



**Report of Global Meeting #5 of
The International Forum of
Meteorological Societies**

www.ifms.org

Progress in Development of an Organization

PART II:

**The GWE Session: EMS Session 1.1:
Global Weather Enterprise Panel Discussion.**

Organized by PRIMET and ECOMET

Attended by IFMS Delegates

At EMS – 2018 Conference

At Corvinus University Fővám tér 8

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Version 01

Prepared by:

Dr. Harinder Ahluwalia, President - IFMS



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LIST OF ACRONYMS

AMS	American Meteorological Society
CBHA	Consortium of British Humanitarian Agencies
CMOS	Canadian Meteorological and Oceanographic Society
ECMWF	European Centre for Medium Range Weather Forecasting
ECOMET,	Economic interest grouping of the national meteorological services in Europe
EMS	European Meteorological Society
EO data	Earth Observation Data
EUMETNET,	Grouping of 31 European National Meteorological Services Network
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
GFCS	Global Framework for Climate Services
GFDRR	Global Facility for Disaster Reduction and Recovery
GOS	Global Observation System
GWE	Global Weather Enterprise
GWEF	Global Weather Enterprise Forum
HAB	Harmful Algae Bloom
HMEI	Hydro-Meteorological Equipment Industry
IFMS	International Forum of Meteorological Societies
IFMS-GM5	IFMS Global Meeting 5
IFS	Integrated Forecasting System
IOT	Internet of Things
JEDI	Just Enough Decisive Information
LDCs	Least Developed Countries
NHMS	National Hydromet Service
NHMSoc	National Hydromet Society – some societies also include Oceanography
NWP	Numerical Weather Prediction
NWS	National Weather Service of USA
PPA	Public-Private-Academic (Sectors)
PPE	Public-Private Engagement
PRIMET	Private Sector Meteorology Forum in Europe
R&D	Research and Development
RAs	Regional Areas of WMO – there are 6 of them
Res 40 Data exchange	WMO Resolution concerning data exchange between nations
S2S	Sub-seasonal to seasonal
SDG	Sustainable Development Goals
SIDS	Small Island
“Start Network”	www.startnetwork.org – a network of local networks
SWOT	Strengths, Weaknesses, Opportunities and Threats
UN	United Nation



WB	World Bank
WBG	World Bank Group
WDX	Weather Data Exchange
WIGOS	WMO Integrated Global Observing System
WIS	WMO Information System
WMO	World Meteorological Organization <i>Zentralanstalt für Meteorologie und Geodynamik in English</i> Central
ZAMG	Institution for Meteorology and Geodynamics



1. Introduction

This Part II of the IFMS Global Meeting 5 (IFMS-GM5) Report presents the Summary of the meeting PRIMET and ECOMET jointly convened as a session on the 'Global Weather Enterprise' (GWE) at the EMS Annual Conference in Budapest. It was considered as the morning session of IFMS-GM5 by IFMS and was attended by many of the IFMS participants. The announcement of this meeting is presented in Annex A of this document.

The session had a very high profile at the Conference and was well attended. A series of authoritative presentations produced a stimulating discussion.

The Moderator for this session was **Dr. Louis Uccellini**, Director, National Weather Service and Deputy Administrator of Weather Services of the USA. He has also been the President of AMS and has witnessed the PPA Collaboration development in the USA first hand. The Panelists were:

1. **Dimitar Ivanov**: Executive Assistant to WMO Secretary General on Public-Private Partnerships
2. **Michael Staudinger**: President of ECOMET and Director, ZAMG Austria National Weather Service - Centre of Meteorology and Geodynamics Management (ZAMG)
3. **Leonardo Smith**: Director Centre for the Analysis of Time Series, London School of Economics, Pembroke College, Oxford
4. **Dennis Schulze**: Chair of PRIMET and Chief Meteorology Officer, MeteoGroup.



2. Louis W. Uccellini (Moderator) Presentation

Louis W. Uccellini opened the meeting by introducing the Panel and then highlighted the Global Risks Landscape with a slide which showed Extreme Weather Events posing the maximum risk to mankind. He then noted that the increasing societal vulnerability to extreme weather events is occurring as government weather agencies around the World are dealing with flat budgets, pointing to a greater need to work with the private sector to address the growing societal needs to be ready and responsive to the increasing threats associated with extreme weather events.

