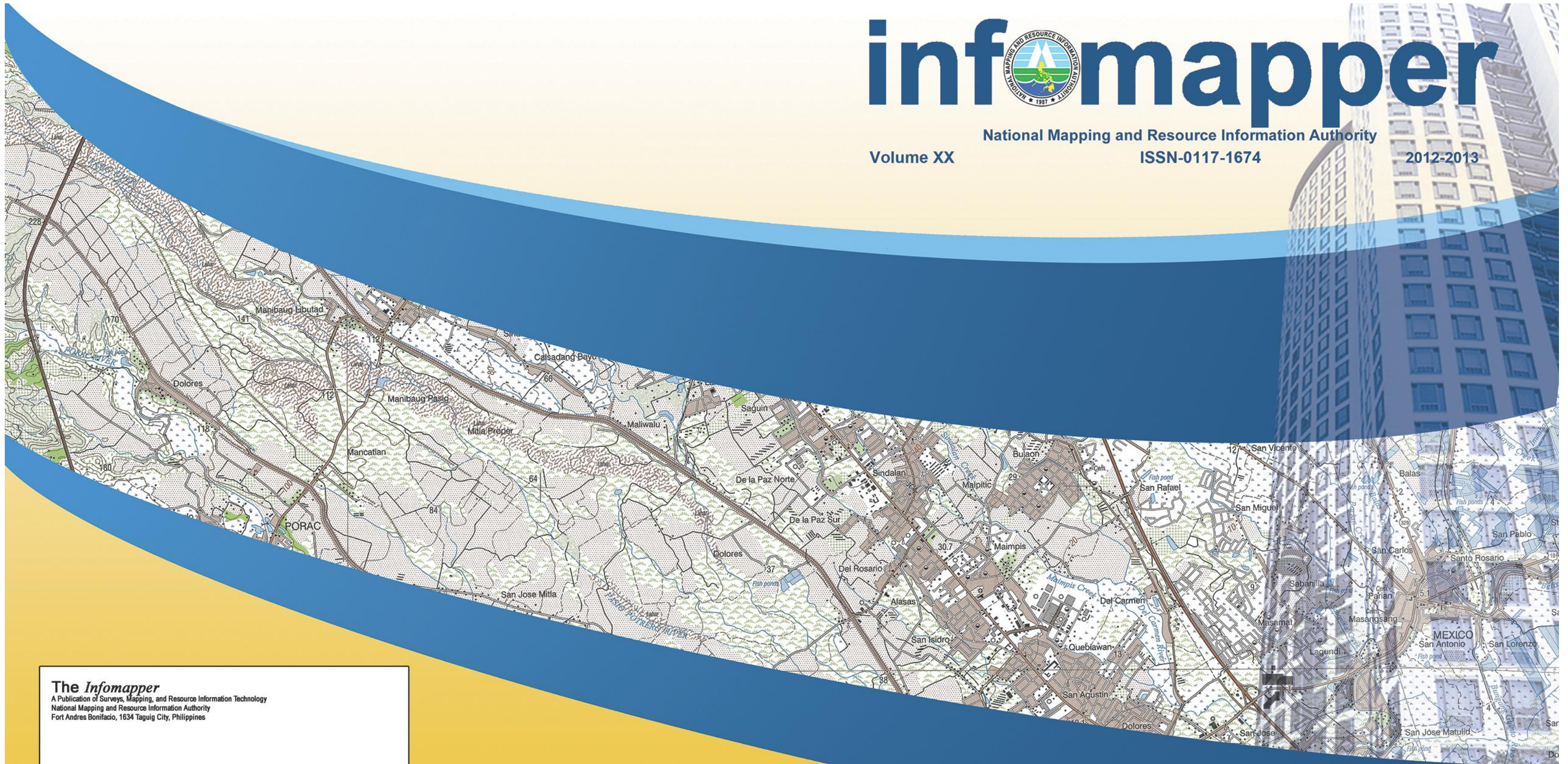
# infomapper

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## The Infomapper

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**PRINTED MATTER**

NAMRIA: At the Forefront of Building a Geospatially-Empowered Philippines



## Editorial

From January to August 2013, NAMRIA embarked on a Strategic Planning Project to define its strategic directions and objectives. The agency's mission, vision, strategies, and core values were reviewed, revised, validated, and aligned accordingly with its operational plans, unit plans, and individual plans. The revisit resulted in a strategic plan from 2013 to 2020, which serves as the True North of NAMRIA. By 2020, the agency envisions a geospatially-empowered Philippines wherein the government utilizes geospatial information in governance and the citizenry benefits from the use of geospatial information. Therefore, a lot of work has to be done in order to attain the vision and to fully support the development activities of all sectors of the Philippine society.

NAMRIA has taken significant steps in its journey towards the agency's True North. These initiatives include the Philippine Geoportal Project, the Unified Mapping Project, and the Competency-Based Human Resource Management System. For service delivery improvement, the agency successfully achieved ISO 9001:2008 certification or Quality Management System standards to further ensure high-quality products and services.

What is crucial, however, is the collaboration with the stakeholders of the agency. On its own, NAMRIA cannot build a geospatially-empowered country; it needs to partner with various stakeholders. As one of



the agency's core values, partnership involves communicating work and plans effectively within the organization and with stakeholders and collaborating with other institutions by sharing ideas, expertise, and resources to address performance and quality gaps and to fully satisfy the requirements of clients and stakeholders. The stakeholders influence and set the strategic directions of NAMRIA; thus, the process of consultation and feedback has to be strengthened in order to build and enhance their engagement and partnership. With the full support and cooperation of stakeholders, NAMRIA will never lose its way toward its vision. •

Editors' Note: Due to space constraints, we cannot publish all of the references consulted for the articles for this issue. Interested individuals may avail themselves of the list from the authors.

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NAMRIA participates in RIMES project...  
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Tidal leveling inside SBMA



Installing the tide gauge and tide staff

from various sources such as remote sensing data (e.g., aerial photographs, Advanced Spaceborne Thermal Emission and Reflection Radiometer Global DEM, Satellite Pour l'Observation de la TerreDEM, and Shuttle Radar Topography Mission Digital Terrain Elevation Data Levels 1 and 2), large-scale topographic maps, and Post Processed Kinematic/Real Time Kinematic Global Positioning System survey.



Tidal leveling party



Establishing tide gauge benchmarks for vertical control

A key project activity was the technology transfer on the generation of near-shore bathymetric and topographic maps and exposure data. Four NAMRIA technical personnel were trained at the RIMES Program Unit at the Asian Institute of Technology, Pathumthani, Thailand on INSPIRE and ESCAPE. The processing of field survey data to generate a near-shore DEM was demonstrated in a workshop conducted on 17 June-19 July 2013.

As part of the continuing commitment towards capacity building, two other NAMRIA personnel attended the Workshop on INSPIRE and ESCAPE Software Application for Tsunami Hazard and Risk Assessment and Evacuation Planning. The workshop, which was held at PHIVOLCS on 25-28 September 2013, aimed to demonstrate and enhance the capacity of participating technical staff and institutions in tsunami hazard and risk assessment and evacuation modeling through case study and processed field data from the pilot site. •



Thus, apart from safe-keeping and providing authoritative spatial information, NAMRIA is responsible for spatially enabling the country towards economic, ecologic, and social sustainability. Steudler and Rajabifard (2012) stated,

*“Spatial is no longer special. In fact, spatial is everywhere and our ability to leverage and harness the ubiquity of spatial information will correlate to benefits in terms of wealth creation, social stability and environmental management.”*

The NSDI is an opportune vehicle for different sectors under all environments to leverage and harness the spatial information under their respective inherent mandates and core functions. Through its full implementation, NAMRIA will unify the country through utilization of reliable spatial information shared by stakeholders from all levels of government and private sectors in land and water. If realized, sophisticated products and services can be made available to the general public. Consequently, this develops a holistic spatially-enabled Philippines, where every Filipino treats temporal and spatial information as a common commodity which may be used for resolving issues or as basis for innovative contributions to the community.

Lastly, the road to realizing a holistic spatially-enabled Philippines is long, but hand in hand with partners and clients, and the availability of world-class technologies and highly competent personnel, NAMRIA through a seamless Philippine Geoportal will soon produce better products and services, build more linkages and develop a more sustainable country one step at a time. •

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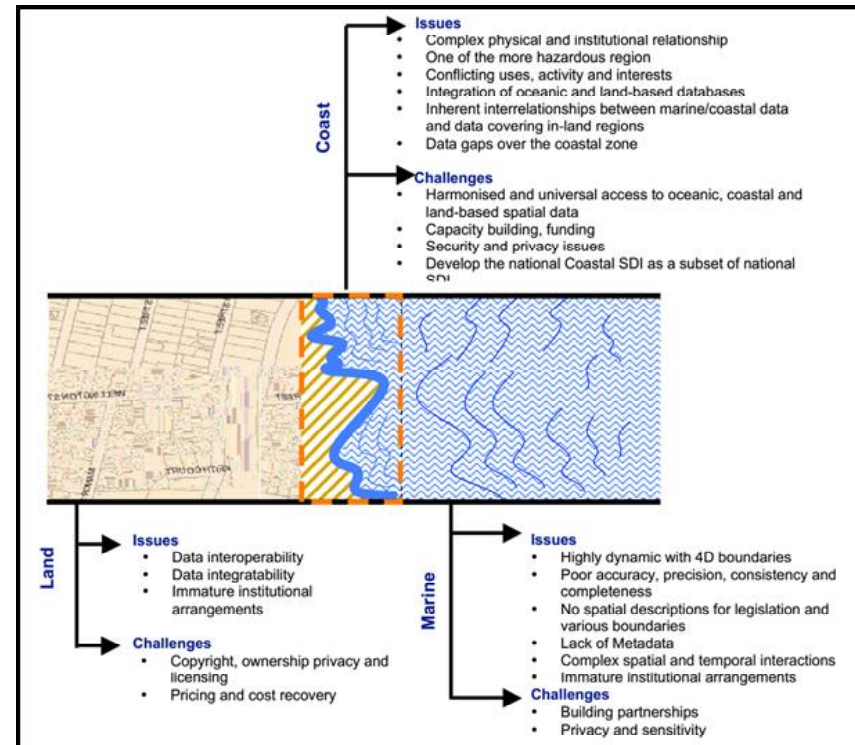


Figure 1. Vaez et al. (2007). *Issues and challenges of the land, coastal, and marine environments*. Reprinted from Seamless SDI model: Bridging the gap between land and marine environments, by Vaez et al. (2009). Copyright 2007 by CoastGIS07.

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<sup>1</sup>Written as a commitment to the Agenda 21 adopted by the participating governments in the United Nations Conference on Environment and Development, also known as the Earth Summit, at Rio de Janeiro, Brazil in June 1992

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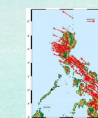
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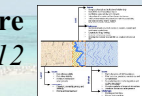
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## NAMRIA Strategic Planning: Finding Its Direction, Finding Its True North

by Maria Romina D. Pe Benito and Lorelei E. Peralta<sup>1</sup>



Administrator Tiangco gives his message during the closing ceremony for NAMRIA's Strategic Planning Project in August 2013

### Vital References

"To provide the public with mapmaking services and to act as the central mapping agency, repository and distribution facility for natural resources data in the form of maps, charts, text and statistics"—If ever there was a primal reference that gave direction to NAMRIA, such a reference would be the agency's mandate, partly stated in the aforementioned text from Executive Order (EO) number 192, series of 1987. 1987 was the year NAMRIA was created and EO 192, series of 1987 is the official document for the agency's creation. Later references include the agency's organization and operations manual which is currently being revised, and the agency's vision and mission developed through the years. NAMRIA's erstwhile vision is stated as follows: "A highly-professionalized, technically-advanced, globally-competitive, and an environment and natural resource-caring agency." And to realize its vision, the agency's erstwhile mission is stated as follows: "To generate and disseminate reliable and up-to-date geographic information and provide related services, by employing state-of-the-art technology, in support to national development and security."

By the time NAMRIA reached its 25<sup>th</sup> year in 2012, the agency had been performing its basic mandate as stipulated in the EO that created it. The agency's operational programs,

plans and activities (PPAs) were already in place, targets were identified and expected outputs were being completed within a specified time frame. However, there was no Strategic Plan<sup>2</sup> that would articulate the agency's long-range goals and strategic direction. The opportunity to have such a plan came through in the midst of NAMRIA's involvement in the implementation of high-impact programs that contribute to disaster risk reduction and management, having been part of the Collective Strengthening of Community Awareness for Natural Disasters (CSCAND) multiagency group.

### Strategic Planning Project

As a CSCAND member, NAMRIA is one of the strategic partner organizations of the Philippines-Australia Human Resource and Organizational Development Facility (PAHRODF) of the Australian Agency for International Development (AusAID). PAHRODF provides human resource and organizational development interventions to their partner organizations "to build competencies and enhance organizational capacity towards the achievement of their development and change agenda."<sup>3</sup>

In January of 2013, NAMRIA launched its Strategic Planning Project "which outlined the agency's long-term directions in order to continue to be relevant in national development through strengthened agency programs and initiatives on human resources and organizational development, as provided for in the NAMRIA Strategy Map" (NSPM). From February to July 2013, the agency's executives and middle-level managers underwent a series of strategic planning workshops specifically to enhance their competencies in setting the agency's strategic directions, aligning their unit-level operational plans with the strategic plan, and managing change. The four learning modules for the process were the following: Strategic Planning Workshop, Operations Planning Workshop, Communications Planning, and the identification of Re-Entry Action Plans, and Sustainable Action Plan Workshop. AusAID through PAHRODF and its local service provider PeopleSparx Incorporated (PSI) assisted NAMRIA in this endeavor. NAMRIA's Strategic Planning Project culminated with the conduct of a Stakeholders Conference

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### MSDI... from page 12

to the real world that may not have been fully understood or tapped before. It will also allow NAMRIA to enhance hydrographic and oceanographic products and services and to work at close hand with other sectors of the maritime industry.

