UN-GGIM
UNITED NATIONS COMITTEE
OF EXPERTS ONGLOBAL GEOSPATIAL
INFORMATION MANAGEMENT

World Geospatial Industry Council

VIRTUAL GEOSPATIAL SUMMIT 2020

GIS RESPONSE TO COVID-19

April 8, 2020

REPORT

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Acknowledgement

The organizing members (The United Nations Committee of Experts on Global Geospatial Information Management Regional Committee for the Americas (UN-GGIM: Americas), its Academic and Private Sector Networks, the UN-GGIM Working Group on Geospatial Information and Services for Disasters) of the **Virtual Geospatial Summit 2020, "GIS Response to COVID-19**", held on 8th April 2020, thank the over 500 plus participants from across the world who logged on throughout the day and contributed to the success of the Summit.

Special appreciation is extended to all speakers and moderators who gave of their time and expertise to prepare and participate in the Summit. Only through your invaluable contribution and effort was the summit made possible.

The organizing group is particularly grateful for the support provided by its sponsors, We Love Learning, Esri and GeoTechVision, strategic partners the World Geospatial Industry Council and URISA Caribbean. A special note of gratitude is accorded to Janet Stewart and the team from We Love Learning; they provided stellar technical and moderating support from Summit planning through to delivery.

Thanks is also extended to the rapporteurs and the report preparation team who generously volunteered their time, took notes during the Summit and prepared this final report.

Especial thanks is extended to Mrs. Paloma Merodio Gomez, Vice President of the National Institute of Statistics and Geography (INEGI), Mexico who also serves as President of UN-GGIM: Americas and her team for providing Secretariat support for the Summit. Ms. Valrie Grant, Managing Director GeoTechVision, representative of the World Geospatial Industry Council and chair of the Private Sector Network for UN-GGIM Americas and her team are acknowledged and commended for initiating and leading the planning and staging of the event.

We wish to note and acknowledge the group from countries in the Americas whom through teamwork, collaboration and partnership made possible, the organization within a short time frame the successful staging of the Geospatial Summit 2020.

Introduction

On 11 March 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a pandemic, and as at the 30th March there were more than 785,709 confirmed cases and 37,686 deaths reported in 178 countries/regions worldwide. Historically, governments have had to respond to natural disasters and infectious disease outbreaks, which have resulted in loss of lives and devastation to the environment and national economies. This current viral outbreak is one of colossal proportions and the rate of infection rapidly multiplies given our densely populated urban centers and an interconnected global economy. Responders worldwide – scientists, doctors, disease trackers, modelers, logisticians, and supply chain experts are now designing and implementing measures to stop the transmission and spread of the virus. Critical to the response effort is the sharing of information and guidelines, the development of tools to deliver data in real time on websites and via messaging networks, identification of locations to establish additional hospitals, quarantine bases and virus testing locations, and effective communication on the situation.

Geospatial data users and providers across governments, the private sector, academia, students and the general public were invited to participate in the ***Virtual Geospatial Summit 2020*** under the theme *"GIS Response to COVID-19"*, to learn and share how the global community of geospatial scientists have been: leveraging geospatial, Earth Observation and statistical data, creating innovative tools to support response measures and manage the containment of COVID-19.

Objective

The objective of the Virtual Summit was to showcase some of the geospatial tools and GIS dashboards that have been developed, the good practices that have been implemented, including the challenges in collecting geospatial health data and to demonstrate how GIS supports effective communication through analytics and data visualization. It is hoped that countries at the start of the infection period will benefit from the experiences and practices to be shared and that a network of geospatial health collaborators for emergency response can be created.

Opening and Welcome Remarks

The Virtual Summit began with an opening segment with remarks from the main collaborators followed by a keynote address from Dr. Este Geraghty, Chief Medical Officer of Esri.

Ms. Valrie Grant, Chair of the Private Sector Network for the Regional Committee of UN-GGIM America, and Managing Director of GeoTechVision, opened the Virtual Geospatial Summit, welcomed all presenters and attendees, and moderated the opening segment. Ms. Grant highlighted the COVID-19 global issues and mentioned that the peoples of the earth were experiencing forced digital transformation. She said that the geospatial community has been

actively creating tools in response to COVID-19 and the Virtual Summit provided an ideal platform to share the work being pursued.

Ms. Rosario Casanova, Professor of the Land Surveying Institute of Uruguay and Chair of the Academic Network for the Regional Committee of UN-GGIM: Americas made welcome remarks on behalf of her Network. She encouraged geospatial professionals to participate in the event given the current crisis. Ms. Casanova stressed the importance of collaborating and communicating with each other and further encouraged everyone to unite and stay at home until the pandemic ends, at that time and everyone will be able to emerge together.

The second welcome remark was delivered by Ms. Simone Lloyd, Senior GIS Manager of the National Spatial Data Management Branch (NSDMB) Jamaica and co-chair of the UN-GGIM Working Group on Geospatial Information and Services for Disasters. She highlighted the importance of the event and the need to have available and accessible geospatial data and statistical information to drive decision making. She indicated that the UN-GGIM Working Group on Geospatial Information and Services for Disasters was in the initial stages of planning a similar virtual geospatial session and was very pleased for the opportunity to collaborate with UNGGIM: Americas and its other partners to convene this Summit. She emphasized the importance of collaborating with other UN bodies in disaster response efforts.