He then highlighted the “tremendous success of the Private Industry” in the Weather Business in the United States. By 2017, the value of the US private sector has grown to more than \$9 Billion across



the entire value chain from observations, modeling to service delivery. The successful growth of the US private sector stems from the recommendations provided in the 2004 National Academy of Sciences “Fair Weather Report” recommending that: 1) the NWS should strive to provide all of its data uniformly to all public interests and private sector companies; 2) that the public and private sector weather providers should recognize “grey zones” when differences arise rather than defining hard and fast policy boundaries; and 3) create a neutral space for discussing these differences and resolving any conflicts. The creation of



what is now the “Weather Water and Climate Commission” in the American Meteorological Society in the 2005-06 time frame was linked directly to the last recommendation, and has provided an important forum for the private and public sectors to resolve any conflicts to the betterment of the entire Weather Enterprise and has certainly played a role in the growth of the US private sector and its acceptance within the AMS professional society along with the public and academic/research sectors which make up the AMS.

Dr. Uccellini noted that the operational “Seamless Suite” of forecast models extending from the Mesoscale to S2S (Sub-seasonal to seasonal) increasingly based on Multi-Model Ensembles are being used to improve and extend forecasting capabilities, especially for extreme weather and water events where longer lead times are now needed for society and governments to prepare for, and respond to, these events. He concluded his remarks by noting that there are many other areas where the public and private sectors can be working together to meet societal needs, referring to the recent “Red Tide” along the Florida Gulf Coast related to a major 2 month long Harmful Algae Bloom (HAB) which has resulted in killing wildlife, and impacting tourism and related businesses. Given the weather-water-climate connectivity for these blooms and the increasing need for extended predictions of the onset and decay of the HABs, there seems to be widening opportunities for the public and private sectors to apply observation and predictive skills and related services to decision makers to mitigate the impact of these events. The bottom line at the end of his presentation was that the future is bright for the continued capabilities and growth of both the public and private sectors working together to address the societal needs in the face of increasing vulnerability to extreme weather and water events.

3. Mr. Dimitar Ivanov (Panelist) Presentation

Dr. Uccellini was followed by Mr. **Dimitar Ivanov** who covered three topics:

1. WMO activities on Public-Private Engagement (**PPE**) and Global Weather Enterprise (**GWE**)
2. Global Weather Enterprise Forum (**GWEF**)
3. Future Activities for GWE Initiative.

Worldwide losses from Natural Disasters in 2017 were US\$330 Billion and 2700 people were killed.



He stated that the PPE Drivers include: Agenda 2030 for Sustainable Development, 17 Sustainable Development Goals (SDG) including ensuring engagement of non-state actors, Paris Agreement and 2015 Sendai Framework for Disaster Risk Reduction:

https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf

He also highlighted the need for public and private sectors and civil society organizations, as well as academia and scientific and research institutions to work more closely together and to create opportunities for collaboration.

Another view of the Drivers is the persisting information and service gaps in developing countries, LDCs and SIDS. The need for collaboration between PPA Sectors is driven by:

1. Rapidly changing technology environment and business landscape.
2. New opportunities for optimization and efficiency through integration of networks, computing power and service delivery
3. Pressure from Governments on public budgets
4. Risk on sustainability of national, regional and global infrastructure.
5. Persisting information and service gaps in developing countries, LDCs and SIDS.

Whereas previously Private Sector was engaged mostly in the equipment manufacturing and tailor-made service delivery to business customers, now Private Sector and academia are engaged in the whole value chain which involves, observations, modelling, forecasting, service delivery, processing and data management and R&D.

The objectives of WMOs PPE activities are:

1. Update its policies and guidance to assist Member countries
2. Enhanced partnerships – World Bank, Industry (HMEI, others), academia
3. Align systems – WIGOS. WIS. GFCS in the GWE realm
4. Maintain WMO's role as UN authoritative voice for weather, climate and water.