### Implementing MSDI for Seamless NSDI

Through the Philippine Geoportal: One Nation One Map Project, NAMRIA has already embarked on the realization of a National SDI (NSDI). The project however caters to land-based datasets only. Ultimately, the NSDI aims to provide a seamless infrastructure that offers integrated datasets and solutions for both land and sea areas. The MSDI, as a marine component of the SDI, completes the Philippine NSDI.

MSDI inherits the challenges of SDI implementation, which include among others the lack of political will among stakeholders, poor cross organizational cooperation, and lack of funding. Nonetheless, it is safe to say that NAMRIA, through the Philippine Geoportal Project, has already over-

come the political, organizational, and monetary challenges of implementing SDIs. Likewise, NAMRIA is also already adept at the governing policies and frameworks of SDI.

Joining land- and water-based data together, however, as a continuous surface presents new obstacles requiring new tools and data collection, standardization of data specifications, improved data management and dissemination, and more education (Cooper et al., 2010). While land-based SDIs are highly challenged by data interoperability and data integratability, MSDIs on the other hand face a more dynamic and constantly moving dimension where features tend to move with time. This in turn leads to poor accuracy, precision, consistency, and completeness of marine spatial data. Vaez, Rajabifard and Williamson (2009) believed that such issues are further compounded across the coastal zone. Being the most used, populated, and profitable among marine areas, the coast presents the highest vulnerability among environments. In addition, coastal activities demand both spatial information from land and marine environments. Presently, such issues are solved by interpreting land and marine information separately. Cooper et al. also presented the setting of the datum as another significant problem. They explained that since mapping and charting use different vertical datums, a seamless geodetic framework is more difficult to calculate and present.

While an independent MSDI can resolve these issues, Vaez and his associates believed that the lack of a harmonized and universal access to a seamless land-marine interface creates inconsistencies in policies and data integration most especially across the coastal zone. They summarized (following Vaez, Rajabifard, Binns and Williamson, 2007) the issues present in land, coast, and marine environments in Figure 1. Notably, they suggested the creation of a coastal SDI as another subset of SDI to resolve the issue. Generally though, the intention is to embed a marine dimension to SDI in order to create one seamless NSDI.

If realized, a seamless NSDI will provide a more well-rounded approach to efficient and effective marine spatial planning and management of the land, marine, and coastal environments.

### Spatially Enabling the Philippines through NSDI

The 1987 Philippine Strategy for Sustainable Development (PSSD) and the 1996 Philippine Agenda 21 (PA21): A National Agenda for Sustainable Development for the 21<sup>st</sup> Century<sup>1</sup> formed the country's three-pillar approach for sustainable future: economic growth, environmental integrity and social development. Related thereto, Memorandum Order 399 s. 1996 directed "all government agencies, departments and instrumentalities ...to adopt and translate the principles and action agenda contained in the Philippine Agenda 21 in their respective workplans, programs and projects."

...continued on next page

<sup>1</sup>Project Evaluation Officer III, Policy and Planning Division, NAMRIA Support Services Branch and is a candidate for Master's degree in Maritime Studies, University of Wollongong, New South Wales, Australia

<sup>2</sup>A document used to communicate with the organization its goals, the actions needed to achieve them, and all of the other critical elements developed during the planning exercise (<https://balancedscorecard.org/Resources/StrategicPlanningBasics>)

<sup>3</sup>NAMRIA Strategic Planning Manual [NSPM]: Towards the Pursuit of Our True North, 2013



is crucial to the effectiveness of a semi-dynamic datum. NAMRIA plans to develop this model together with the academe and PHIVOLCS.

Status

As early as 2007, the activities of the NAMRIA Geodesy Division have been aligned with the end goal of migrating the NGS to a geocentric datum. The zero order control network was established in 2008-2009 using select PageNET AGS as references. A re-observation of first-order geodetic control points (GCPs) was conducted in 2010 to update its original 1989-1992 coordinates when the PRS92 was first established.

The densification of the PageNET fiducial network is ongoing. To date, there are 17 stations established nationwide with five more sites targeted for the current year. The PageNET AGS are regular contributors to geodetic reference frame definition, both locally and abroad. The AGS in NAMRIA (site ID: PTAG) has been incorporated into the International GNSS Service (IGS) global network of tracking stations, and is one of the ground stations contributing to the definition of the Asia-Pacific Reference Frame (APREF). Likewise, data from the PageNET AGS are regularly submitted to the annual campaigns of the Asia and the Pacific Regional Geodesy Project (APRGP) of the UN-GGIM (formerly PCGIAP).

To facilitate the computation of an ITRF solution for the whole country, the agency acquired the Bernese GNSS Software, a scientific software capable of long baseline processing. This is needed since the nearest IGS stations that can be used to tie to the ITRF are from hundreds to thousands of kilometers away. It is expected that re-computation of the network solution will commence next year. NAMRIA is looking into partnerships with international organizations to augment its personnel’s technical skills on reference frame definition and maintenance.

Adopting a geocentric datum has a far-reaching implication, not just for the surveying and mapping industry. As such, NAMRIA is continually reaching out to various sectors to encourage their participation in this undertaking. A stakeholder’s conference was conducted in January 2013 to present the proposed modernization. Representatives from the private sector, academe, and other government agencies engaged in surveying and mapping took part in the consultation.



It is expected that an interagency technical working group will be created to study and oversee the implementation of the migration.

Mandatory Adoption

The modernization of the national geodetic system is a major undertaking and requires careful study to ensure that all issues—whether technical, legal, or socioeconomic—are properly addressed. The active participation of the various sectors of society, particularly the surveying and mapping communities, is needed to ensure the successful and smooth transition.

In the light of recent events, it is fast becoming obvious that adopting a geocentric datum is mandatory in order for the government to properly and effectively respond to the needs of the changing times. •

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and Graduation Ceremony on 02 August 2013. Among the major outputs was the agency’s Strategic Planning Manual.<sup>1</sup>

NAMRIA’s True North<sup>2</sup>

The *True North* associated with the NAMRIA Strategy Map metaphorically is about NAMRIA “getting in the right course and proceeding in the right direction” (NSPM). NAMRIA was able to find its *True North* through a *Geospatially-Empowered Philippines by 2020* and the agency’s Strategy Map is its roadmap for reaching this goal.

The Strategy Map summarizes and articulates NAMRIA’s strategic direction. It contains the agency’s new Vision statement which says that — *By 2020, NAMRIA is a center of excellence building a geospatially-empowered Philippines* that will enable the agency to help bring about a government that utilizes geospatial information in governance and a citizenry that benefits from the use of geospatial information especially in the conduct of their day-to-day activities. The strategic map also contains the agency’s new Mission statement which is—*To provide accurate, timely, and accessible topographic maps, nautical charts, and other geospatial products and services*. This encapsulates what the agency will do to achieve its new Vision, that is, to be able to meet the need for geospatial information products and services of its diverse stakeholders in both the public and private sectors.

As its strategic objectives, NAMRIA has *to develop and maintain a sufficient pool of competent human resource; to develop, upgrade, and sustain functional capacity of equipment and facilities; and to ensure efficient utilization of financial resources*. These will all result in the agency’s having an *enhanced organizational capacity* which in turn will enable it *to deliver relevant quality maps, nautical charts, and related ENR data and geospatial services on time; and to effectively and efficiently manage geospatial resources*. NAMRIA will in the end be able to realize the *fully supported socioeconomic, environmental, and other development activities of all sectors* of its target market.

The core values of *Professionalism, Transparency and Accountability, Innovation, Efficiency, and Partnership* would serve to guide the agency in the realization of its vision, accomplishment of its mission, and implementation of its strategic objectives and initiatives. NAMRIA’s strategic initiatives or programs that will ensure achievement of its targets are *Topographic Base Mapping; Geodetic Network Development; Hydrography and Nautical Charting; Physical Oceanographic Surveys; Environmental and*



NAMRIA officials led by Administrator Tiangco with employees and PAHRODF consultants

*Natural Resources Mapping; Geospatial Information Management; Partnership Development; Facilities and Equipment Development; Organizational Performance Management; Research, Development, and Extension on Mapping and Geospatial Information Management; Strategic Human Resource; and Morale and Welfare*. The agency’s different branches—Mapping and Geodesy, Hydrography, Resource Data Analysis, Geospatial Information Management, and Support Services—are responsible for the overall implementation of the aforementioned initiatives or programs. With the existing and future initiatives of NAMRIA, it is crucial to align efforts towards one clear direction and ensure that all organizational actions and initiatives contribute to the achievement of strategic objectives.

Leaders as Movers

It remains for NAMRIA’s leaders to make full and effective use of its clearly defined strategic plan, as a guide especially in performing its mandate and communicating it to its stakeholders and clients. This ensures the delivery of high-quality results and the meeting of the expectations of its stakeholders and clients. As NAMRIA Administrator Peter N. Tiangco himself said, “the challenge for NAMRIA leaders is to embed the True North in the organization and to align and identify themselves with the core values or the moral compass of the agency” (NSPM). This only means that the strong efforts of NAMRIA leaders are crucial to spurring on the staff towards the True North, thereby realizing the true success of the whole strategic planning exercise. •

<sup>1</sup>The manual documents the strategic planning process undertaken by the NAMRIA leaders that highlights the NAMRIA Strategy Map called the True North. It is a step-by-step guide on how agreements are made towards developing a unified strategic direction for NAMRIA.

<sup>2</sup>Aside from the NSPM, other references used in this section were from the NAMRIA Strategic Planning Workshop held in Summit Ridge Hotel in February 2013; and the discussion on the NAMRIA Strategy Map by Deputy Administrator Efren P. Carandang during the cascading session held at the NAMRIA Lecture Hall in September 2013.





## NAMRIA's Human Resource Management and the Competency-Based System

by Maria Romina D. Pe Benito

A work organization that is able to perform to the utmost its mandated functions largely owes its success to its human resource complement. As part of its efforts towards seeking and later securing ISO certification, NAMRIA with the full support of Administrator Peter N. Tiangco started in 2012 to adopt a competency-based approach in its human resource management. The development of the agency's Competency-Based System (CBS) happens to be one of the ISO requirements. Enhancement of employees' competency was one of the means identified to support the agency's quality management system.

The CBS, as defined in the agency's CBS project profile, is "a comprehensive system of methodologies and tools to facilitate the collection, validation, interpretation, and dissemination of NAMRIA competencies linked with organizational strategic directions." NAMRIA's CBS generally seeks to fulfill the requirements of ISO 9001:2008; serve as the foundation of all human resource programs (e.g., recruitment and selection, trainings, and promotion) to ensure placement of the right person for the right job; and improve individual as well as organizational performance. Furthermore, NAMRIA's CBS specifically aims to design an organizational core competency model to clearly define the required skills, knowledge, abilities, and behaviors necessary to achieve organizational success; conduct competency assessment of the current workforce; identify the gaps and recommend appropriate human resource intervention; and match existing human resource to organizational core competencies.

A committee chaired by Deputy Administrator Linda SD. Papa spearheaded the establishment of the agency's CBS. The agency embarked on the undertaking with the assistance of Ms. Jacqueline P. Galvez, former project manager and human resource consultant for DENR, and currently independent organizational development consultant for several government and private agencies.

The major activities involved for the undertaking are Competency Development, Position Profiling, Incumbent Assessment, and Manualization. *Competency Development* has to do with assessing the current knowledge, skills, and behavior requirements of the agency for it to attain its mandate and strategic goals; and identifying all the core and universal competencies, including the behavioral and activity manifestations, of the offices in NAMRIA. *Position Profiling* has to do with determining and deciding on the ideal level of proficiency in all unique and universal competencies required for each specific position. *Incumbent Assessment* has to do with aligning all existing job descriptions with the competency-based system developed as well as developing the job descriptions to respond to the changing needs of the agency's clients. It also aims to assess the actual level of proficiency of each incumbent in all core and universal competency requirements for each position in all the offices of NAMRIA. The last stage has to do with the development of the CBS manual for NAMRIA.