Mrs. Paloma Merodio Gomez, Vice President of INEGI, Mexico and President of the Regional Committee of UN-GGIM: Americas said that the event had been organized by a community of geospatial professionals and within the current situation and isolation, uniting efforts to showcase the use of maps and Geography in the global response to COVID-19 was very inspiring. She emphasized that Geographic Information Systems (GIS) has provided a common and easy way to use maps and give the ability to analyze spatial data and produce high-quality maps for decision making. Finally, she stressed that the exchange of knowledge could make a great use of Geography for decision making and combating COVID-19.

Opening Keynote:

Health - GIS Infectious Disease Response Planning

Dr. Este Geraghty, Chief Medical Officer of the Environmental Systems Research Institute (Esri), stressed that GIS is an enterprise system for emergency response currently being used by FEMA and John Hopkins among others in understanding and responding to pandemics (disease surveillance, planning, logistics and others). GIS provides a framework and process (observing, understanding, responding) to such scenarios.

She explained how the framework and process applies to sectors of the population such as demographics, vulnerable population, health facilities, testing sites among others.

She mentioned that GIS has predictive tools that test scenarios to social distancing issues. Modeling and spatial analysis tools help predict when and where local hospitals will reach their capacity. Pandemic analysis is facilitated using inputs to make faster decisions and adjusting resources accordingly in a more effective manner.

She outlined ESRI's five step approach for using GIS to understand and respond to COVID-19: 1)map the cases, 2) map the spread of the disease over time and space, 3) map to understand vulnerable and high risk populations, 4)map response and capacity and 5) communicate with maps.

Once you understand the where, she said, you can start to make decisions on where needs attention, how businesses are affected and others. Maps showing school closures and event cancellations can be easily facilitated for monitoring purposes. She stated that data sets shown in (Table 1) are most useful in these circumstances.

Table 1: Datasets most useful in Pandemic Mapping, Analysis, Projections & Planning

Primary:

- Demographics (age, race, etc.)
- Cases (confirmed, hospitalized, ICU, recovered, deaths)
- Persons tested (confirmed, negative, unknown)
- Hospitals (how you define, capacity etc.)
- Forecasted demand
- Social Distance Restrictions (school closures, non-essential travel, quarantine)
- Mobility data (net change in movement over time)
- Alternate care sites (universities, clinics etc.)
- Test sites (parking lots, schools etc.)

Site selection:

- Treatment sites
- Food Distribution sites
- Testing sites

Population Demand:

- Transmission risk
- Socio economic risk
- Susceptibility risk
- Do not have to use all, can use what is applicable to your community
- Ability to provide risk ranking
- Location-Allocation

Dr. Este explained that an evaluation of outcomes would need to be pursued and in so doing monitor the ability of sites to handle population needs. She indicated that this would require more than technology. Leadership is key throughout the process to make things happen. Therefore, clear strategies, ongoing governance and good people-GIS Professionals are essential.

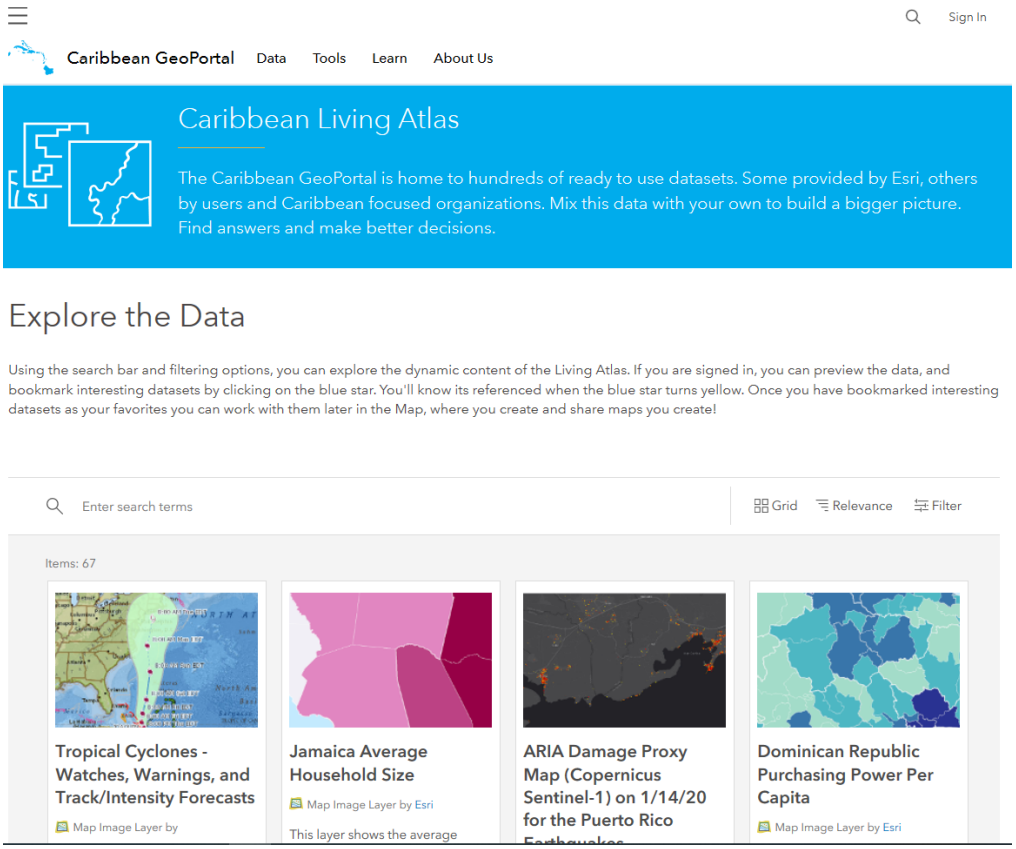
The keynote speaker presented the prediction mapping tool, which includes the information necessary to respond to the COVID-19 pandemic, and to be able to create an overview of risk areas and response capacity. This tool includes: Mapping confirmed and active cases, deaths, and recovery cases to identify where COVID-19 infections exist and have occurred. Mapping the spread of the disease over time is essential to determine where interventions should be directed. Mapping of social vulnerability, age and other factors help to monitor the groups and regions with the highest risk. Mapping the installed capacity, for example, employees, medical resources, equipment, and services is needed to analyze the response capacity to the impacts of the pandemic. Finally, the interactive web map allows information to be communicated quickly to the population during the crisis and recovery.