Dimitar then narrated the activities in which WMO has participated and plans to lead or engage in or has led since the WWOSC-2014 in Montreal, Canada. These activities include: WMO Congress-2015-EC-68, Meeting in Washington DC organized by the WBG-GFDRR, AMS Conference Jan 2018, InterMet



Asia-2018, EC-70 in June 2018 and Special Public-Private dialogue, etc. The current and future activities include participation in EMS-2018 Conference GWE Session and IFMS Global Meeting 5 in Budapest, Meteorology Technology Show in October 2018 in Amsterdam, InterMet Asia-2019, etc. From these events one can judge the importance WMO is putting on promoting GWE – PPA Collaboration.

Here are the outcomes of EC-70 presented by Dimitar:

- a) The Executive Council supported the PPE and GWE orientation
- b) Adoption of the WMO PPE Policy Framework – set of principles for successful PPE
- c) Better integration of partners including private sector and academia, in WMO process
- d) Directions given for high level policy act on PPE and GWE by Congress 18 (June 2019)

He then talked about the GWE Forum (**GWEF**) which WMO-WBG-HMEI created in InterMet Asia-2018. It was created following recommendations by WB GWE Workshop (in Washington DC, November 2017). Its Aim is:

- i. To provide a platform for consultation and to facilitate co-operation, engagement and liaison
- ii. To build trust between the sectors, identify a common vision and mission in line with societal needs for information and services

The GWEF consists of a small group of leaders from the three sectors – public, private, academia – to steer the dialogue and provide, recommendations to relevant bodies including WMO.

Dimitar then outlined the Main Themes of the GWEF:

- Building trust and identifying common vision for the GWE, its role in the global agenda.
- Business models for GWE growth
- Developing Data sharing, data policy to create a level playing field
- Changing the development assistance approach – sustainability through public-private partnerships
- Technology impacts of GWE – big data, IoT, AI, etc.
- Human resources, education and training in the future GWE
- A multi-stakeholder provision of information and services – hence a need for validation verification and authentication.

He also gave a list of future events which have already been presented in this article. Following is the picture of the GWEF Members appointed in April, 2018 in Singapore and some others who were present in this GWE Meeting..



4. Dr. Michael Staudinger (Panelist) Presentation

Michael’s presentation first described the actors involved in GWE as follows:

Entities Engaged In	In the field of	Decision-making by
Scientific Research	Meteorology	Governments
Technology Development	Hydrology	Citizens
Education	Oceanography	Businesses
Service Delivery	Related Observations	

He then showed various types of equipment for gathering weather data which included payload on geostationary and polar orbiting satellites, Pilotless aircrafts, domestic and international flights, meteorological observation stations on the ground, in water and on the ships.

He then urged the GWE members to:

- 1) Strengthen their commitment to the free and unrestricted exchange of meteorological and related data and products
- 2) Increase the volume of data and products exchanged to meet the needs of WMO Programs
- 3) Assist other members, to the extent possible, and as agreed, by providing additional data and products in support of time-sensitive operations regarding severe weather warnings.

Michael then spoke about the Value Chain in Weather Enterprise in weather, climate and Water fields which consists of taking observations, doing modelling, forecasting, service delivery.



He stated that Good Governance comes from balance between common goods and market activities; fragmentation needs to be avoided. It is important to ensure standardisation, interoperability, Development of Business cases with right incentives. A platform such as GWEF is important for dialog for PPP.

He then presented SWOT Analysis of WMO Res 40 vs GWE. He cited the following strengths of Res 40:

- GOS well established, Res 40 Data exchange is unparalleled in other sectors
- System details known to most partners
- Readiness for discussion and changes
- Funding for new sources possible (e.g. development agencies, etc.)

He then cited the weaknesses of Res 40 as:

- Some partners are not complying
- Large data gaps (e.g. RA I)
- No enforcement mechanisms of R40 et al.
- No coherent mechanisms for private data
- Cooperation possibilities with private sector not fully exploited
- Only groups of countries are sharing data
- R40: the definition of the essential vs additional data – 1999 is not clear.

He stated that there are opportunities offered by GWE concept:

- New technologies (EO data, IOT, funding for data gaps)
- Getting all data, know-how on a level playing field
- Optimize competition / cooperation possibilities
- WDX data market to be developed.