As a result of the strategic planning which the agency underwent from January to August 2013, adjustments had to be made in the targets and activities of the project workplan to produce the CBS Manual. The agency's CBS manual was approved by the NAMRIA Administrator in July 2013 but it is presently undergoing revision. This is due to the changes in the agency's organizational structure and staffing pattern resulting from its rationalization plan, which was approved in June by the Department of Budget and Management. The finalized NAMRIA CBS Manual is expected to be a most useful and reliable tool to enable the agency to have a constant a pool of competent human resource for the optimized fulfillment of all of its mandated functions and other activities. •

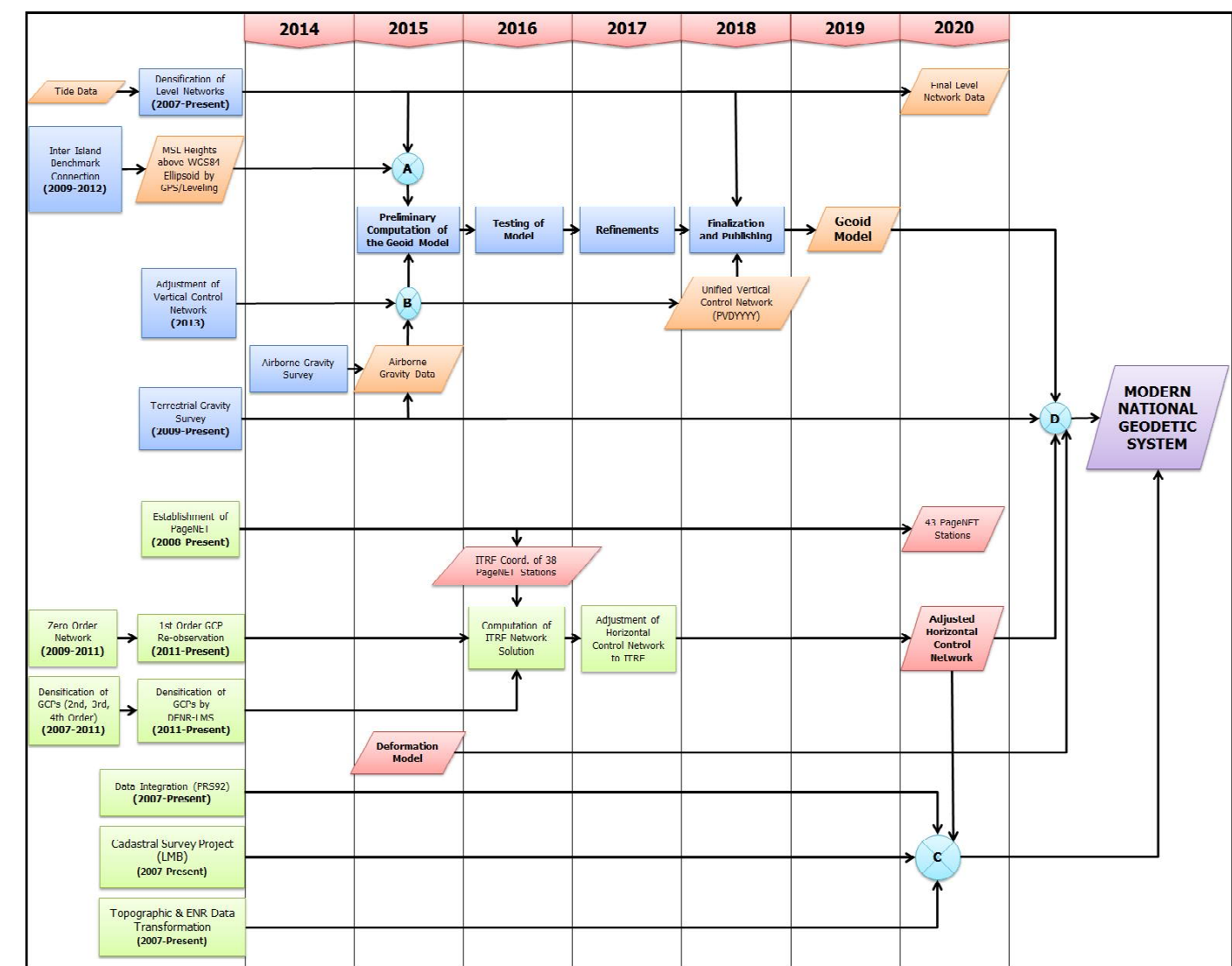


Figure 2. Proposed road map towards a modern national geodetic system by 2020

The migration to a geocentric datum in the Philippines is ushered in by the establishment of the Philippine Active Geodetic Network (PageNET). The PageNET comprises of active geodetic stations (AGS) collecting GNSS data to provide positioning solutions to the public via the internet. The availability of continuous GNSS data makes possible the precise definition and monitoring of coordinates of points all over the country.

The PageNET fiducial network, comprising of 38 stations nationwide, is expected to be completed by 2016, after which an ITRF network solution will be computed for the whole country. Re-adjustment of the zero to the lower-order control networks will follow. The resulting geodetic frame shall define the PGD2016.

The upgrading of the national geodetic system into a geocentric datum is appropriate, given the dynamic nature of a country that lies along a tectonically active region. PRS92 has remained static in these past years and the integrity of

the network may have already been affected by crustal deformation and/or tectonic plate motion (Paringit et al., 2009).

Accounting for geodynamics in the development of a geocentric datum for the Philippines is another issue that needs to be carefully studied. NAMRIA is looking into the experiences of other countries such as Indonesia and New Zealand, who share almost the same geologic characteristics as the Philippines and have already migrated their geodetic reference system to a geocentric datum.

Subject to the results of more in-depth research in its applicability to local settings, it is likely that a semi-dynamic geocentric datum will be adopted for the whole country. This approach meets the need for accurate coordinates of geodesists at any point in time, while being static enough to satisfy the mapping community who also require that major deformation events be reflected by the datum (Blick et. al., 2010). The availability of a deformation model that will be used to account for geodynamics in updating the coordinates

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## Towards a Modern National Geodetic System... from page 13

### Geodetic Reference Systems in Use

By law, surveying and mapping activities in the country should be referred to the Philippine Reference System of 1992 (PRS92) to provide the horizontal controls. PRS92 is a Global Positioning System (GPS)-based local geodetic datum established in 1992 as part of the Natural Resources Management and Development Project (NRMDP). It replaced the old datum in use, the Luzon Datum of 1911, which was realized using astronomical observations on triangulation stations established by the US Coast and Geodetic Surveys from 1901 to 1927. The new reference system retained most of the parameters of the old datum to minimize the changes in the coordinates, and introduced a geoid-spheroid separation at the origin in Balanacan, Marinduque:

Reference Ellipsoid: Clarke Spheroid of 1866  
Origin: Station Balanacan  
Latitude 13°33'41.000" N  
Longitude 121°52'03.000" E  
Reference Azimuth 9°12'37.000" (from South to Sta. Baltasar)  
Geoid-Spheroid Separation 0.34 m

To date, PRS92 has yet to be fully adopted as the standard reference system. Issues on data integration have resulted in some surveys, particularly property surveys, being referred to the old datum.

As PRS92 is a local datum, its applicability on select applications is limited. Crustal deformation studies and aviation in the country, for example, are referred to the World Geodetic System of 1984 (WGS84) or to the International Terrestrial Reference Frame (ITRF).

### The International Terrestrial Reference Frame

Adopting a geocentric datum has been deemed as inevitable due to the widespread use of satellite positioning systems (Nwilo et al., 2013). Geocentricity offers the following advantages (Kadir et al., 2003):

1. Compatibility with space geodetic techniques so data derived through these means will be fully utilized.
2. Ease of use so there is no need to learn about datum transformations.
3. Efficient production and management of geospatial information
4. Homogeneous set of coordinates to support a wide array of applications, especially those extending beyond national boundaries such as aviation, crustal deformation or climate change studies.

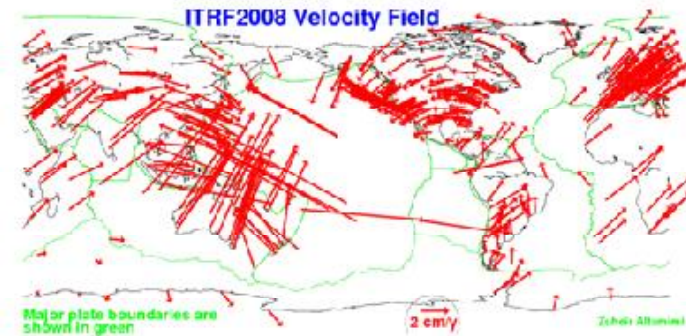


Figure 1. ITRF2008 velocity field showing the magnitude and direction of crustal deformation.

In Southeast Asia, majority of the countries have tied to or plan to align their geodetic reference system to the International Terrestrial Reference Frame (ITRF). The ITRF is the physical realization of the International Terrestrial Reference System (ITRS) wherein the definition of terrestrial coordinates to the highest possible accuracy is based (Rizos, 2012). The ITRF is defined and maintained by the International Earth Rotation Service (IERS) through a worldwide network of ground stations, and is closely aligned to the World Geodetic System of 1984 (WGS84) to within the centimetre level. VLBI, SLR, DORIS, and GNSS are used in combination to arrive at an ITRF solution at a particular epoch. Throughout the years, different ITRF realizations have been made, the latest being ITRF2008 and with a new one, ITRF2013, expected to be published next year. The differences in the coordinates between realizations are attributed mainly to crustal deformations and tectonic plate motions.

### Roadmap

The PRS92 Project laid the groundwork for the updating and upgrading of the national geodetic system (NGS). Current and future activities of NAMRIA for geodetic network development have been planned with the end goal of completing the modernization of the NGS by 2020.

A preliminary road map has been drafted, but this is expected to be refined along the way as more data and resources become available. The modernization involves three major undertakings:

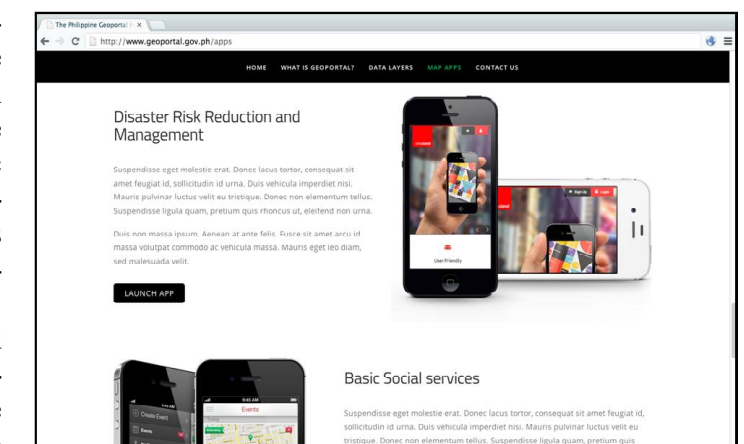
1. Migration to Philippine Geocentric Datum of 2016 (PGD2016)
2. Development of the Philippine Geoid Model (PGM2020)
3. Unification of the Vertical Control Network, Philippine Vertical Datum 2020 (PVD2020)

## Philippine Geoportal Project... the Second Phase

by the Geospatial System Development Division, NAMRIA Geospatial Information System Management Branch

Phase 1 of the Philippine Geoportal Project (PGP) fore-runs and paved the way for the creation of the National Spatial Data Infrastructure (NSDI), also known as the Philippine Geospatial Data Infrastructure (PGDI). The successful establishment of the collaborative platform consisting of hardware, network, software, and application systems for sharing of available base maps, geospatial data, and thematic maps is due to the concerted efforts of the stakeholders. The resources and services of this collaborative platform are now available to stakeholders for their respective purposes. Phase 2 of the development and implementation of the PGP is now in the pipeline as an offshoot of the Phase 1 accomplishments. Phase 2 will expand the geographic coverage for the creation and availability of the targeted common set of authoritative multiscale framework maps. This will include large-scale digital maps already available during phase 1 which will be reprocessed to meet standards. New datasets from various sources will also be requested and added to the Philippine Geoportal System (PGS) established during the first phase. The generation of multiscale base maps will be based on the topographic data models while the Metro Manila geospatial data will be maintained and updated while being served on the Web.

New features will be developed to enhance the existing functionalities of the PGS. Features like *Automatic Geospatial Information update*, *GIS-based Mobile Applications (Smart Phones/Tablets)*, *Crowd Sourcing*, *Private sector utilization*, *Geo-processing services*, and *Geospatial query and analysis* will expand the system's usability and effectiveness.



Screenshot of Philippine Geoportal website

Specific business cases will be defined and developed. These will include cases of interest or critical need. In order not to duplicate the work and efforts of other government agencies, geospatial websites with rich and critical content will be electronically linked to the Philippine Geoportal. This will be made possible through inter-agency agreements. The following will be developed and linked to the Philippine Geoportal Project:

- (1) **Tourism Assistance.** This concept focuses on taking advantage of GIS in promoting tourism in the Philippines. The solution aims to provide tourists, foreigners, and locals alike with direct access to relevant information especially as regards their destination. The application will allow tourists to the Philippines to plan their itinerary with respect to their time of stay, allocated budget, and planned activities during or before the trip itself. The application would feature the tourist spots in a Philippine locality. The web application can be accessed primarily via the



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The Strategic Performance Management System:  
From 1963 through 2013

by Carina A. Santos<sup>1</sup> and Lorelei E. Peralta<sup>2</sup>

Ideas, technologies, and approaches evolve. The approach to performance evaluation and appraisal systems in Philippine government service is no exception. The Civil Service Commission (CSC) has never looked back since its very first efforts on performance evaluation and appraisal were made in 1963 through *Performance Rating*. This approach paved the way for several others, some of which might be familiar to those who have been with government for a number of years: *New Performance Appraisal System*, *Agency-Developed Performance Evaluation System*, *Revised Performance Evaluation System* and *360-Degree Evaluation*, *Performance Evaluation System*, *Performance Management System-Office Performance Evaluation System*, and the *Strategic Performance Management System*.

The Administrative Code of 1987, Book V of Executive Order number 292 provides the goals of performance management, which are to establish a performance evaluation system in accordance with rules, regulations, and standards promulgated by the CSC, and to continually foster the improvement of individual employee efficiency and organizational effectiveness.<sup>3</sup>

The Performance Rating System of 1963 was characterized by an input-oriented approach, measuring abilities and attitudes of supervisors and non-supervisors at the work place. However, since the system relied more on the assessment made by supervisors, ratings were in most cases based on the supervisor’s general impression on abilities and attitudes. Then came the New Performance Appraisal System of 1978 that used the output-oriented approach where employees were rated according to the dimensions of quality, quantity, and timeliness. While employees participated in every step of the appraisal and were allowed to compute their own ratings, it was difficult to reconcile the employees’ work objective with the key result areas reflecting the vision, mission,

and mandate of the office. Employees only focused on the commitment objectives at the end of the performance period and simply aligned these with what has been accomplished. In 1989 and onwards, government agencies were given relative freedom to craft their own evaluation measures using the CSC guidelines on Performance Evaluation System. To resolve dissatisfaction with supervisors’ ratings, a significant percentage of the ratings was given to subordinates so that the ratings were no longer solely based on supervisors’ prerogative, thus opening communication between the supervisor and the subordinate. At this stage, two more dimensions were added: peers’ and clients’ ratings.