The CHIME model was presented that can be used to identify where resources should be moved to satisfy the demand for testing sites, treatment sites, resources, among others. Tools such as location

allocation and network analysis methods are used for these models that can guide these decisions and ensure that demand is met in the most effective and equitable way possible, allocating resources based on projected hospital demands.

Announcing the Caribbean Geoportal

Linda Peters of Esri presented the Caribbean GeoPortal. This cloud-based platform provides access to geographic data and imagery for the Caribbean community. It also provides tools needed to do analysis, planning for responses to disasters and supports decision making on issues such as economic development. In particular, for the COVID-19 emergency, the platform provides solution templates and tools to help countries understand and obtain an overview of the impact of COVID-19 and to monitor confirmed, recovered cases and deaths. https://www.caribbeangeoportal.com/



The platform is free and open to the Caribbean community and Ms Peters encouraged participants to use the portal, the data and the learning tools provided.

Segments

Segment 1: GIS data to support response to COVID-19

Geospatial data inclusive of base map data from the mapping agencies, demographic and social mobility data, at risk population data and other thematic layers from statistical organizations, Ministries of Health and other reliable sources are aiding the response to COVID-19. This session highlighted how organizations are using GIS data in the fight against the corona virus pandemic.

Presenters:

Mr. Keran Wang
Chief Space Application Section, ICT and DRR Division
UN Economic and Social Commission for Asia and the Pacific, Thailand

Mr. Alvaro Monett
Regional Advisor on Geospatial Information Management
UN Economic Commission for Latin America and the Caribbean Chile
Geospatial information in the ECLAC COVID 19 Observatory

Prof Maria Brovelli
Professor of GIS
Politecnico di Milano, Italy
GIS DATA TO SUPPORT RESPONSE TO COVID 19: THE ITALIAN CASE

Mr. Javier Teran Castro
Statistician
United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA)
GIS Response to COVID 19

Ms. Rosario Casanova, Professor, Land Surveying Institute, Uruguay moderated the segment; welcomed all attendees and introduced the four presenters.

Keran Wang reflected on the importance of integrating statistics and geo-data to analyze pandemic impacts, understanding that the countries of the entire world are struck by the situation, that cooperation in the field of knowledge, experience, analysis and particularly having georeferenced data is critical to mitigate COVID-19 expansion, and understanding how to limit the effects on different sectors of society and economy. The focus has been on analysis together with experience

and knowledge available from the first cases in China and seeking to build predictive methods that can be replicated in other countries.

Alvaro Monett presented the UN Economic Commission for Latin America and the Caribbean (ECLAC) COVID-19 Observatory, geoportal. It is a decision-making tool that gathers knowledge, scenarios, recommendations, information about the pandemic, detailed descriptions and monitoring of the actions that is used to counteract the expansion of the pandemic.

María Brovelli presented a temporal and spatial analysis of the available data on the COVID-19 outbreak in Italy and analyzed the efficiency of the lockdown, the profile of cases, incidence and mortality behavior across several Italian provinces.

UN OCHA aims to increase the impact of data on crisis response by bringing together local knowledge and giving guidelines for its best use, in complete legality with the care of privacy and ethics. Javier Teran showed the Humanitarian Data Exchange -HDX, that gathers useful information from member states, data surveys, data on context perception in communities, big data, social networks, as well as methodological guidelines for responsible and ethical use of information; shared by over 250 organizations.

Rosario Casanova thanked the speakers and summarized the segment by underlining the great opportunity for the Americas to benefit from the rapid progress in analysis of experience, lessons learned, and tools already developed to make better decisions, gained from the countries hit earlier by the pandemic.

Segment 2: Assessing and Combating COVID19: Satellite Imagery

Infectious diseases are estimated to cause more than 15 million deaths globally each year, an ever-evolving challenge to human health, according to the World Health Organization. As the world rushes to contain COVID-19, tracking where and how it spreads, is difficult due to the global nature of society. Human mobility like air travel and commuting, logistics, infrastructure, and public health facilities, as well as poor socioeconomic conditions are all important factors in modeling pandemics. Segment 2 highlighted the use of high-resolution imagery in analyzing and responding to COVID-19.

Presenters

Mr. Kumar Navulur
MAXAR
Director, MAXAR Global Strategic Programs
COVID 19 RESPONSE USING IMAGERY AND GEOSPATIAL DATA

Ms. Alicia Williams
MAXAR
Supervisor, MAXAR Geospatial Analytics
COVID 19 RESPONSE USING IMAGERY AND GEOSPATIAL DATA

Ms. Michelle St. Claire, Land Surveyor, Lands and Surveys Department, Barbados, moderated the segment; she welcomed all attendees and introduced the two presenters.

MAXAR's high resolution imagery available was shared. Space provides a unique vantage point using high orbiting and terrestrial sensors that provide imagery on daily and periodic basis to monitor impacts of COVID-19, for efficient modelling to understand social-economic and environmental impacts.