He concluded by stating that where there are opportunities, there are threats too:

- Fragmentation of data landscape, standards, services
- Increased divide between private vs public services
- Monopolisation
- Weak regulators

5. Dr. Leonardo Smith (Panelist) Presentation

The presentation by Leonardo Smith was on the topic, “Obtaining More Useful Forecasts Earlier”.

The background of his presentation appeared to be based on the “Start Network” which, according to their website, started because it was felt that the humanitarian system shaped after Second World



War does not serve the current situation where humanitarian crises come and go with ever increasing frequency. Too much of humanitarian action seemed reactive, driven by politics or media and influenced by factors other than the needs of people directly affected by each crisis. If an event does not make newspaper headlines, there might be no response at all; when help did come it was often too late, or of the wrong kind. The result was unnecessary human suffering, scarce resources used inefficiently, and crises that were allowed to

escalate into disasters before anybody intervened. Humanitarian leaders were frustrated by the challenges they faced. Governments were struggling to adapt quickly enough to tackle global problems such as climate change. From some informal conversations between aid agencies in and around London, UK, resulted the birth of Consortium of British Humanitarian Agencies (CBHA), with the goal of rethinking the humanitarian aid system – and of showing that by working together they could innovate, do things differently and deliver aid more effectively. In 2012, CBHA became “Start Network”.

He talked about the Process Resource Allocation which included: Observation, Computation, Model Improvement, Forecast Improvement, Feedback Management and Idea Management. Communication and conversation.

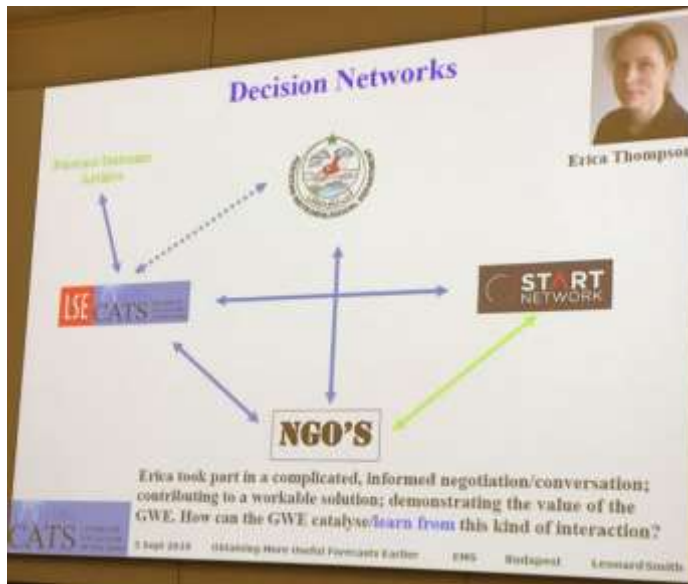
The User Guide available on the link (<https://confluence.ecmwf.int//display/FUG/1+Introduction>) is meant to help meteorologists make the best use of the forecast products from ECMWF - to increase understanding of the ensemble forecast process, to develop new products, to reach new sectors of society, to satisfy new demands. The User Guide presents the Integrated Forecasting System (IFS) and advises on how best to use the output, not the least on how to build up trust in the forecast information. A good forecast that is not trusted is a worthless forecast. The emphasis is on the medium-range forecast products, as this is ECMWF's primary goal, and because medium-range NWP output generally differs significantly from dealing with short-range or seasonal NWP.

He gave the example of Start Network partnering with London School of Economics to forecast and mitigate the effects of a heatwave in Pakistan. In May 2018, members of the “Start Network” in Pakistan raised a Start Fund alert for a heatwave; the alert was activated. Members collectively analyzed weather forecasts and raised the alert before temperature reached the deadly levels.

In a paper Sarah Klassen discusses the challenges of forecasting heatwaves and why a similar alert in 2017 was not activated.

<https://startnetwork.org/news-and-blogs/getting-ahead-deadly-heat>

In April 2017, a severe heatwave with temperatures as high as 50°C hit Pakistan, breaking temperature records across the country. Heatwaves tend not to capture media headlines the way other hazards can in the humanitarian sector (take conflicts or disease outbreaks for example) - but they can be just as deadly.



He spoke about how their decision Networks work and how Erica Thompson took part in a complicated, informed negotiation/conversation; contributing to a workable solution demonstrating the value of the GWE. His question was how can GWE catalyse/learn from this kind of interaction?