In 2005, the Performance Management System-Office Performance Evaluation System (PMS-OPES) was introduced. The concept was “what gets measured gets done”. The development of the PMS-OPES created the OPES Table that identified the number of points assigned to tangible and non-tangible aspects of individual, unit, and organizational performance and have “objectively-measured performance outputs” in order to eliminate bias or conflict between rater and ratee. However, the system still promoted an activity-oriented mindset since tangible outputs that acquired greater points were what mattered the most.

The systems implemented over the years focused more on individual appraisal simply because these would be used for personnel actions such as incentives, promotion, discipline, or separation. However, these systems did not show how an employee is aligned with the agency’s mission, vision, and mandate; neither did they demonstrate if the employees’ performance contributed to or hindered organization effectiveness. Therefore, the sense of accountability cannot be easily discerned and employees vaguely see their respective contributions to the organization. In other words, institutional accountabilities are not cascaded to the individual level and there is no opportunity for employees to participate in

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<sup>2</sup>Project Evaluation Officer III, Policy and Planning Division, SSB and is a candidate for Master’s degree in Maritime Studies-Research, University of Wollongong, New South Wales, Australia

<sup>3</sup>Official Gazette, Executive Order No. 292, “Administrative Code of 1987”, Book V, Chapter 5: Personnel Policies and Standards, Section 33: Performance Evaluation System, see <http://www.gov.ph/1987/07/25/executive-order-no-292-book-vtitle-isubtitle-achapter-5-personnel-policies-and-standards/>

Office	Positions Before RATPLAN	Positions Under RATPLAN
Administrator	11	11
SSB	136	84
MGB	147	149
HB	60	41
RDAB	107	97
GISMB	88	88
<b>TOTAL</b>	<b>549</b>	<b>470</b>

*Analysis Department.* The approved RATPLAN has reduced the agency authorized plantilla positions from 549 to 470. It has abolished 86 positions composed of 32 positions with incumbents and 54 vacant positions. Affected personnel who remain in the government service were placed in other positions or in positions with Coterminous with the Incumbent (CTI) status while seven employees availed themselves of the retirement package of the Rationalization Program.

The RATPLAN has modified 37% of the NAMRIA positions, with 24 positions newly created, 16 retitled, 121 transferred from one unit to another within the agency, 11 reclassified, and six CTI. With its implementation was also abolished the agency casual positions after a month from its date of effectivity. Affected permanent and casual employees received the benefits provided for under the Rationalization Program including the retirement benefit offered to qualified Government Service Insurance System members.•

Philippine Geoportal Project...  
from page 7

Internet through mobile devices. Information kiosks in relevant airports/piers/bus terminals would be able to access information through the PGS.

**(2) Disaster Risk Reduction Management (DRRM) and Climate Change Assistance (CCA).** The Philippine Geoportal can be used as a channel for disaster-risk coordination, management, and reduction. Information plays a major role in disaster preparedness, whether a man-made or a natural disaster. The large-scale/high-resolution natural hazard maps could be included in the geoportal and will be developed in coordination with the inter-agency Hazard Mapping and Assessment for Effective Community-Based Disaster Risk Management (READY) Project spearheaded by the Office of Civil Defense. Serving relevant climate change data needed for disaster risk reduction will be coordinated with the Climate Change Commission. The concept of DRRM and CCA focuses on taking advantage of the Philippine Geoportal as a platform for serving needed information in planning community-based disaster risk reduction and management activities. The Philippine Geoportal can provide access to relevant maps with regard to natural and man-made hazards and disaster potentials. The web application would pro-

vide information about known natural and man-made hazards, and information about government provisions for disaster risk reduction.

**(3) Basic Services Provision Assistance.** Using GIS in delivering basic services quickly and efficiently is the motivation behind the concept of incorporating to the PGP the basic services provision assistance web application. The concept intends to provide the public with direct access to information relevant to basic services, and to promote transparency in the government’s efforts to provide the basic needs of Filipinos in both urban and rural areas. The public would be made aware through this application of the basic services offered in their area. An example is whether a nearby health center will offer free medical and dental check-ups, or whether the day care center is big enough to accommodate the children expected to enter. The application may include information about existing basic services facilities such as day care centers; primary, secondary, and tertiary health facilities; and water, electricity, and solid waste sanitation facilities.

The sustainability of the system will also be the priority of the Phase 2 design, which will also measure the GIS as a service concept developed in Phase 1. Phase 2 will test the possibility of cloud computing platforms in its implementation, and will also be the venue for exploring the nationwide expansion of Public-Private Partnership models.•



## NAMRIA adopts organizational and staffing modifications

by Concepcion A. Bringas\*

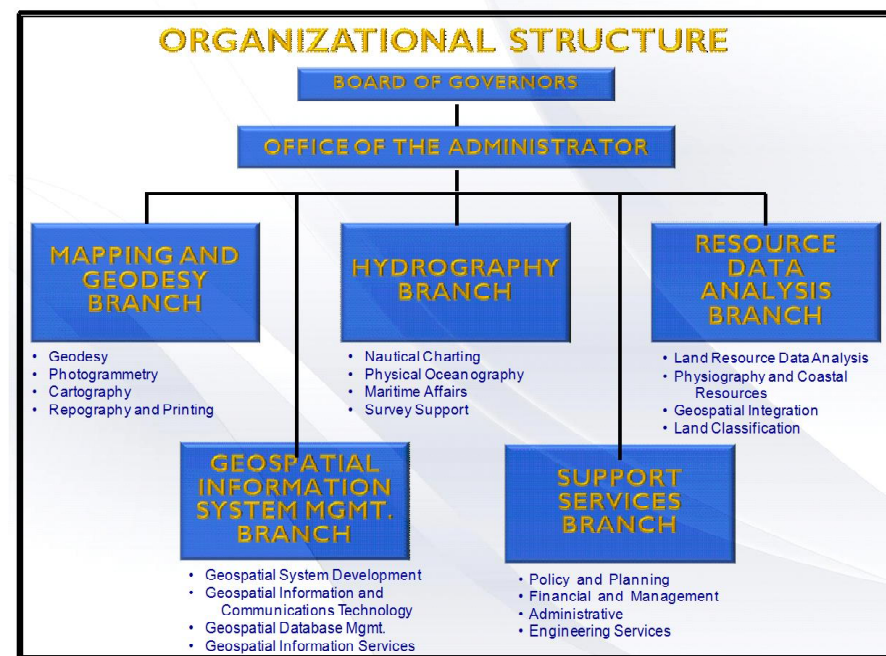
NAMRIA through its Administrative Order number 003, series of 2013, has implemented the NAMRIA Rationalization Plan which was approved by the Department of Budget and Management on 26 June 2013. The approved Rationalization Plan (RATPLAN) provides modifications in the organizational structure and staffing pattern of the agency. The specific modifications are the abolition, merging, transfer, consolidation, and creation of offices and the abolition, renaming, and creation of new positions.

The following were abolished: one of three Deputy Administrator offices, the Medical and Dental Clinic, the Security and Intelligence Division, and the Engineering Services Department (ESD). The new Geospatial Information System Management Branch (GISMB) formerly called *Information Management Department*, is the result of the merging of the Media Production Division and the Information Services Division. Likewise, the Aerial and Spatial Survey Division was made part of the Photogrammetry Division, which is under the Mapping and Geodesy Branch (MGB), formerly called *Mapping and Geodesy Department*.

The three divisions, namely, Facilities and Maintenance, Transport Services, and Instrumentation and Communication of the former ESD were consolidated to form the new Engineering Services Division. The Engineering Services Division together with the Administrative, Policy and Planning, and Financial and Management support service divisions were consolidated to form a new branch, the Support Services Branch (SSB). The Cashier Section was transferred from the Financial and Management Division to the Administrative Division.

The Geodesy and Geophysics Division, renamed *Geodesy Division*, was transferred from the Hydrography Branch (HB) formerly called *Hydrography Department* to the MGB. The former ESD division, the Computer Engineering Division, renamed *Geospatial Information and Communication Technology Division*, from the former ESD was transferred to the GISMB. The newly created offices under the HB are Survey Support office, Maritime Affairs office, and three Hydrographic Survey Command offices.

Aside from the MGB, HB, and GISMB, the other renamed branch is the Resource Data Analysis Branch (RDAB) formerly called *Remote Sensing and Resource Data*



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performance planning and development. Coaching and mentoring are not readily provided, thus staff are unable to see their place in the organizational structure. This results in mediocrity, average performance, poor service delivery, and dissatisfied customers.

The Strategic Performance Management System (SPMS) is the most recent effort at performance evaluation and appraisal with CSC Memorandum Circular number 6, series of 2012 spelling out the details for its establishment and implementation in the different agencies in government. Like all new systems, this one resulted from the continuing need to improve and to address limitations of previous systems. Deliberate care has been, of course, undertaken to retain the useful attributes of the systems that preceded it.

What sets this system apart from the others? Let us begin with looking at the major shifts in perspective, focus, indicators, performance alignment, and the role of the supervisor in this system.

The SPMS adjusts perspectives through performance management instead of performance evaluation. While the latter was individual-centered providing undefined link to the organizational performance, performance management on the other hand ensures that goals are consistently being met with the collective performance of the organization, branch, division, employee or even the processes involved in the provision of its mandated service. In terms of focus, the old systems accounted for the number of inputs and activities whereas the new one utilizes the perspective of strategic planning, which is to identify Key Performance Indicators at the output – outcome level of results. In terms of performance alignment, the current system aligns individual performance with organizational performance which furthers teamwork and collaboration as opposed to focusing on individual performance and competition. The supervisor's role shifts from being evaluator to coach and mentor.

The core of this system lies in performance management, a process by which organizations align their resources,

systems, and employees with strategic programs and priorities and ensure that the agency's major final output (MFO) is attained. This results in finding out what outputs and outcomes are being met well, and making timely interventions and adjustments in cases wherein lapses are noted.

With the understanding and appreciation of these basic concepts, NAMRIA set forth on embracing the SPMS as a way to manage performance. The first step entailed the participation of the agency's executives and middle-level managers in a two-day orientation-workshop on the implementation of the new system at One Tagaytay Place Hotel Suites in Tagaytay City in February 2012, and the identification of the key players and their roles in the system.

The Performance Management Team (PMT) spearheads the implementation of the SPMS, with Deputy Administrator Jose C. Cabanayan Jr. as chairperson. Among the key responsibilities of the PMT are to conduct consultation meetings with the agency unit heads to discuss the office performance commitment and rating system and tools, and to act as the appeals body and arbiter arising from the implementation of the SPMS. The PMT is composed of the officials from the Policy and Planning Division, Financial and Management Division, Human Resource Management/Development Sections, and a representative from the Organization of NAMRIA Employees (ONE).

In the years 2012-2013, the PMT and NAMRIA were busy conducting workshops to discuss the mechanisms to implement the SPMS, and preparing the NAMRIA SPMS Guidelines to ensure that the agency performance goals and measurements are aligned with national development plans, agency mandate, vision, mission, strategic priorities, outputs, and outcomes. After two years of careful study and preparation, NAMRIA will be implementing the SPMS next year. It is quite timely that the agency has undertaken strategic planning and has identified its strategic initiatives. The SPMS concretizes the linkage of individual performance with organizational performance and further to strategic initiatives as spelled out in the NAMRIA Strategic Plan.

The revision of the existing performance evaluation system into what is now the SPMS is a necessary step for NAMRIA to be truly compliant to the rewards and incentives attached to performance. The key word is alignment—NAMRIA has to be connected and integrated to be able to transform the culture of performance management with a true sense of purpose, responsibility, and accountability required of public servants. The transition from the old to the new system is finally taking place and the mixed feelings of anxiety, confusion, excitement, and anticipation are expected. The transition may not be easy but NAMRIA will cope as always. •



Review of the SPMS with CSC Dir. Victoria F. Esber during the orientation workshop held in Tagaytay City on 05 February 2013



## Three Significant Projects for Building a Geospatially-Empowered Country

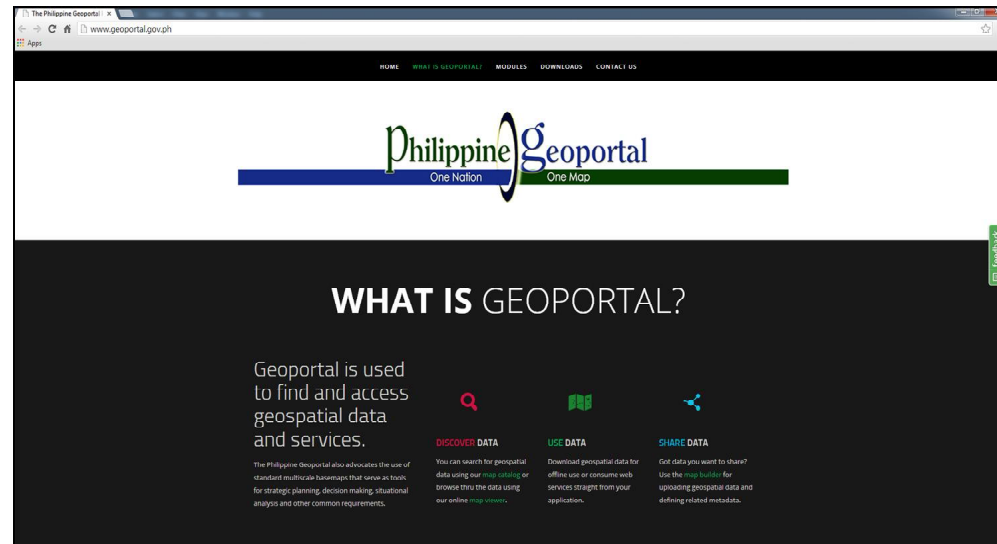
by Benjamin P. Balais<sup>1</sup> and Angelo T. Arboleda<sup>2</sup>

In this day and age of advanced technologies like GIS and the Internet, coupled with the individual capacity to develop customized web-based applications, practically anyone or anybody who possesses this set of skills can develop an application that can be used by everyone online.