With this, clear and specific examples of possible exploitation of this data were mentioned. For instance, the use of these images could permit the counting of vehicles in urban areas, and hence, provide a criterion for models that estimate the economic impact of the actions taken to address the COVID-19 experience. Also discussed was how it is also possible to address environmental impact using satellite imagery. An example from a recently published report from NASA/ESA was described and some of the results presented.

These results included the impact due to COVID-19 in the mean tropospheric NO_2 density; this variable was compared in two maps with data observed over China in early January and in mid-February; a clear reduction could be observed during this short time period. In conclusion, the traffic reduction derived from the actions taken to fight the spread (and "flatten the curve") of COVID-19 unintentionally reduced polluting gases.

MAXAR also presented "Spotlight," a free leaflet of analysis reports that are elaborated to address the current problems or matters of public interest. MAXAR is not only a provider of imagery but also human landscape data in eight core themes that can be made available to support national GIS work/the current pandemic within 2-3 weeks. It was noted that the crowd is used to validate their human landscape data – GEOHIVE, and this allows for rapid data development. MAXAR's imagery data is commercially available and accessible and this is made possible by the International Treaty on Remote Sensing, but with a few country exceptions.

Segment 3: Geospatial Tools & Dashboards

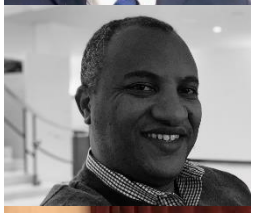
The COVID 19 response will require a collection of data, maps and apps that can be used by public health agencies and others such as first responders, to understand the impact of the corona virus and to share authoritative information about the pandemic with communities. Governments and agencies need to be able to configure and share corona virus response maps, data and applications; or configure and share an individual map or application that meets their specific needs.

This session demonstrated several applications that are being used to monitor the spread of the corona virus, track the impact on public gathering places (for example, schools, government buildings, common places), inventory testing sites, and share this information with the public via dashboards.

Presenters

Mr. Adam Reedy
Americas National Government Manager
Esri
COVID 19 Response

Mr. Milquiades Walther-Rodriguez
Americas National Government Solution Engineer
Esri
COVID 19 Response



Mr. Daniel Eshetie
Information Systems Officer
UN Statistics Division
UN COVID-19 Data Hub aims

Mr Josiah Burkett
GIS Analyst
GeoTechVision
Geospatial Tools and Dashboards

Ms. Simone Lloyd, Senior GIS Manager, NSDMB, Jamaica moderated this segment; she welcomed all attendees and introduced the four presenters.

Adam Reedy and Milquiades Walther Rodriguez from Esri presented on the GIS tools available to support COVID-19 response as well as Esri's "*Disaster Response Package*". The package provides access to a six-month ArcGIS Online Subscription; ArcGIS Hub basic, ArcGIS insights; 15 creators with insights add-on; ArcGIS Pro Advice Online and also, a free "ArcGIS Solutions for public health response and business continuity" that includes some hub templates. These tools will assist users seeking to collaborate at all levels with information portals to support decision making in times of crisis and to provide security.

GIS provides a framework, a process and an integrated system for managing COVID 19 response, based on understanding the community risk; measuring social distancing effectiveness, to modeling the spread and impact of disease and with that information manage resources and select sites to communicate with the public.

GIS integrates all types of data such as population and demographics; mobility data; hospital resources, facilities; social distancing and models disease spread.

They said that there are five steps to understand the impacts of COVID-19, the first is mapping the cases, second mapping the spread, third mapping the vulnerable populations, fourth mapping the response – i.e. capacity of hospitals etc. and fifth communicating all of this with maps.

Americas COVID-19 Hub and other hubs, apps, data, resources, and best practices are available at https://go.esri.com/coronavirus and https://americas-covid-19-hub-esridistributor.hub.arcgis.com/

Daniel Eshetie showcased the UN Statistics Division COVID-19 Data Hub which is designed to facilitate access to software and tools, leverage the use of web GIS technologies for sharing available data resources and web services. The objective of the data hub is to assist national statistical offices get quickly up to speed in building their own dashboards. Information is available at: https://covid-19-data.unstatshub.org/ It also provides a space for the global statistical community to share guidance, actions, tools and good practices to ensure the operational continuity of data programs by National Statistical Offices, and to address issues of open and timely access to critical data needed by governments and society.

Josiah Burkett presented the GeoTechVision´s approach to COVID-19 using dashboards and web applications. The need for data solutions was highlighted given the health crisis. Dashboards as a data solution allows effective and efficient visualization of the issues. Building dashboards is about collecting information from National Statistical Offices, making open and interoperable in the lower possible desegregation. The second-best strategy consists of sharing experiences about what is happening during a pandemic and GIS provides tools to effectively communicate this information.

Segment 4: Community Engagement & Feedback

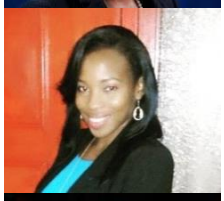
With this paradigm shift in how we will conduct day to day activities across global communities, community engagement is now a critical component in response and recovery programs. Community engagement can, play an important role in shaping our response to crisis and for COVID-19 it is critical. In order to initiate improvement at national and international levels collaboration is

needed at the community level to properly diagnose and spark innovative means of combating this pandemic. Community engagement can lead to improved outcome for communities as it promotes inclusion and focuses on better understanding of the needs and priorities of citizens.