START NETWORK has only 72 hours to decide whether or not to act: they are happy to have things (NWP) taken off the Table! They are more interested in answers to the questions: What is a heatwave and when it started. Can

ANTICIPATION allow one to begin before we know it started? He asked how to better/communicate that the best available model may not be adequate for the purpose? Who does the background assessment under these definition and specialized utilities? He believes NOT the practitioners!

He gave the example of a regulator requiring an Energy Company to hold minimum resources based on a national hi-res forecast. The company bought an Ensemble Forecast and used it to judge whether or not changes in the hi-res are “signal” or “noise”. The Project is counted as one of the “UK Success Stories in Industrial Mathematics”. He asked the question: “How does the GWE enable such work and deserve the credit for the value of such work?” He also showed examples of using Ensembles for Insight and not numbers.

He presented the idea of “Just Enough Decisive Information (JEDI)”. There are advantages to letting go of the “Perfect Model” Model. There are other useful goals than probability forecasts.

One approach is to use our forecast models to look for things we are vulnerable to e.g. look in the medium range, regulate industries to avoid dangerous situations, etc. He suggested that it is important to listen to the needs of those who use outputs of today’s GWE and adoption of JEDI approach can yield significant value. Today this is a vastly larger and more rewarding task than it was in the past.

He also presented the following less Scientific Challenges which GWE will face:

- a) That the three sectors of the GWE will compete, not cooperate, while each ignoring valuable information from practitioners.
- b) The actors within an individual sector will compete, not cooperate.

- c) The GWE as a whole will act as if (refuse to accept that) the boundary conditions have changed.
- d) Weather forecasting is now about much more than meteorology.
- e) Practitioners see things of value.
- f) The next generation feels different incentives than we did.
- g) There are (costly) alternatives to the traditional approach.
- h) The best forecast information could move out of the public view.

These examples are not so important in themselves, rather they point to:

- a) Gaps not bridged in the current GWE
- b) Unqualified value not claimed by the current GWE, and
- c) Valuable insights not exploited by GWE

He suggested that the acknowledged value of the enterprise would increase if we protect operational research from demands of operational forecasting, while keeping the research extraordinarily close to operational modelling.

He also believes that:

- a) Feedback fatigue will become embarrassing and will soon become costly; the information, insights, and data from practitioners will be a central contributor to progress, if we wish to move forward more quickly.
- b) Operational centres working more closely together could yield significant benefits, and open pathways currently impossible to explore
- c) Earlier, lower probability alerts of plausible extreme weather or merely high-impact weather, will prove to be of greater value in an altered climate.

He questioned whether today's GWE can evolve quickly enough to maintain adequate fitness in the forecasting environment of tomorrow and be a central contributor to progress. If we wish to move forward more quickly Multi-model Cross Pollination in Time is required.

6. Mr. Dennis Schulze (Panelist) Presentation

Mr. Dennis Schulze first introduced the PRIMET as a Private Sector forum in Europe incorporated in 2010 which currently represents 38 companies in 19 different countries. It has observer status at WMO. Its objective is to ensure a level playing field in the meteorological services market.



It aims to improve collaboration between Public and Private stake-holders for the benefit of the society at large. PRIMET holds regular meetings with ECOMET, EUMETNET, ECMWF and EUMETSAT to promote sharing of data freely and other matters related to PPP.



The Private Sector in Europe provides the following services in a flexible, reliable and cost-effective manner to millions of consumers and many broadcasters: weather conditions including severe weather conditions, data and visualization technologies to public and private broadcasters, support for winter maintenance services to keep transport safe in all spheres, data to power traders, grid operators, and renewable energy operators, routes ships across oceans and ensures safe working conditions offshore.

In order to illustrate the capabilities of the private sector companies in Europe, he gave an example of Czech-Hungarian joint venture company “MeteoSense” which operates the 2nd largest Radar Network in Europe augmenting and substituting public observation networks where there are gaps. Another example he gave was that of a Swiss-based company “Meteomatics” which produces and operates its own drones providing additional input to numerical modeling and statistical post processing. It provides one of the most mature API access to observation and forecast data.