With issues on global warming, climate change, and disaster risk management and mitigation looming largely in our everyday lives, more and more groups and individuals both from the public and the private sector are developing web-based applications focused on the abovementioned discipline.

But this is not as easy as it seems. There are questions on data accuracy and availability that need to be resolved and developers need to have expertise on a very specific topic or field of science like mathematical modeling and mapping of various hazards in order to develop a credible and sound application.

Backed by its mandate and true to its strategic objective of helping build a geospatially-empowered nation by the year 2020, NAMRIA has embarked on the development of the Philippine Geoportal Project (PGP), with the more engaging tagline *One Nation One Map*. This is a GIS-based web application that combines multiple services into one system, with users provided access on a 24/7 basis to NAMRIA basemaps and the geospatial datasets of other agencies. Initiatives like the Unified Mapping Project, even the Philippine Active Geodetic Network (PageNET) that provides real-time Global Navigation Satellite System (GNSS) data, are supporting the PGP by ensuring that the most current basemaps and accurate real-time sub-meter positional information will be available in the Philippine Geoportal.



Screenshot of Philippine Geoportal website



Presentation of workshop outputs during the second PGP roundtable discussion held in DENR central office in November 2013

The Department of Science and Technology (DOST) and the National Economic and Development Authority (NEDA), in collaboration with other institutions including the academe, have also embarked on projects that place the country one step further into being geospatially empowered. These

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<sup>2</sup>Information Technology Officer II, Geospatial System Development Division, GISMB and holds a Master's degree in Information Technology from The University of Sydney, Australia



Key NAMRIA officials led by Administrator Tiangco (seated sixth from left) with the chief hydrographers from the EAHC member states

cerns/activities: Environment Marine Information Overlay Working Group (E-MIO WG) which include the E-MIO WG member formation and workplan, outcome of the IHO Inter-Regional Coordination Committee 5, status of Tsunami Warning System, issues and concerns on the SCS and East Asia ENC's, updates on harmonization of ENC's, status of paper charting and updating, responsibilities of MSs as regards charting, and status of hydrography (equipment/technology used, survey standards adopted, and future plans). The tentative schedule of the second CHC Meeting back to back with the next Steering Committee Meeting was set to be held in Malaysia in early 2014.

In a related development, HB Assistant Director Jacinto M. Cablayan attended the first Technology Research and Development Commission (TRDC) Board of Directors Meeting (BOD). This was held in Busan, Republic of Korea (ROK) on 04-05 September 2013 as part of the EAHC MSs 2013 regional capacity building activities/trainings. The meeting primarily aimed to (1) establish a capacity-building infrastructure and training in the development of hydrography and cartography for enhanced safety of navigation and for the protection of the marine environment; (2) create a framework for training in the region in order to nurture the next generation of hydrographers and cartographers; and (3) foster cooperation among EAHC MSs.

Likewise, Cdr. Herbert L. Catapang, HB Nautical Charting Division Chief, participated in the S-100 Seminar held on

09-13 September 2013 and the Stakeholders Forum held on 11 September 2013 in Busan, ROK. The S-100 Seminar aimed to provide the EAHC MSs with a clear understanding of S-100 and have good preparation as regards the use of the standard which is expected to be implemented in the next five years. The conduct of the S-100 Seminar was part of the approved capacity-building program for the EAHC of the IHO Capacity-Building Committee for 2013. The ROK through the Korea Hydrographic and Oceanographic Administration (KHOA) hosted the seminar.

The S-100 or the IHO Universal Hydrographic Data Model has been developed to provide a contemporary hydrographic geospatial data standard that can support a wide variety of hydrographic related digital data sources for easier integration of hydrographic data and applications into geospatial solutions. The data model is compliant with ISO 19100 series of geographic standards and it will replace S-57 IHO standard for the exchange of digital hydrographic data, especially for encoding ENC's for use in ECDIS. The forum, on the other hand, served to increase the Asian countries' understanding and awareness of the S-100 standard which will enable the development of new applications that go beyond the scope of traditional hydrography. It also provided an overview of marine geospatial information based on S-100 standard related to e-Navigation strategies. •



## NEWS

## EAHC MSs chief hydrographers convene to promote maritime safety

by Elinor C. Delos Reyes



Administrator Tiangco delivers his opening remarks



Meeting of chief hydrographers from the EAHC member states

Amid existing maritime boundary issues in the East Asia region, chief hydrographers from the East Asia Hydrographic Commission (EAHC) member states (MSs) convened for the first EAHC Charting and Hydrography Committee (CHC) meeting for the common goal of promoting navigational safety and protecting the marine environment in the region. NAMRIA hosted the three-day meeting which was held at the Alona Kew White Beach Resort in Panglao Island, Bohol on 26-28 June 2013.

The Philippines through the Hydrography Branch (HB) of NAMRIA represents the country in the International Hydrographic Organization (IHO) and currently chairs the EAHC, the regional commission of the IHO that takes the lead in promoting the work and activities of the IHO in the East Asia region. The EAHC is a regional hydrographic commission within the framework of the International Hydrographic Organization (IHO). Specifically, the EAHC CHC meeting aimed to (1) strengthen hydrography and nautical charting capabilities of EAHC MSs; (2) enhance production and harmonization of Electronic Navigational Charts (ENCs) through regional capacity-building activities/trainings; and (3) further increase cooperation among the EAHC MSs. The delegates to the meeting were the EAHC MSs composed of China, Indonesia, Japan, Malaysia, Philippines, Republic of Korea, Singapore, and Thailand. Some key NAMRIA officials also attended the meeting.

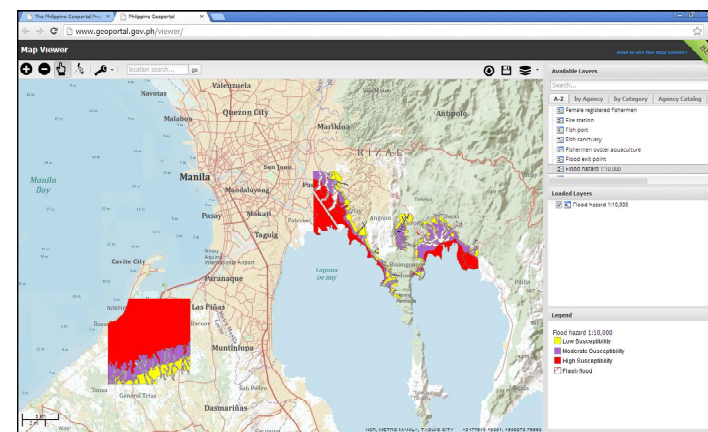
NAMRIA Administrator Peter N. Tiangco highlighted in his message during the opening ceremony the importance of the meeting which he said will provide the EAHC MSs

with an excellent opportunity to exchange knowledge and expertise, explore possible areas for collaboration and cooperation to strengthen charting and hydrographic capabilities, and enhance safety of navigation in the region. He likewise encouraged the MSs to closely collaborate their activities to adopt actions on various maritime problems and environmental issues for their common benefit.

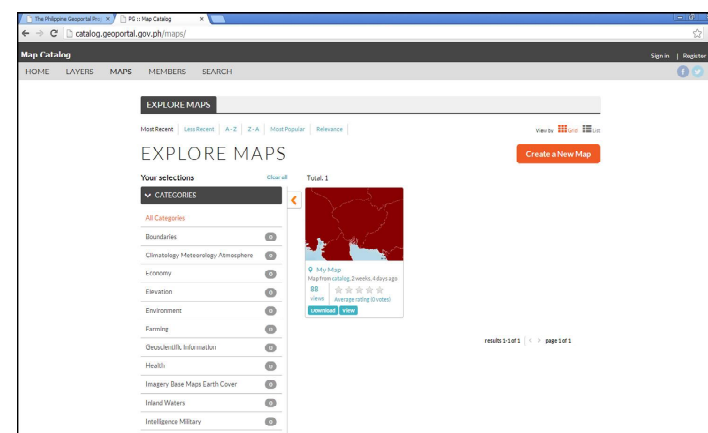
On behalf of Bohol Provincial Governor Edgar M. Chatto, Bohol Provincial Administrator Alfonso R. Damalerio II welcomed all the delegates of the EAHC MSs. He expressed his great pleasure and sincerest gratitude for the choice of the island of Panglao in the province as the meeting venue and hoped the EAHC MSs delegates would work as a team for the success of the meeting, sharing commitments and action plans which will uphold the welfare of the people and forge development, partnership, and unity in the East Asia region.

The current EAHC Chair, HB Director Commodore Romeo I. Ho, spoke of his expectations that the newly elected Chair and Vice-Chair of the CHC will take the lead to further advance and enhance the hydrography and charting capabilities of the EAHC MSs and sustain regional capacity buildup plans and application of the most recent technologies in hydrography and charting.

During the meeting, there were discussions on the CHC terms of reference, possible collaborative projects within the EAHC, and the proposed concept study of tides and sea level in the South China Sea (SCS). There was also reporting by EAHC MSs on the following major topics and regional con-



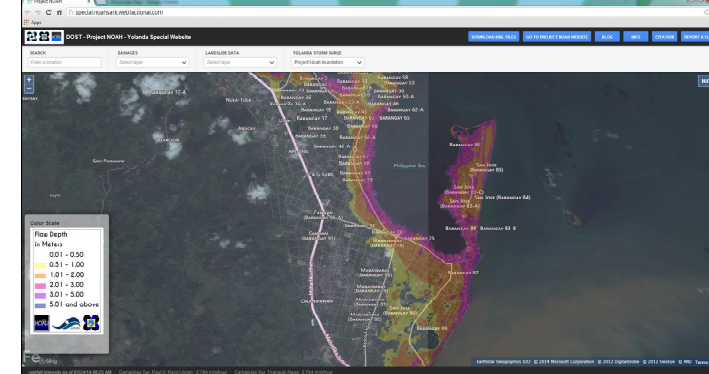
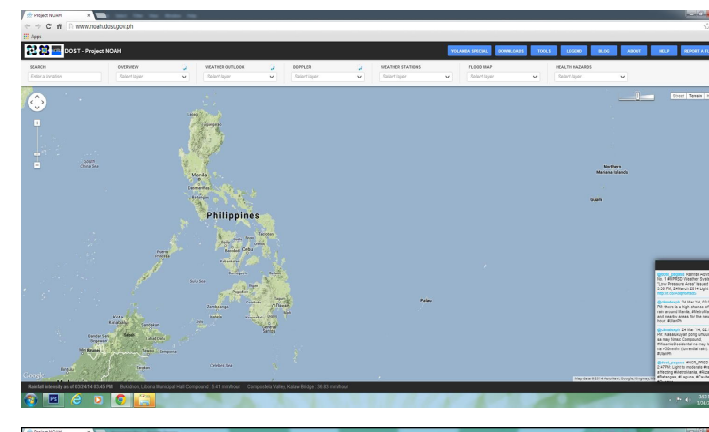
Map Viewer module of the Philippine Geoportal



Map Catalog module of the Philippine Geoportal

projects are the Project Nationwide Operational Assessment of Hazards (NOAH) and the Regional Geographic Information Network (RGIN)-Climate Change and Risk Reduction Information Support System Project (CRISP)/NEDA Climate Change Adaptation (CCA) for Local Development Planning. This article attempts to examine the two initiatives and how they relate to the PGP.

**Project NOAH** harnesses technologies and management services for disaster risk reduction activities offered by the DOST through the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA); the Philippine Institute of Volcanology and Seismology (PHIVOLCS); and the DOST-Advanced Science and Technology Institute (ASTI), in partnership with the University of the Philippines (UP) National Institute of Geological Sciences and the UP College of Engineering. The project has a number of components that include the following: setting up of devices and the use of existing network and facilities that generate, monitor, and assess geohazard data; development of hazard maps and disaster risk exposure assessment; and the development of information systems primarily for the use of scientists that could analyze and further process the system-generated data.



Screenshots of Project NOAH website

The **RGIN-CRISP/NEDA CCA for Local Development Planning** aims to use GIS and the Internet for enabling LGUs to make use of geospatial information and mainstream these into the planning process. The project proposes the use of existing data standards and aims to formulate policies for undertaking inter-agency GIS project development and data sharing. Another objective of the project is to develop the CRISP for Planning.

A closer look at the three projects shows that they are similar in terms of making full use of the Internet and GIS technology in delivering geospatial information to their target users mainly for the purpose of climate change adaptation and disaster risk reduction and management, which are both currently pressing issues.

NAMRIA being the central mapping agency should play a significant role in the development of projects and programs that intend to use geospatial information more so its basemaps. The Internet brought public awareness to the importance of spatial information through Google and other Internet-based map services. Slowly but surely the country is becoming spatially enabled. While spatial empowerment of the nation is not NAMRIA's sole responsibility, its mandate suggests that it should take the lead role given its resources. NAMRIA should take the opportunity to lead the country towards the geospatial empowerment the agency envisions. •



## The Marine Spatial Data Infrastructure

by Ltjg. Lorena Jasmin D. Lerio\*

The Philippines being an archipelagic country has more than 7,100 coasts, more than two million square kilometers of seas (NAMRIA, 2013), and an overwhelming marine biodiversity. Exposed to threats caused by her geographical location, the global climate change, and negligent use, these resources are vulnerable to natural and manmade disasters and thus need proper management.