From dashboards, to story maps and visual analytics, GIS presents us with a plethora of means by which we can engage the community and other stakeholders. This segment showed how members of the geospatial community are taking different approaches in breaking down communication barriers and keeping all members of the community engaged and informed during the pandemic.

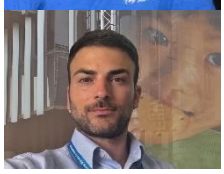
Presenters

Mrs. Valrie Grant
Managing Director
GeoTechVision



Ms. Sheree Cameron
Geoinformatics Manager
GeoTechVision

Mr. Alan Mills
Preparedness Coordinator
MapAction
Community Engagement and Feedback: Reaching all Communities



Mr. Francesco Stompanato
Regional GIS Officer
UN World Food Programme (UNWFP)
COVID 19 Geospatial Products Remote Assessments and GeoDashboard

Mr. Roshaun Clarke, Deputy CEO, Spatial Innovision Ltd. moderated segment four; he welcomed all attendees and introduced the four presenters.

Valrie Grant and Sheree Cameron presented tools such as “Stories of Hope Community Response to COVID 19” that allows users to build and share stories using maps, graphs, statistics, videos, all through a story map.

A COVICHK Application was developed that facilitates self-diagnosis of people's health. One of its objectives is to locate potential sources of infection by the corona virus. This application allows all to use technology responsibly to self-monitor and get better understanding of health status and recommendations in based on WHO and CDC guidelines in relation to the coronavirus. This kind of

data is useful in helping national health organization and in this way contribute to a better understanding of the pandemic.

Alan Mills of Map Action promoted the use of technology and data in communities with little development and limited possibilities of access to technology. He shared that it was important for the geospatial community of experts to engage civil society and government, to use geospatial tools to guide efforts of all sectors, to enhance the data collection and to have more and better information to monitor particularly the vulnerable communities in slums and camps and the peri-urban margins. This support will help to design public policies and actions that are more effective to face the crisis situations, such as the COVID-19 pandemic. He challenged the geospatial community to innovate, refine and update tools in the coming months given that one size does not fit all, there is a need to identify gaps and there are other crisis happening across the world that increases vulnerabilities.

Francesco Stompanato shared that UNWFP has developed a tool to help users to apply questionnaires in addition to telephone interviews, made with Arc GIS's Survey123. The mobile data collection tool is being used to apply remote evaluation of vulnerable population in Caribbean countries. Considering the limitations and risk of conducting face-to-face surveys, remote evaluations are an important alternative. The rapid impact assessment takes into consideration market accessibility, food security and daily livelihood topics. In less than one week more than 4,000 responses were received from Caribbean countries. This data is accessible at the Caribbean COVID-19 Food Security & Livelihoods Survey 2020 Dashboard and the summary report here COVID19 Regional Food Security and Livelihoods Impact Survey Report

Segment 5: Data Sharing Amidst Crisis

Geospatial data, tools and their management have served as an important enabler in the decision-making process. In response to the ongoing pandemic it has now become vital that decision makers are equipped with the right analytics to guide policy, recovery strategies and future planning. Now more than ever GIS professionals need access to reliable data.

Health data presents its own unique parameters and sharing of this data has inherent restrictions and other challenges that must be examined towards adequately addressing data access and their use in addressing any pandemic or epidemic.

This panel discussion featuring representatives from Member States shared their national COVID-19 response measures and addressed the challenges being experienced in accessing geospatial data needed, where they may exist, and how the challenges have been addressed.

Presenters

Mr. Martin Brady
Director, Geospatial Solutions of the Australian Bureau of Statistics
Australian Bureau of Statistics
COVID 19 - statistics and geospatial

Ms. Macarena Perez Garcia
Secretary of SNIT SDI
SNIT – SDI Chile, Ministry of National Assets
SNIT - SDI Chile

Ms. Sandra Moreno
Technical Director of Geostatistics
DANE – Colombia
Data sharing amidst the crisis, Geovisor to support crisis management

Mr. Ivan DeLoatch
Executive Director
Federal Geographic Data Committee (FGDC), USA
Leveraging a Health SDI for COVID 19 Pandemic Response

Ms. Valrie Grant officially moderated segment five; she welcomed all attendees and introduced the four presenters.

The first speaker was **Martin Brady**, representing Australia. He said that statisticians create content to what, when and where. Interlinking location, people and business is in the heart of the Global Statistical and Geospatial Framework.

He highlighted the important role of statisticians and geospatial professionals in providing information to decision makers. He stressed that statisticians contribute tools and methodologies to have reliable and accurate data. He challenged the audience about how to do better when a next crisis occurs, that we must be clear about good and bad practices and identify gaps in capabilities.

The second speaker was **Macarena Perez Garcia from** Chile. She noted that SNIT is a permanent inter-institutional coordination mechanism for the management of public territorial information in the country, composed of the State Institutions generating and using this information.

She said that to maximize the benefits derived from the use of territorial information, it is necessary to work under the concept of a Geospatial Data infrastructure. She also shared that they created a Working Group Disasters, which manage emergencies.

The third speaker was **Sandra Moreno** from Colombia. Ms. Moreno presented Geovisor, a geospatial dashboard to support crisis management. The objective of Geovisor is to provide

statistical and geospatial information to support decisions for crisis. Geovisor is easy to use, it has timely information, high level of geographical disaggregation and was developed through inter-institutional partnerships.

Geovisor is uses a vulnerability index per blocks in urban areas, and was created using demographic variables (age, adult population, overcrowded zones, access to public services) and comorbidities (hypertension, diabetes, high disease). The map in the Geovisor defines urban areas with high, medium and low vulnerability, so local governments can make better decisions.