Whereas onetime infrastructure used to be the responsibility of Public Sector, today there is an increasing involvement of the Private Sector. The growth of the Private Sector companies has resulted in the involvement of even non-met companies in the GWE. As we move from general products to custom-tailored products, there is more and more involvement of the Private Sector.

Changes in the GWE have resulted in: open data (not subsidized data), consolidation within the private sector (bigger companies buying smaller ones), new participants from outside the community, International Economic integration, technology advances (“big data” & “Internet of things, low-cost satellites, cloud computing. Etc.), Scientific advances in Climate Change and its increasing awareness.

The GWE concept and PPA collaboration bring new opportunities and risks.

On the new Opportunities side, Scientific advances allow application of meteorology to solve more problems, reduce friction between public and private service, deeper integration of meteorological services into business applications and broader reach of warnings.

On the other side of the ledger, there are risks such as Replacement of government monopoly on observations by private monopolies, breakdown of international data exchange and low-quality services, etc. Benefits are mainly realized in societies of well-developed countries.

He also stressed that there is a bright future under the GWE if we understand and respect different roles, within the GWE. We can approach the state of “no weather-related fatalities” if people and organisations are empowered to make a solid risk assessment when making their decision.

Public and specialized users can benefit from services everywhere on earth if all different parties are equally well represented in international bodies i.e. there is a true level playing field when competing.

Consideration of impacts on other parts of the GWE in each other’s decision making – no surprises! “ Capacity building in developing countries focusses not only on government services but also empowers the (local) private sector. Publicly funded data are available to all, free of charge, accessible for everybody under same conditions. There is a sustainable business model possible if additional private observations and Joint (research/technology) projects become the norm. These ideas create transparency in the quality of services delivered to users.



7. Conclusions

The GWE session at the EMS Conference which was also attended by the participants in the IFMS Global Meeting #5, was an interesting event to appreciate different points of views about opportunities generated by the GWE Initiative. In general, the idea of three sectors (PPA) as well as various countries working together can produce much more value is irrefutable. The investing power of the public sector is limited, especially when governments do not understand the value of this investment and are not ready to invest more. Private sector in many countries is ready to step in, make investments and employ their brain power to come up with innovative solutions. The Academic Institutes and Research Centres are an important component of this mission.

In some countries there is a resistance to the idea of PPA collaboration for different reasons. Some developing countries feel that the Private Sector is trying to compete and make them less important. Especially the entry of international private sector is seen to be a threat. WMO through GWEF is trying to allay these fears. Public Sector in all countries should encourage the concept of GWE because of the strength of this idea and benefits it can provide for society at large.

Private sector in some countries (e.g. in USA) has grown because they do not have a commercial component in their NHMS. It has been noted that in countries that have a weather service with a commercial section, the private sector has a much harder time getting established.

NHMSocs should support NHMSs to address GWE strategy. WMO should also make a strategy to convince the Governments the value of investment in infrastructure and R&D in hydromet and environmental areas which could also be used by each NHMS as a value proposition to convince their Government. It is also important that WMO develops a strategy to be used by NHMSocs and others to educate public about the value of this investment.

Availability of data collected by NHMSs should be made available free of cost to all those who are capable of adding value to this data.

One solution does not fit all needs. Some countries do not have a well-developed private sector and efforts are required to build capacity and infrastructure in those countries. In many countries where private sector does exist, we need to ensure responsible and ethical behaviour as a participant in the GWE.

Since WWOSC-2014 Conference organized by WMO in Montreal, both WMO and GFDRR-WBG are involving HMEI in strongly supporting the PPA participation in the GWE.

The GWE Forum (**GWEF**) aims to provide a platform for consultation and to facilitate co-operation, engagement and liaison between PPA and to build trust between the sectors, identify a common vision and mission in line with societal needs for information and services. All GWE members should support the work this forum is doing.

In support of the GWE Initiative, we believe that all “learned national societies” should encourage the participation of the private sector in their activities. AMS, CMOS and some other societies have proven that by involving private sector along with the Public and Academic sectors, they have become stronger and still have been able to maintain their learned society status. All NHMSocs are encouraged



to participate in the GWE Initiative, identify issues, and be open to “middle ground” compromise in the interest of providing better service to society at large.