The work of managing these resources is divided among various government agencies and other sectors throughout the country, with fields that include fishery, commerce, defense, recreation, tourism, education, and energy, among others. Each sector demands sea space for its respective marine activities and individual monetary funds for policies. Unfortunately, this single-sector approach of management results in overlapping, redundant, at times conflicting (Ehler and Douvère, 2009), and most especially costly systems.

In response, coastal countries similar to the Philippines adopt a marine spatial planning (MSP) for their coasts and seas. Ehler and Douvère explained that through MSP, the current and anticipated spatial and temporal distribution of human activities are analyzed and properly allocated in sea space for long-term economic, social, and ecologic sustainability. Not replacing single-sector management, MSP guides single-sector decision makers to have objectives that are consistent, integrated, and ecology-based. It allows each sector to present solutions to objectives individually but through and in line with participatory policies and frameworks.

To realize the full benefits of MSP, however, each sector must be able to share its respective spatial data across a common technology. This avoids conflicts and redundancy, and ensures that data which are not yet collected are identified. Hence, a Spatial Data Infrastructure (SDI) that supports marine information must be implemented to provide a common platform across stakeholders for discovery, sharing, access, evaluation, and application of marine spatial data.

### MSDI: the Marine Dimension of SDI

The SDI is already of common interest among countries and is thus fully documented in print and online, but mostly from a land-based perspective. Nonetheless, the high economic and social value of coastal and marine activities and the threats they may entail are attracting governments to establish a Marine Spatial Data Infrastructure (MSDI) independently or as an extension of existing SDIs.

The MSDI is a relevant base collection of technologies, policies, and institutional arrangements that facilitate the availability of and access to marine spatial data. A dimension of the SDI, the MSDI inherits the four components of the SDI — policies, organizations, standards, and content. As a marine component, it involves wider and more complicated themes which include but are not limited to the horizontal and vertical datum, maritime baseline, marine boundaries, bathymetric elevation, seabed character and infrastructure, oceanography, and climate information (Cooper, Pepper, and Osborne, 2010).

### NAMRIA as Key Player in MSDI Implementation

NAMRIA, through the Hydrography Branch, serves as the national hydrographic office and thus represents the Philippines in the International Hydrographic Organization (IHO). The IHO is an intergovernmental consultative and technical body that sets forth hydrographic standards in support of safety in navigation and marine environment protection. Moreover, it recognizes MSDI as a natural extension in the management and dissemination of hydrographic and oceanographic information and thus acknowledges national hydrographic offices as key players in MSDI development.

Accordingly, in 2011, the IHO released publication C-17 entitled *Spatial Data Infrastructures: “The Marine Dimension” — Guidance for Hydrographic Offices*. It is a procedural guide establishing specifically the role of hydrographic offices as key players in MSDI initiatives. The guide discusses MSDI in the simplest sense and provides the vital references for MSDI implementation.

The guide also identifies other uses of hydrographic and oceanographic data beyond safety of navigation which are as follows: Habitat mapping and heritage assessment; Conservation assessment and designation; Site selection (e.g., renewable energy and oil and gas extraction); Route optimization; Vessel location and disposal monitoring; Homeland security and defense; Aggregates extraction; Fisheries regulation; Coastal protection and shoreline management; Licensing and consent evaluation; Emergency planning and management; and Survey planning and execution.

Thus, by being involved, NAMRIA will have greater appreciation of the conduct of hydrographic and oceanographic activities since the SDI can provide solutions and applications

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\*Presently assigned in BRP HYDROGRAPHER PRESBITERO, Survey Support Division, NAMRIA Hydrography Branch and is a candidate for Master's degree in Environment and Natural Resource Management, Open University, University of the Philippines



Unity fun run



Exhibit

tion, valuation and real estate management, climate change and disaster risk reduction, environmental management, institutional development and capacity building, education and mutual recognition, spatially enabled society, geovisualization, geospatial intelligence, and geodetic research and development. The exhibit, which brought together top players in the geomatics industry, showcased the latest advances in surveying and mapping technologies.

The congress also included a forum for young surveyors on the theme “Building a Sustainable Future: Engaging Young Surveyors in Geospatial Cooperation” and a roundtable discussion (RTD) on Strengthening Disaster Risk Reduction and Management in the ASEAN Region. The forum had activity presentations for the young professionals and open discussion with members of AFLAG, FIG, and SEA surveying professional organizations. The panellists for the RTD were Philippine Institute of Volcanology and Seismology Director Dr. Renato U. Solidum Jr. and AFLAG Vice President and PhilGECS Executive Vice President Engr. Randolph S. Vicente.



49<sup>th</sup> AFLAG Council Meeting



Plenary session

The SEASC is the banner event of AFLAG, an ASEAN-accredited civil society organization representing the surveyors and geodetic engineers in Southeast Asia. The event started in 1979 with Singapore as host country. The popularity of the congress through the years had seen the event being organized quadrennially to biennially since 2005. Indonesia (1983 and 2009), Hong Kong (1987 and 2003), Malaysia (1991 and 2011), Australia (1999), Brunei Darussalam (2005), and New Zealand (2007) have already hosted the SEASC.

The SEASC debuted in the Philippines this year along with the holding of the 49<sup>th</sup> AFLAG Council Meeting at the Sofitel Philippine Plaza on 17 June 2013, the 8<sup>th</sup> AFLAG Biennial General Assembly on 19 June 2013 at PICC, and the 50<sup>th</sup> AFLAG Council Meeting on 20 June 2013 at PICC. The 12<sup>th</sup> SEASC kicked off with a unity fun run at the Cultural Center of the Philippines Complex on 16 June 2013.

The next SEASC will be held at Marina Bay Sands in Singapore on 28-31 July 2015 with the theme “Expanding the Geospatial Future.”•



## NEWS

## NAMRIA spearheads landmark confab

by Xenia R. Andres



Administrator Tiangco welcomes the conference delegates and participants

The Philippines, through NAMRIA, hosted the 12<sup>th</sup> South East Asian Survey Congress at the Philippine International Convention Center (PICC) on 18-20 June 2013. The event, which was the first ever to be held in the Philippines, had the theme “Geospatial Cooperation towards a Sustainable Future.” It was organized for the Association of South East Asian Nations (ASEAN) Federation of Land Surveying and Geomatics (AFLAG) by NAMRIA in cooperation with the Philippine Geodetic Engineering and Geomatics Society (PhilGEGS), a professional and technical association composed of geodetic engineering and geomatics practitioners in the Philippines.

NAMRIA Administrator Dr. Peter N. Tiangco chaired the 12<sup>th</sup> SEASC Steering Committee with PhilGEGS President Engr. Avelino L. San Buenaventura as co-chairperson. The 12<sup>th</sup> SEASC Organizing Committee was chaired and co-chaired by Engr. Raymund Arnold S. Alberto of PhilGEGS and Director John Santiago F. Fabic of NAMRIA Geospatial Information System Management Branch, respectively.

Hundreds of delegates from the ASEAN region and worldwide participated in the conference which aimed to provide updates on the surveying, mapping, and geomatics industries through plenary lectures, technical sessions, forums, and exhibits. The gathering of the surveying and mapping professionals also served as a venue for the declaration of unity and solidarity to strengthen cooperation between and among AFLAG member states and the international community.

Featured keynote speakers during the plenary sessions were Administrator Tiangco, Philippine Department of Environment and Natural Resources Undersecretary for Policy and Planning Manuel D. Gerochi, AFLAG President Dr. Wicha Jiwalai, International Federation of Surveyors (FIG) President Teo Chee Hai, World Bank Senior Land Policy Specialist for the East Asia Pacific Region Dr. Keith Clifford Bell, FIG Commission 5: Positioning and Measurement Chair Mr. Mikael Lilje, International Association of Geodesy President Prof. Chris Rizos, Asian Development Bank Space Technology Specialist Mr. Yusuke Muraki, Philippine Department of National Defense Office of Civil Defense Deputy Administrator Romeo F. Fajardo, and Earth Observatory of Singapore Technical Director Dr. Paramesh Banerjee.

The industry-focused plenary session speakers were Mr. John Whitehead of Trimble, Mr. Justin Kinser of Intermap Technologies, Mr. Matthew Smith of Leica Geosystems, Mr. Frank Bignone of Astrium, Mr. Brent Jones of Environmental Systems Research Institute, Mr. Zhixiong Bao of Hi-Target Surveying Instrument Company Ltd., and Mr. Kian Kang of Digital Globe. Coordinates, Geospatial Media and Communications, *Manila Bulletin*, and UNTV also took part in the event as media partners.

The breakout sessions focused on land administration and resource management, local governance, coastal and marine resource management, construction and transportation management, geospatial information management and cooperation.

## Towards a Modern National Geodetic System: Migrating to a Geocentric Datum<sup>1</sup>

by Charisma Victoria D. Cayapan<sup>2</sup>

The United Nations through the Global Geospatial Information Management (UN-GGIM) initiative has identified the need for a global geodetic reference frame that will form the foundation of all geospatial information. Likewise, the UN-GGIM has called on the active participation of member states, particularly for national mapping agencies, for the establishment of a sound national geodetic infrastructure that will contribute towards the definition of the said global system.

NAMRIA, as the agency mandated to develop the national geodetic network, has embarked on the roadmap towards modernizing the national geodetic system. Said initiative includes the migration to a geocentric datum, development of the local geoid model, and the unification of the national vertical control network. The modernization is a vital component in the agency's thrust to help create a geospatially-empowered Philippines by 2020.

### Drivers

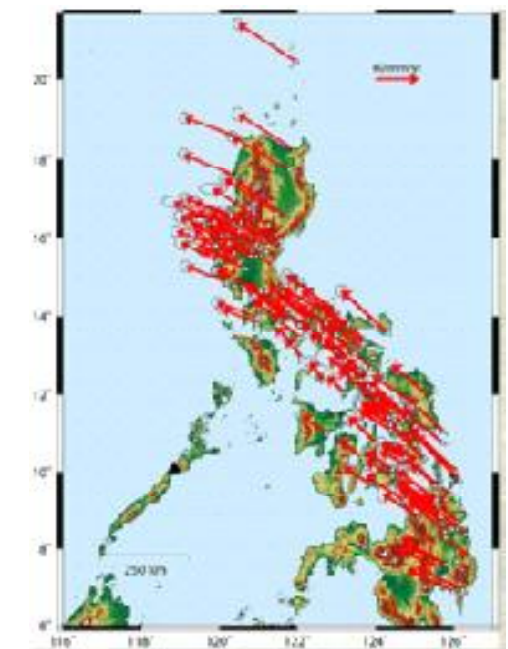
For the Philippines and other countries located along a tectonically active region, it is highly imperative that the geodetic reference system being used in all surveying and mapping activities be dynamic enough to reflect the deformations on the ground. These distortions can be in the form of gradual crustal drift or through instantaneous ground shaking as in earthquakes. Based on studies conducted by the Philippine Institute of Volcanology and Seismology-Department of Science and Technology (PHIVOLCS-DOST) on ground deformation, it was found that the behavior of the distortion along the Philippine Fault Zone varies. The starting point of a maximum of 97 millimetres per year in Batanes decreases to 44 millimetres per year in Bohol, then increases again going to Mindanao (67 millimetres per year in Southern Mindanao).

Meanwhile, the past decades have seen advances in space geodesy that make possible timely and precise positioning. Nowadays, a multitude of space geodetic techniques such as very long baseline interferometry (VLBI), satellite laser ranging (SLR), global navigation satellite systems (GNSS), and doppler orbitography and radiopositioning by satellite (DORIS), provide independent and, at the same time, complementary systems vital for Earth observation and monitoring.

GNSS, in particular, has become ubiquitous in almost all sectors of society. Developed primarily for military users, the civilian applications of GNSS have grown significantly, from surveying to location-based services. In the case of geodetic reference frame definition, GNSS is a reliable and cost-effective tool for three-dimensional positioning with its all-weather, anywhere capability. GNSS has replaced conventional surveying methods that depend on line-of-sight between two stations in order to determine its coordinates. With the improvements in geoid modelling, GNSS heightings also provide a viable alternative to elevation measurements by factoring in the geoid-spheroid separation.

In order to fully maximize the benefits of GNSS for positioning, connection to a geocentric reference system is necessary in order to make position measurements compatible with the reference system being used by GNSS. This is one of the primary reasons why an increasing number of countries are migrating to or adopting an earth-centered, earth-fixed geodetic reference system.

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Philippine velocity field based on campaign surveys carried out by PHIVOLCS from 1996 to 2011

<sup>1</sup>With excerpts from *Strategy for the Development of the National Geodetic System in the Philippines*, Gatchalian, R.C. and C. V. D. Cayapan. 12<sup>th</sup> South East Asia Survey Congress. Manila, Philippines, 18-20 June 2013

<sup>2</sup>Engineer III, Photogrammetry Division, NAMRIA Mapping and Geodesy Branch and holds a Master's degree in Navigation and Related Applications (cum laude) from Politecnico di Torino in Turin, Italy





## NAMRIA and Excellence: The Quest for ISO 9001:2008 Certification

by Maria Romina D. Pe Benito



NAMRIA and DAP officials during the MOA signing in NAMRIA in July 2011

### The Set Course

NAMRIA has more than 25 years of public service in mapmaking and geospatial information dissemination. Rising from the difficulties and challenges of its early years, the agency has since then and with the guidance and inspiration of its leaders, nurtured the awareness to always strive to effectively and fully perform its mandate. It was inevitable that NAMRIA's quest for excellence in its products and services would lead to the goal of seeking and maintaining certification to specifications of the International Organization for Standardization (ISO), "the world's largest developer of voluntary International Standards" (<http://www.iso.org/iso/home/about.htm>).