The last speakers were **Ivan DeLoacth** and his colleague **Ajay Gupta**. They showed the geospatial tool HSR.health that is used to leverage health and other data for response to the COVID-19 pandemic. Using several factors – social, infrastructure, environment, services among others mortality and pandemic risk indices and related maps are generated. This tool was developed to be used for understanding and monitoring the crisis, modeling and predicting future events and predict and anticipate possible social and economic impacts. They mentioned that it is a very practical tool for decision making that can save many lives.

Data Sharing Challenges

1. The crisis has opened up data. The challenge is how to use barriers to gain access to data and the challenges also highlight the importance of geospatial data.
2. There were concerns regarding privacy and the willingness to open data where there is uncertainty on the quality of the data.
3. It was found that data found was not always applicable and therefore data curation is now an area of focus.
4. Data is being deomocratized however there is uncertainty on the quality of data.
5. Mechanisms need to be improved to guarantee data security and updates.
6. There is the need to improve partnerships with the private sector and also universities and research centres.
7. Existing inter-institutional arrangements made data sharing and the development of data tools and dashboards easier.

Final Remarks

The first staging of the Virtual Geospatial Summit 2020 on COVID 19 has allowed us to take a moment to recognize and focus on a positive side of the COVID19 pandemic, within which the whole geospatial community, health providers and other stakeholders came together to contribute societal benefit through the rich exchange of thoughts, ideas, technology and solutions. The Geospatial Community has shared proposals, questions, challenges, problems and solutions, working together to win this global encompassing battle. We have all learnt the importance and significance of facilitating joint ventures with government, decision makers, academia, civil society, private sector, etc.

During the summit it has been clearly stated that it is essential to carry out monitoring not only for the people in risk of catching the virus but also the people vulnerable situations and it is so relevant to monitor the policies that are being applied, in each country or region. It has also highlighted the relevance of using geographic information to understand the behavior of the COVID-19. Furthermore, the importance of learning from the past of other nations to be able to predict and be one step ahead of the virus was highlighted. Therefore, sharing experiences and knowledge takes a special role in the battle against this pandemic.

Last, but not least, we all felt an overwhelming feeling of being closer than ever. It is now the aim of the organizing committee to build work collaboratively with multiple stakeholders to build on this initial activity for the benefit of the community.

Innovative Webinar Activity – Virtual Tours around the World

A unique activity of the Virtual Geospatial Summit was providing tours to virtual museums and historic sites around the world during segment breaks. The application Second Live was also used where summit attendees could meet each other in a virtual world. Participants were encouraged to take an active break by visiting different virtual sites included in the links below.

PLACES VISITED:

1. THE NATIONAL MUSEUM OF NATURAL HISTORY
   https://naturalhistory.si.edu/visit/virtual-tour/

2. THE TAJ MAHAL http://www.airpano.com/360photo/Taj-Mahal-India/

3. THE GREAT WALL OF CHINA http://www.airpano.com/360photo/Taj-Mahal-India/

4. THE J. PAUL GETTY MUSEUM:
   https://artsandculture.google.com/partner/the-j-paul-getty-museum/

5. THE LOUVRE https://www.louvre.fr/en/visites-en-ligne/

6. THE VATICAN'S MUSEUMS
   http://www.museivaticani.va/content/museivaticani/en/collezioni/musei/tour-virtuali - elenco.html

7. THE SISTINE CHAPEL
   http://www.museivaticani.va/content/museivaticani/en/collezioni/musei/cappella-sistina/tour-virtuale.html

8. THE COLOSSEUM
   http://www.airpano.com/360photo/Italy-Rome-Colosseum/

9. PALACE OF VERSAILLES https://www.pbs.org/marieantoinette/life/index.html
10. HAWAI'I VOLCANOES NATIONAL PARK https://www.nps.gov/havo/index.htm
11. THE MUSÉE D'ORSAY
    https://artsandculture.google.com/partner/musee-dorsay-paris
12. YOSEMITE NATIONAL PARK https://www.virtualyosemite.org/
13. THE PYRAMIDS http://www.airpano.com/360photo/Egypt-Cairo-Pyramids/

Evaluation Summary

Esri's Survey 123 for ArcGIS solution was used to prepare a questionnaire and participants were encouraged to complete it at the end of the Summit. The objective of the survey was to ascertain participants experience, views and recommendations post attending the Summit. A total of 62 participants from 30 countries participated in the survey. This represented approximately five percent of total attendees. Sixty five percent of these participants were male and 35% were females. Most of the participants fell within the 31-40 years age group.

Sixty percent of the respondents stated that it was extremely likely for them to recommend a similar Virtual Summit. A total of 98% percent agreed to recommend the summit. This was supported by 98% rating the summit as being predominantly excellent and very good.

Seventy five percent and 90 % of respondents found all sessions useful and very useful respectively. Eighty eight percent found the keynote address on "Health GIS Infections disease response planning" very to extremely useful.

An overwhelmingly number of respondents indicated that "Segment 3: Geospatial Tools and Dashboards" session was the most useful for their organization, while 21 % advised that "Segment 1: GIS data to support response to COVID-10" was the second most useful segment given their

organization's requirements. See (Figure 1) for the most useful segments.