GWEF should look into the idea of the Start Network introduced in the presentation of Dr. Leonardo Smith. This network is leading for change in humanitarian aid. Its aim is to deliver more effective emergency aid, harnessing the power and knowledge of the network to help people affected by crises. It advocates for radical change to develop a more balanced international aid system, which shifts power to those closest to the front-line which will generate more effective and appropriate responses for people affected by crises.

PRIMET aims to improve collaboration between Public and Private stake-holders in Europe for the benefit of the society at large. Like in the US and Canada, the Private Sector in Europe provides various services in a flexible, reliable and cost-effective manner to millions of consumers and many broadcasters. The private sector in Europe provides services in a flexible, reliable and cost-effective manner to millions of consumers and many broadcasters. Whereas onetime infrastructure used to be the responsibility of Public Sector, today there is an increasing involvement of the Private Sector even in Europe. Other continents and countries are encouraged to adopt such ideas in their own context.

The GWE concept and PPA collaboration bring new opportunities and risks and we need to consider them carefully to avoid any conflicts.

Capacity building in developing countries needs to focus not only on government services but also the private sector needs to be empowered. There is a bright future under the GWE if we understand and respect different roles, within the GWE.

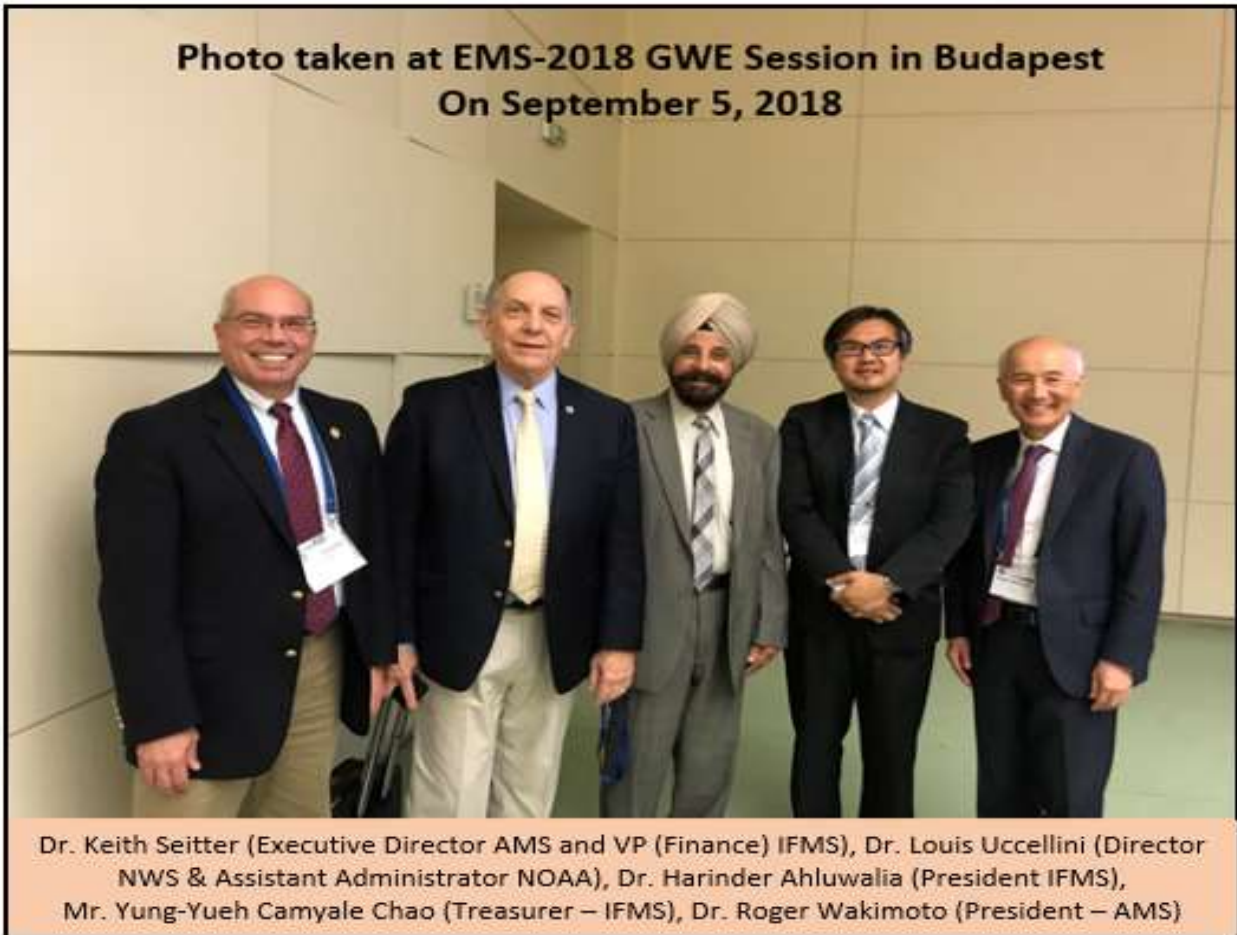
8. PRIMET/ECOMET GWE Session Attendees at the EMS Conference