In January 2011, NAMRIA Administrator Peter N. Tiangco gave the go signal for the agency to start working towards ISO certification. This was in pursuance to Executive Order No. 605, series of 2007, "Institutionalizing the Structure, Mechanisms and Standards to Implement the Government Quality Management Program, Amending for the Purpose Administrative Order No. 161, s. 2006." In February 2011, the Administrator constituted a committee, the NAMRIA ISO Quality Management System (QMS) Committee, to jumpstart the agency's efforts to obtain ISO certification. This initial working group was chaired by NAMRIA Deputy Administrator Efren P. Carandang with members from the NAMRIA branches and staff divisions.

The agency eventually made it its goal to seek agency-wide certification to ISO 9001:2008 for its core process of mapping and geospatial information management. On 29

July 2011, the agency formalized its intention for this goal through its sealing of a Memorandum of Agreement with the Development Academy of the Philippines (DAP). The DAP's foremost role was to assist NAMRIA in establishing and implementing a QMS that is certifiable to ISO 9001:2008. The NAMRIA ISO QMS Committee became the NAMRIA ISO Core Team with Deputy Administrator Carandang as Quality Management Representative (QMR) and Geospatial Information System Management Branch Director John Santiago F. Fabic as Deputy QMR. The Core Team is made up of the Planning, Document and Records Control, Training and Education, Workplace Organization, and Internal Quality Audit committees.



One of the DAP learning sessions

### NEWS

## NAMRIA participates in RIMES project

by Norelius G. Baloran\*

A total of 13 technical personnel from the Hydrography Branch and the Resource Data Analysis Branch of NAMRIA participated in the Regional Integrated Multihazard Early Warning Systems (RIMES) field training for Asia and Africa on low-cost near-shore survey methodologies for generating tsunami hazard and risk assessment data in the Philippines. The training, which was part of the project entitled "Enhancing Coastal Hazard Early Warning and Response: Tools and Institutional Strengthening," was held at the pilot site in Barrio Barretto, Olongapo City on 18 January-01 February 2013. Other training participants came from the Philippine Institute of Volcanology and Seismology (PHIVOLCS), the Olongapo City Disaster Risk Reduction and Management Office, and Barrio Barretto Public Safety Office.

The crucial requirements for a detailed tsunami inundation modeling are good quality near-shore bathymetric, topographic, and exposure datasets. For most countries in the Indian Ocean and Southeast Asian region, however, there are not enough good quality datasets and resources to conduct surveys especially in high-risk coastal areas. The RIMES member states and collaborating countries agreed to address the gaps in tsunami-risk assessment through capacity building in tsunami inundation modeling and risk evaluation as well as in generating the required high-resolution datasets. The tsunami risk assessment capacity developed within the RIMES Program Unit and the tools that it developed and tested, which included a low-cost methodology for near-shore bathymetric, topographic, and exposure surveys, were taken into consideration.

Forming part of the capacity-building program was the development of a computer-based tsunami propagation and inundation risk assessment tool, named INSPIRE (Internet-based Simulation Platform for Inundation and Risk Evaluation), integrated into the evacuation modeling tool ESCAPE (Evaluation System for Computing Accessibility and Planning Evacuation). INSPIRE calculates the tsunami travel time, amplitude, and current velocity, and the probabilities of human death and building damage while ESCAPE calculates and maps the fastest evacuation route, taking into consideration decelerating factors such as land use and water dynamics.



The pilot site: Barrio Barretto, Olongapo City

The development aimed to integrate various sources of good quality near-shore datasets and to conduct low-cost near-shore survey in areas where data are not available. Near-shore data are composed of bathymetric and topographic data. Bathymetric data are generated by integrating existing bathymetric data from various sources such as sounding data from hydrographic surveys, large-scale nautical charts, General Bathymetric Chart of the Oceans datasets, and low-cost bathymetric survey. The bathymetric survey is conducted using commercial fishfinder sonar along an optimized survey route design with a depth of 30 to 50 meters. Increasing survey density in areas with local variation improves the accuracy of the dataset. The topographic digital elevation model (DEM) is generated by integrating topographic data

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\*Oceanographer II, Oceanographic Surveys Section, Physical Oceanography Division, NAMRIA Hydrography Branch and holds a Master's degree in Management, Major in Public Administration from the Philippine Christian University in Taft Avenue, Manila



## NEWS

## NAMRIA and the Strategic Maritime Territorial Information System Project

by Dennis B. Bringas\*

Maritime nations have been in a race to advance their territorial and economic interests since the United Nations Convention on the Law of the Sea (UNCLOS) took effect on 16 November 1994. The same case is especially true with the Philippines which has maritime boundary issues with China, Indonesia, Japan, Malaysia, Palau, Taiwan, and Vietnam. Technical, scientific, and legal information on the country's maritime territories have become critical inputs in crafting diplomatic, political, and legal strategies and building up claims before international bodies. NAMRIA is always being called upon to provide such critical inputs given its expertise and vast data holdings.

The Strategic Maritime Territorial Information System Project will provide a system to collect, organize, and secure from unauthorized access all maritime territorial data holdings from the agency's different branches as well as other institutions.

NAMRIA, through the Extended Continental Shelf (ECS) Center, is implementing the GIS-based application system project, which will strategically support the NAMRIA management and the national government on policy formulations and the decision-making process with regard to maritime boundary issues. The ECS Center was established in 2007 to spearhead the Philippine claim to an ECS under the UNCLOS.

The specific project objectives are the following: (1) To provide the necessary tools for helping facilitate efforts whenever NAMRIA is requested to comment or present positions on maritime boundary issues; (2) To define, visualize, and realize legally defined maritime boundaries and the rights, restrictions, and responsibilities under the UNCLOS, as well as national laws and local legislations/regulations in its spatial dimension; and (3) To create a GIS-based application system and a secure and scalable database which features a more efficient and strategic approach to the decision-making process. The project will cover data within the maritime regimes over which the country has sovereignty and territorial jurisdiction. The expected outputs consist of a specialized and customized GIS-based application and a maritime, scientific, technical, and legal database.

The project will develop an application system that integrates, into a digital database, data on the country's maritime domains which include but are not limited to



*Demonstration of the system with the author (at left) and Mr. Angelo T. Arboleda of GISMB*

international maritime boundaries, national and local maritime zones and jurisdictions, and relevant marine geospatial intelligence information. The relevant data from the successful claim of an ECS in the Benham Rise Region on 12 April 2012 will also be part of this database. The system will feature a secure and scalable database of all the data which, considering their sensitive nature, will be accessible only to authorized NAMRIA users.

To date, the Geospatial Systems Development Division (GSDD) has already started evaluating appropriate technology stack that will be used to build the system. There will be two core components to the system: the digital document management and the geospatial data management. Instead of building the whole system from the ground up, an open source document management system will be implemented in a form of a virtual machine. The geospatial data management component meanwhile will be developed using an already existing software stack that was used to implement the Philippine Geoportal System. There is ongoing gathering of digital files of documents or information on maritime issues particularly the documents in the Benham Rise Region submission. The gathered files are to be formatted in an optical character recognition file. There is already an office to house the system and all the required computer equipment have already been procured. Document management is fully operational while the geospatial data management component is undergoing customization until the end of 2013. •

\*Geophysicist IV, NAMRIA ECS Center and holds a Master's degree in Marine Management from Dalhousie University in Nova Scotia, Canada

### Traversing the Path for the Goal

NAMRIA embarked, with the assistance of the DAP, on a 12-month undertaking to develop its QMS. The major activities involved for the undertaking are enumerated and briefly described as follows: an overview of the project and brief orientation on the importance and principles of ISO 9001:2008 for top management and key officers; orientation of NAMRIA employees on ISO 9001:2008 to develop their awareness and understanding on the concepts and principles of QMS; a walkthrough for the DAP project team of the present quality practices of NAMRIA to determine the agency's specific needs with regard to ensuring consistent quality in the delivery of services; training to develop in the ISO core team an in-depth understanding of ISO 9001:2008 requirements and documentation; technical assistance to the ISO core team in drafting the agency's Quality Policy, Quality Objectives, Higher-Level Process Model, which also became part of the agency's Quality Manual, and the agency's Quality Core Procedures, Quality Procedures, and Standard Operating Instructions; Seminar Workshop on Basic Productivity and Quality Improvement Approaches; and training on Internal Quality Audit (IQA) to enable participants to understand, interpret, and audit ISO-QMS requirements, as well as address audit findings.

In preparation for the planned ISO certification and in compliance with the National Archives of the Philippines (NAP) Act of 2007, the agency embarked on several activities to improve its records management through the creation of the NAMRIA Archival Committee and the Records Management Improvement Committee. For this purpose, an executive briefing on the NAMRIA Archives and Records Management was conducted in July 2011 with the assistance of representatives from the NAP. Another initiative was the conduct of orientation seminars on the Practice of Good Housekeeping in the Workplace. Subsequently, the NAMRIA 5S Committee was created.

NAMRIA's Quality Manual, Quality Core Procedures, Quality Procedures, and Standard Operating Instructions were completed and signed for approval in December 2011. The agency's Quality Management System and documents were presented to the officials and employees through a series of orientation activities held in November and December 2011 and February 2012. The DAP conducted office-to-office checking of the implementation in the agency of the QMS and documents in January 2012. The first NAMRIA management review meeting was held in April 2012 for the post-first quarter evaluation of the effectiveness of the QMS and the agency's performance against the set objectives. For the Final Gap Assessment, the DAP project team conducted in NAMRIA in April and May 2012 an assessment of the agency's established QMS. In June 2012, the DAP project



*DAP consultants with NAMRIA Deputy QMR Fabic*

team met with the NAMRIA ISO core team and other NAMRIA officials and staff to discuss the gaps and their recommended necessary actions, and also gave pointers to help prepare the agency.

NAMRIA underwent and passed the two third-party audit stages conducted by the Certification International Philippines (CIP), Inc., with stage one held in July 2012 and stage two held in September 2012. The agency successfully achieved certification to ISO 9001:2008 or QMS standards officially on 02 October 2012. With its ISO certification, NAMRIA accomplished a crucial step towards further ensuring the high quality of its products and services.

### Carrying On

The dream of ISO certification that seemed so difficult had been realized but the work continues for the agency. According to the CIP, NAMRIA's ISO 9001:2008 Certificate of Registration, with the core process of "mapping and geospatial information management" as scope, "is valid for three years until 01 October 2015, subject to satisfactory results of semi-annual surveillance audits". Furthermore the extension of NAMRIA's Certificate after the three-year period will be based on the agency's "effective conformity to the requirements of ISO 9001:2008, as determined by a reassessment" of its "Quality Management System in its entirety".

Achieving ISO certification is one thing, maintaining it is another. In 2013, NAMRIA underwent and passed its first and second surveillance audits respectively held in July and in November. Henceforth, NAMRIA's leaders and followers are expected to deliver the same strong commitment that realized the agency's initial ISO quest, this time for the goal of continued ISO certification. Even later there could be a higher goal like the Philippine Quality Award. It would all depend on the agency's people. •



## Updates for NAMRIA's Two Catamaran-type Survey Vessels

by Cdr. Sheilon T. Cadaoas<sup>1</sup>, Ltjg. Romel M. Correa<sup>2</sup>, P/Ensign Kurt Louis A. Montemor<sup>3</sup>

NAMRIA, through the Hydrography Branch, is expanding its hydrographic survey capabilities with the acquisition of two 23-meter<sup>4</sup> catamaran-type survey vessels. The vessels will collect hydrographic and oceanographic data within Philippine waters (e.g., archipelagic waters, territorial seas, ports and harbors) with depths ranging from 10 to 2000 meters below sea level. Set to be commissioned in the early part of 2014, the vessels shall augment NAMRIA's current fleet composed of the following: two 53-meter survey vessels, each having its own survey launches and skiffs aboard; and three independent survey skiffs that can be towed by service vehicle to the hydrographic survey area.

### Vessel Design and Living Provisions

A distinct feature of the two survey vessels is its hull configuration. *Catamaran* (derived from the Tamil words “*kattu*” [to tie] and “*maram*” [wood or tree]), literally means “tied wood”<sup>5</sup>. A catamaran is geometry-stabilized. Its stability comes from its wide beam, rather than having a ballasted keel like a monohull. To complement this stability, the vessel's hulls are fabricated and designed with sturdy marine-grade aluminium to withstand daily operation in extreme marine conditions.

To ensure a safe and comfortable environment during navigation and hydrographic surveys, the survey vessels are fully furnished with the following modern living provisions: extractor fans and marine split type air conditioners integrated into the ventilation system to provide fresh and cool air and prevent harmful carbon monoxide build-up; a reverse osmosis-type desalination plant (with 250 litres per hour



Sample finished catamaran vessel

capacity) to augment water supply; an International Maritime Organization (IMO) – compliant chemical sewage plant connecting all sanitary pipes to a 1000-liter polyethylene holding tank to treat sewage before disposal; elegant cabins, water closets, shower rooms, galley, crew mess room, officers' ward room, and storage rooms that can accommodate a maximum of 22 seamen. Each catamaran is powered by two Cummins *KT19-M4* main engines with 520 kilowatts @ 2100 RPM output of propulsion power, enabling it to reach a maximum cruise speed of 20 knots. Two 50-kilo volt ampere (KVA) main generator sets and one 10 KVA harbor generator are likewise provided for onboard power.