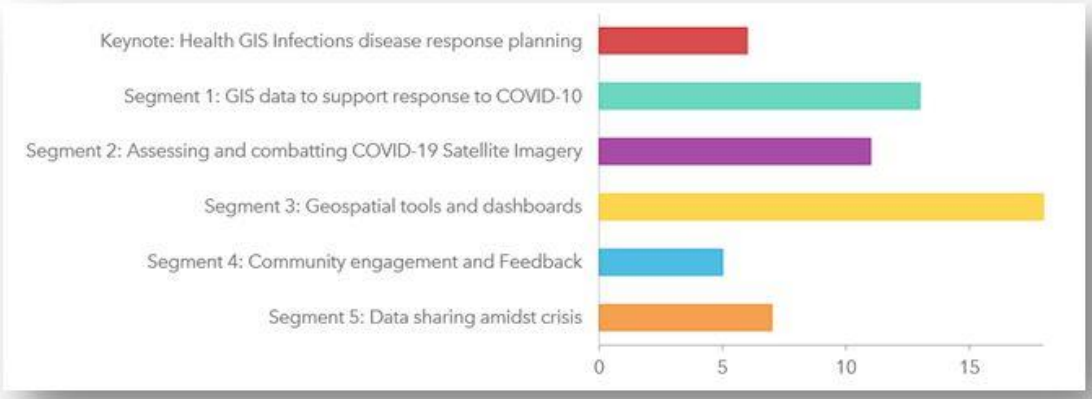


Figure 1: Level of Usefulness of Summit Sessions for the Organizations

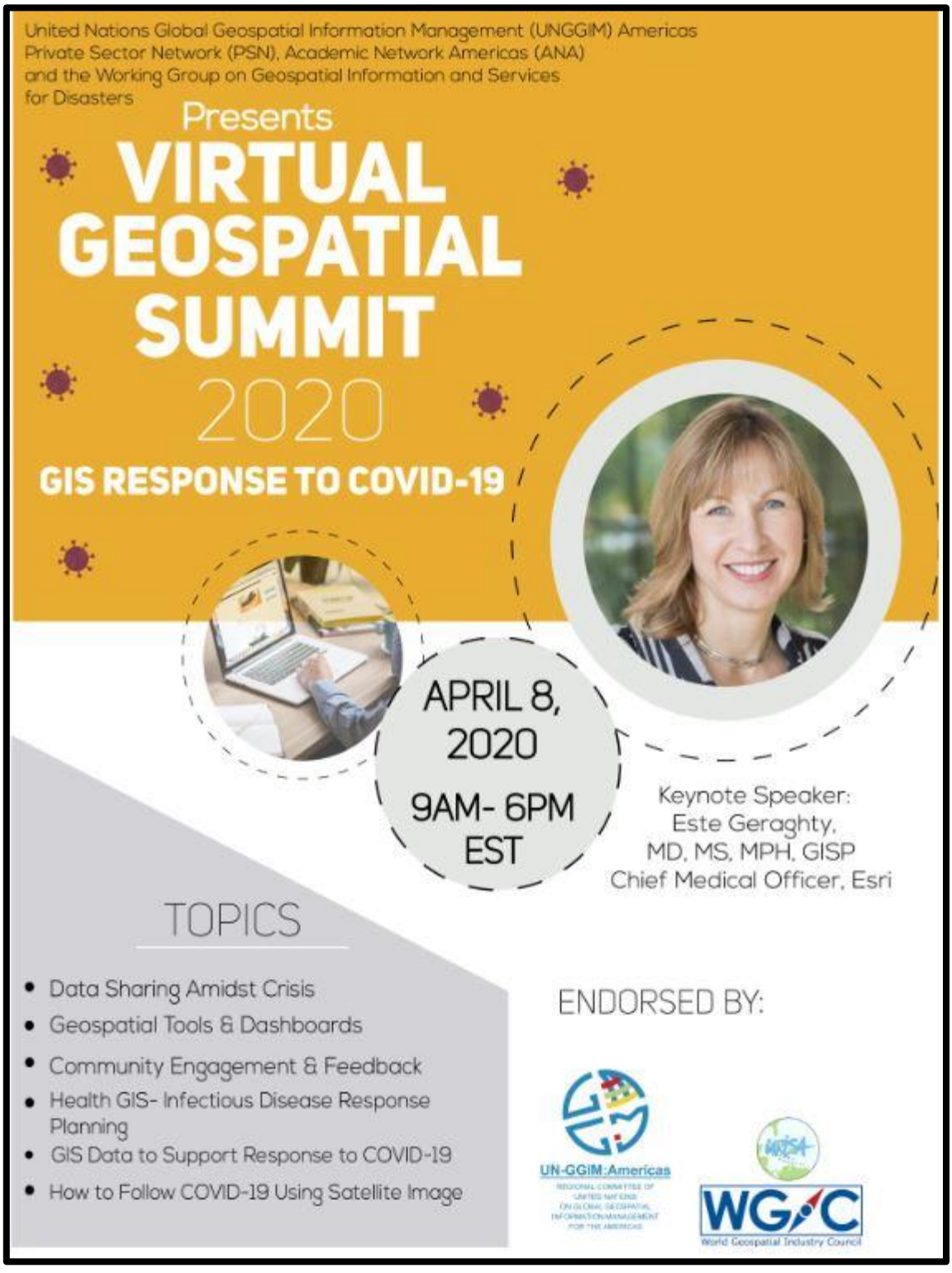
There was a resounding positive response regarding the high level of organization and execution of the highly relevant virtual geospatial event, given the current need. Strong compliments were received regarding the timeliness, excellent presentations and speakers, and sharing of geospatial information and technology from across the globe that is applicable for current and future response strategies.