The following IGM5 participants attended this session: Cam Chao, Liz Bentley, Keith Seitter, Mary Voice, Workneh Degefu, Buruhani Nyenzi, Tefesse Gurmu, Andrew Eccleston, Mario Caffera, Graciela Salaberri, Olavo Rasquinho, Tomáš Halenka and Harinder Ahluwalia.

9. Acknowledgment

I am very much thankful to Dr. Louis Uccellini and Dr. Jack Hayes for their thorough review of the Report and useful comments which have improved this Report.

**Photo taken at EMS-2018 GWE Session in Budapest
On September 5, 2018**



Dr. Keith Seitter (Executive Director AMS and VP (Finance) IFMS), Dr. Louis Uccellini (Director NWS & Assistant Administrator NOAA), Dr. Harinder Ahluwalia (President IFMS), Mr. Yung-Yueh Camyale Chao (Treasurer – IFMS), Dr. Roger Wakimoto (President – AMS)



ANNEX A: ES1.1 The Global Weather Enterprise Announcement

“The weather enterprise is a well-established and successful global public-private partnership in which both sectors share common goals. There are new opportunities emerging to develop this partnership further that will enable the whole enterprise to grow and produce more accurate and reliable weather forecasts. The urgency to do this comes from the need to be even more effective in saving lives and protecting infrastructure because of vulnerability to weather hazards in a changing climate.” WMO Bulletin Vol.65 (2) – 2016

There is an increasing demand for accurate weather and climate information to serve the needs of our global community. Users may be individuals or corporations and their needs may relate to activities involving leisure, safety or commerce. The delivery of the required information depends on the successful operation of three key elements:

The Public sector: comprises National Weather Services and pan-European entities such as EUMETSAT, EUMETNET, ECMWF and ECOMET as well as bodies with global responsibility including WMO and ICAO. These organisations are principally funded through public taxation and are responsible for large-scale observational programmes, global modelling, public safety warnings and the setting of standards for observations and data exchange.

Academia: Universities and Research Institutes may not be so visible to the public, but they are also an essential element in the delivery of weather and climate services. They provide both the necessary basic training for the profession, as well as research necessary to advance the science of meteorology. This may lead to new methodologies for weather forecasting and guidance on future climate change.

The Private sector: over the past three decades Europe has seen a steady growth in the number of commercial weather businesses that offer direct services to end users in many different formats. These organisations typically seek to access publicly-funded data and customise it to the needs of their customers. They may also run their own local-area models and sometimes find themselves competing with the National Weather Services.

- The Session will be chaired by Dr Louis Uccellini, Director National Weather Service, USA
- Dimitar Ivanov, Executive Assistant to Secretary-General WMO will review current Activities and progress

Three eminent speakers will present their views on the current state of the Global Weather Enterprise:

- Dr Michael Staudinger: President of ECOMET and Director, ZAMG Austria National Weather Service
- Prof Leonard Smith: Director Centre for the Analysis of Time Series, London School of Economics
- Dennis Schulze: Chair of PRIMET and Chief Meteorology Officer, MeteoGroup

This will be followed by a panel discussion to address some issues raised in the presentations.

Co Conveners:

Andrew Eccleston PRIMET General Secretary

Willie McCairns ECOMET Chief Executive