### Security, Safety, and Navigation

The vessel's navigation system comes with the latest navigation and communications equipment for National Standard for Commercial Vessels/Uniform Shipping Laws<sup>6</sup> Class 2C<sup>7</sup> operation, featuring a marine autopilot complying with National Marine Electronics Association 0183 specifications. Navigational aids include a 36-mile

<sup>1</sup>Staff Officer for Logistics, Hydrography Branch (HB)

<sup>2</sup>Presently assigned at the Hydrographic Data Section, HB

<sup>3</sup>Presently assigned at the Survey Ship Support Division, HB

<sup>4</sup>General Arrangement Plan for two catamaran survey vessels, Sheet 701-C.; length overall is 23.55 meters

<sup>5</sup><http://en.wikipedia.org/wiki/Catamaran>

<sup>6</sup>Technical standard for the design, construction and operation of Australian commercial vessels.

<sup>7</sup><http://www.transport.wa.gov.au/marine/usl-and-nscv-codes.asp>

<sup>8</sup>Sea-going non-passenger vessel for use in all operational areas up to and including restricted offshore operations

## NEWS

### Philippine National Health Atlas Phase I: Building a spatially-empowered DOH

by Benjamin P. Balais\*

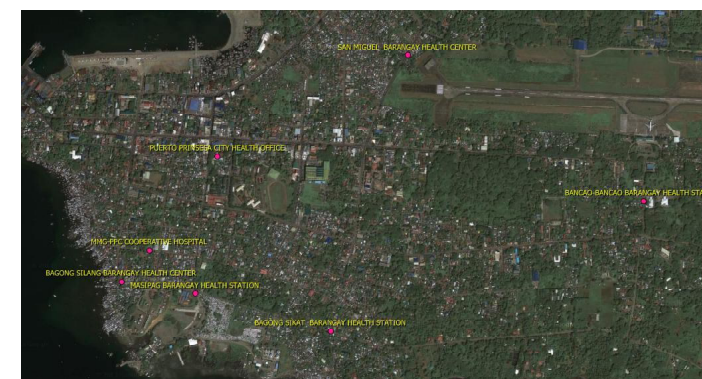
In 1999, the Department of Health (DOH) and NAMRIA jointly conducted the Maternal Health Atlas Project. The output for the project was a GIS-based system that provides information and location of the rural health facilities all over the country. A geodatabase of rural health facilities at the municipal level was developed for the use of the query system. The said dataset contains the GPS coordinates of the health facilities and information on the available equipment, services, manpower, trainings, and medicines being provided to patients availing of maternal health services. Photos and images were also collected to give users an idea of what the rural health facility looks like. The said dataset is still being maintained by the DOH and has been utilized by other projects in managing and monitoring these facilities.

In 2013, the DOH decided to collaborate again with NAMRIA to expand the dataset to include all facilities at the *barangay* level. This new project is called the *Philippine National Health Atlas* project. For 2013, the project aims to collect data on private and public hospitals, rural health units, *barangay* health stations, and other social hygiene clinics for 10 provinces. Just like its precursor dataset, the new dataset will be geocoded with GPS coordinates that come with photographs of the facilities and an updated set of attributes. The Phase I activity is being funded by a European Union Grant under the Health Sector Policy Support Programme II (HSPSII). The project, which formally started in the last week of May 2013, will run for a duration of nine months.

Activities for the project include the acquisition of GPS devices with a camera for data-collection activities. The project will hire contractual employees to do the fieldwork under the supervision of NAMRIA technical staff with DOH regional offices providing the attribute information. The project also covers the development of a web-enabled GIS-based display and query system to be installed at the DOH. All these will be complemented by a user's training and a comprehensive GIS training for DOH technical staff using an open-source GIS software. The updated geodatabase of health facilities will be included in the Philippine Geoportal System as part of the DOH fundamental dataset that can be viewed 24/7 by online users. •



Sample map of location of health facilities in Guimaras



Sample map of location of health facilities in Palawan

\*Chief, Geospatial Database Management Division, NAMRIA Geospatial Information System Management Branch and holds a Master of Science degree in Remote Sensing and GIS from the University of the Philippines in Diliman, Quezon City



NEWS

Land Cover Mapping Project

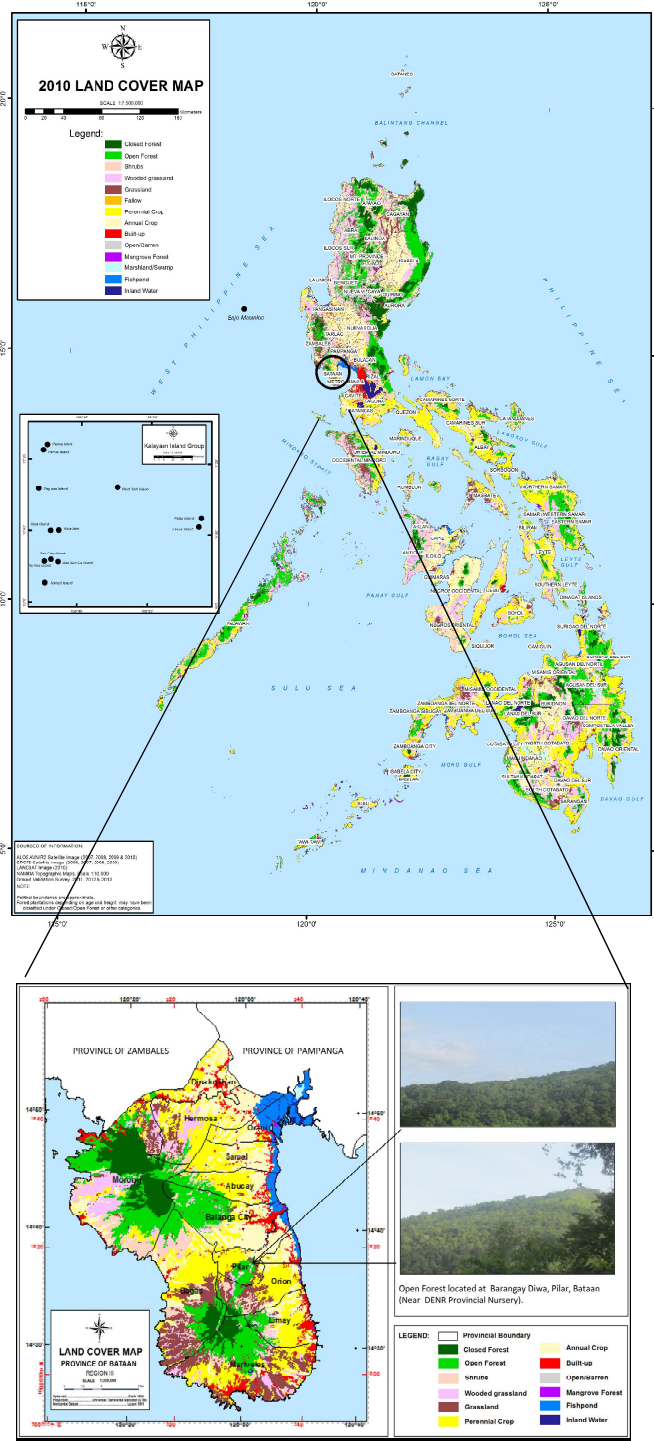
by Dr. Rijaldia N. Santos<sup>1</sup> and Raul T. Magabo<sup>2</sup>

Land cover relates to the type of features present on the earth’s surface including vegetation, rocks, and human-modified surfaces such as buildings and other structures. Land cover data serve as essential inputs in various physical and developmental planning activities at the local, provincial, regional, and national levels. They are valuable information for green house gas (GHG) inventories and other climate change-related studies.

NAMRIA has completed and released the 2010 Land Cover Maps and Statistics of the country. A total of 185 satellite imageries comprising mostly of Advanced Land Observation Satellite-Advance Visible Near Infrared Radiometer type 2 (ALOS-AVNIR2) and *Satellite Pour La l’Observation de la Terre 5* (SPOT5) were used for this project. The data are in 10-meter resolution and were taken mostly in 2010. A few LANDSAT 7 scenes were also utilized to fill in the gaps. These imageries were processed and interpreted using the United Nation’s Food and Agriculture Organization (FAO) classification. Further aggregation into 14 classes was made to generate the final land cover maps and statistics.

Preliminary provincial land cover outputs were validated on the ground by NAMRIA teams in coordination with local DENR offices. However, for Zamboanga del Norte, Sultan Kudarat, North Cotabato, Lanao del Norte and the five provinces of the Autonomous Region for Muslim Mindanao (ARMM), ground validation was conducted by their respective local DENR offices with training and financial support provided by NAMRIA.

The validated provincial land cover maps were presented to the DENR regional offices for their comments before publication. The coastlines indicated were derived from the satellite imageries and administrative boundaries are approximate. The 2010 Land Cover Maps covering the whole country are now available at NAMRIA. Copies of provincial land cover maps and statistics have been distributed to the respective regional/local DENR offices and Office of the Governor of the various provinces. Funding support for this project was partly provided by DENR.



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range Radio Detection and Ranging (RADAR), an IMO-approved Electronic Chart Display and Information System with Automatic Identification System Automatic Identification System, gyro compass, log and 18-inch screen, magnetic compass, echo sounder, Very High Frequency radio, barometer, thermometer, and clocks. For signaling, the vessels are furnished with bells, double filament streaming side and stern lights, rotating anti-collision beacon, searchlight and floodlights at port and starboard boarding positions, an Aldis lamp 24 volts direct current at the fore and aft deck, horn and a complete set of flags. Emergency Position Indicating Radio Beacon and RADAR transponder help track the vessel in times of emergency. Each vessel is also equipped with a closed-circuit television security system for monitoring strategic locations in the ship. Security surveillance monitors are conveniently placed at the bridge.

Survey Systems

Both survey vessels are likewise equipped with advanced survey instruments and a system to meet the highest level of survey accuracy set by the International Hydrographic Organization (IHO) for hydrographic surveys. These instruments (summarized in Table 1) are physically linked by a high-speed Ethernet Local Area Network (LAN) connected to a central computer that manages all data for local storage and retrieval.

Data from all survey instruments are logged and processed in the central computer with the help of an integrated survey system software, *Hypack Max*. *Hypack* is a complete suite of software that aids the hydrographer in all phases of his fieldwork: from planning of survey; calibrating, collecting, and interpreting multibeam data; applying corrections (such as tides and sound velocity) to sounding data; editing raw data to remove outliers; plotting field sheets; and exporting data to various formats such as Computer Aided Design and shapefiles. It even has modules for computing volume quantities, generating contours, creating side-scan mosaics,

SURVEY INSTRUMENTS FOR TWO CATAMARAN-TYPE SURVEY VESSELS		
Instrument/ Hardware	Brand	Remarks
Multibeam Echosounder	L3-ELAC SeaBeam 1050D	Primary sonar used for accurate depth measurements ranging from 3 to 3000 meters; Operates at 180 and 50 kilohertz (kHz); Forms 128 high-density, equiangular beams covering a maximum receive sector of 153 degrees
Sidescan Sonar	Klein System 3000	Towed and lowered behind the vessel for sea bottom interpretation and imaging; Features include dual-frequency (100 and 500 kHz), long-range scans (150 meters at 500 kHz, 500 meters at 100 kHz), and the SonarPro software
Forward Looking Sonar	Echopilot	Mounted in front of the vessel, tilted forward at an angle; complements primary sonar data and warns crew from hitting any obstruction and/or shoals along the vessel’s path (The view ahead is 60 degrees in the horizontal plane and over 90 degrees in the vertical plane and the forward range is up to 200 meters.)
Singlebeam Echosounder	SyQuest EchoBox	Auxiliary singlebeam echosounder; Can perform marine surveys and deep ocean surveys up to 5000 meters of water depth and operates at 12 kHz, 24 kHz, 33 kHz, 50 kHz, or 200 kHz.
Sound Velocimeter	SBE 45 Micro TSG Thermosalinograph	Measures sea surface conductivity, temperature, salinity to compute sound velocity; Made of plastic and titanium to ensure long life with minimum maintenance
Inertial Motion Sensor Unit (IMU) and Positioning	Applanix Position and Orientation System for Marine Vessels (POS/MV)-MV-WAVEMESTER E (RM), global navigation satellite system (GNSS) -Aided Inertial Navigation System	Measures ship position, heading, heave, and attitude; Features “TrueHeave” that reduces filter settling times in long period swells; With the real-time kinematic (RTK), POS MV can also estimate the GNSS to IMU offsets during the calibration routine without requiring dimensional control surveys
Survey workstation, monitors	Dell R5500, Dell UltraSharp U2412M	Intel® Xeon® with up to six cores, a Genuine Windows® 7 Professional, options for up to five standard, full-length, full-height PCIe x 16 cards, up to 192GB of system memory, five SATA drives and six SAS with optional dual redundant power supply; Two 24” U2412M LED Monitors
Data Storage	Dell PowerVault MD1200	Distributed File System (DFS) that gives simplified, quick access to data stored across wide LAN

Table 1: Instruments installed in the 23-meter catamaran-type survey vessels

and for creating and editing electronic charts. Thus it is the ideal survey software for most of NAMRIA’s survey vessels.

In situations where the hydrographic survey area is too shallow (with depths less than 10 meters) and may compromise the safety of the 23-meter survey vessel, onboard survey skiffs equipped with compact survey instruments are ready for the task. Just like their mother vessel, they are equipped with ultra-compact multibeam, Global Positioning System and motion sensors, sound velocity probe, and a portable tide gauge. A rugged, high-performance laptop is also onboard to guide the hydrographer and to control data from all instruments throughout the survey duration.

Latest Updates

To date, the vessels are well on schedule for delivery and commissioning in 2014. The acquisition of the two state-of-the-art survey vessels will provide the much-needed and timely hydrographic survey data updates for NAMRIA. Thus the updating of the agency’s nautical publications will be facilitated. Safety of navigation within Philippine waters will also be ensured along with the availability of accurate and reliable geospatial information to effectively manage the country’s marine and coastal environment.





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