On the other hand, common concerns about the summit included microphone and internet challenges, the intensive requirement given that the summit was nine hours with 30 minute breaks every hour, there were five segments and 19 presentations, the varying time zones which did not allow for some persons to participate and the fact that it was all in English among others.

Fifty eight percent of the respondents agreed that the duration of the summit was just right. Thirty two percent however stated that it was too long. Ninety five percent agreed that the summit met their expectations. The remaining five percent disagreed by indicating: "Majority of presentations and discussions were broad-based and general in nature. More specific and/or focused and detailed sessions may be more beneficial." In addition, respondents stated that 'It was just an introduction for the GIS person, should include the lecture/presentation on the GIS tools /approach used for analysis & prediction."

The Summit had an overall rating of 4.5 of 5, with 55% of respondents giving a 5/5 rating. The respondents were very thankful for the event and attested to it being very good and well planned. Some highlights included comments such as "You really did a great job. You should all be proud of it". "Thank you for organizing this and allowing the geo-spatial community to come together and understand how our skills and ability to inform decision makers can be used in a variety of disaster response efforts, inspiring presentations, an informative day and a n exhilarating day of information sharing."

Appendix I: Summit Flyer



Appendix II : Summit Agenda

VIRTUAL GEOSPATIAL SUMMIT 2020

UN-GGIM
UNITED NATIONS COMITTEE OF EXPERTS ONGLOBAL GEOSPATIAL INFORMATION MANAGEMENT

WGIC World Geospatial Industry Council

GIS RESPONSE TO COVID-19

April 8, 2020

HOUR	ACTIVITY	TOPIC	SPEAKER / TITLE	ORGANIZATION	MODERATOR	RAPPORTEUR
9:00 - 9:20	**Welcome remarks**		**Valrie Grant** Managing Director GeoTechVision	PRIVATE SECTOR NETWORK AMERICAS		
			Rosario Casanova Professor Land Surveying Institute-Uruguay	ACADEMIC NETWORK AMERICAS		
			Simone Lloyd Senior GIS MANAGER, Ministry of Economic, Growth and Job Creation, GISP-Jamaica Co-chair, UN-GGIM WG-DISASTERS	UN-GGIM WG DISASTERS		
			Paloma Merodio Vicepresident INEGI-México	UN-GGIM: AMERICAS		
9:20 - 10:00	**Opening Keynote**	**Health GIS Infectious disease response planning.** **Introduction to Caribbean Geoportal.** This session will present the role of GIS in planning and responding to infectious disease outbreak.	**Dr. Este Geraghty,** Chief Medical Office	Esri	Valrie Grant	Josiah Burket
			Linda Peters, Business Development Manager	Esri		
10:00 -10:30	Break	Virtual Field Trip.				
10:30-11:30	Segment 1 **Speaker Session with Demos**	**GIS data to support response to COVID-19.** This session will highlight how agencies are using GIS data in the fight against the coronavirus pandemic.	**Keran Wang** Chief Space Application Section, ICT and DRR Division	UNESCAP	Rosario Casanova	Sheree Cameron
			Alvaro Monett, Regional Advisor on Geospatial Information Management	ECLAC		
			Maria Brovelli, Professor of GIS	Politecnico di Milano		
			Javier Teran Castro Statistician	UNOCHA		
11:30 -12:00	Break	Virtual Field Trip.				
12:00 - 13:00	Segment 2 **Speaker Session**	**Assessing and Combating COVID19: Satellite Imagery.** The session will highlight the use of high-resolution imagery in analyzing and responding to COVID-19.	**Alicia Williams,** Supervisor, Geospatial Analytics	Maxar	Michelle St. Clair	Cecille Blake
			Kumar Navulur, Director, Global Strategic Programs	Maxar		
13:00-13:30	Break	Virtual Field Trip.				
13:30 - 14:30	Segment 3 **Speaker Session with Demos**	**Geospatial Tools & Dashboards.** This session will review a series of applications that can be used to monitor coronavirus cases, track the impact on public gathering places, inventory testing sites, and share this information with the public via dashboards.	**Adam Reedy,** Business Development National Government	Esri	Simone Lloyd	Nadisha Poyser
			Milquiades Walther-Rodriguez Solution Engineer	Esri		
			Josiah Burkett, GIS Analyst	GeoTechVision		
14:30 - 15:00	Break	Virtual Field Trip.				

15:00 - 16:00	Segment 4 **Panel Discusion**	**Community Engagement & Feedback.** This session will review how members of the geospatial community are taking different approaches in breaking down communication barriers during this time and keeping all members of the community engaged and informed.	**Valrie Grant** Managing Director GeoTechVision **Sheree Cameron** Geoinformatics Manager **Alan Mills** Preparedness Coordinator **Francesco Stompanato** Regional GIS Officer	GeoTechVision GeoTechVision MapAction WFP	Roshaun Clarke	Jenieve Johnson
16:00 -16:30	Break	Virtual Field Trip.				
16:30-17:30	Segment 5 **Panel Discussion**	**Data Sharing Amidst Crisis.** This session will review how GIS has served as an important enabler in the decision-making process. In response to the ongoing pandemic it has now become vital that decision makers are equipped with the right analytics to guide policy, recovery strategies and future planning.	**Martin Brady,** Director/Geopsatial Solutions **Macarena Perez,** Executive Secretary **Sandra Moreno** Technical Director of Geostadistics	Australian Bureau of Statistics SNIT-SDI Chile Ministry of National Assets DANE-Colombia	Valrie Grant	Josiah Burkett
17:30 -18:00	Thanks and closing. **Prizes awarded**					

Registration: https://gis_summit_covid-19.eventbrite.com