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>> Audio test for video and captioning. English language.

(no English translation)

>> Good morning, everyone. This is an audio test for video caption.

>> 1, 2, 1, 2, 1, 2

>> 1, 2, 1, 2, 1, 2, 1

(music)
(no English translation)
>> Areas that the project has been implemented. One of them is Kisia and storyteller is an area meaning program, and so this is one of the areas that we put the project and benefits a lot.
(beeping)
>> We had to identify what locations would be based as a pilot and where. So the disaster management, that were the people (?) that was kickstarted.
After installation, they come to the district committee and members of the satellite committee in that area, they were trained how the system functions. And we offered a training, which is covered and user-friendly for people in the village as well.
Our role is to take care of this -- this equivalent region being put for us, and we have to make sure that they are safe and are well maintained, and everything that is supposed to be given to the community is being given at the right time.
(no English translation)
>> The early warning system project with the ITU I think is tied from the Dubai Action Plan. Before the actual realization of this project, ITU was working in collaboration where every year they used to send us a number of satellite -- they were used
>> They usually help the people to go to get the plans, but whatever the people that are actually affected with the plans, and so this project now has a human face and give those people something that they can also use to be ready before the floods happen, so this is it a good project, and I think now it has tried to give a human face to the assistance that you get from the ITU.
(music)

(silence)

>> Test

>> Good morning, again. Welcome back to the Forum on our last

day today which is the 8th of March, a very special day, International Women's Day and I'm sure we'll have more on this later. This morning's session is about to start, Session 8, Transforming the humanitarian response through ICTs.

The moderator for this morning is Ms. Elysa Jones, Chair of the Emergency Management Technical Committee. Morning Ms. Jones, and over to you.

>> ELYSA JONES: This microphone? Yes. Can you hear me? Yes. Good morning and welcome to the last day of the Forum. It's delightful to be here in beautiful Mauritius, thanks to the Government of Mauritius and ICTA for hosting us. Thanks to the government we've all heard the importance of many things about the telecom ICTs and I look forward to this session where we're going to talk about the disaster resilience for ICTs. ICTs are such an important part of our everyday lives, and certainly when they're disrupted during emergencies and disasters, we must find a way to be resilient.

Joining me on the stage this morning are Mr. Cedrick might, Infrastructure Unit Manager, African network information center. To my right, Mr. Darmen Ellayah, and to my left, Franz Russ, districtor of business operations and infrastructure procurement from Intelsat. Please be thinking of questions that you would like to ask any of us on the podium as they give their presentations.

We'll start with Cedrick, please.

>> CEDRICK MBEYET: Good morning, everyone. Thank you, Elysa. First of all, I would like to thank the ITU Team for organizing this event, also the Government of Mauritius and ICTA for hosting us this week.

Today, my presentation is about resilience and security of critical Internet infrastructure in Africa. I would like to say that I would like to thank the team for the tabletop exercise yesterday because they will make my life very easy because now talking about critical Internet infrastructure is -- will be much more simple.

First of all, something to know about critical Internet infrastructure is that it's not only about hardware, it's not only about backbone, switching equipment, cables, and but it's also about software services. And any interruption for a significant period of time of any of this will impact Internet as we know it.

And one thing that you can do is to go for Internet measurement. You will get a pulse of your Internet connectivity and you will know -- you will monitor the routing path, but also you can identify connectivity gaps and you will know exactly in your country, in your location, in your region where the connectivity is not good.

So what you can do? You can get involved in one of those many Internet measurement programs. I spoke about some during the week,

but also you have more programs like M Lab and Speed Test and so on and so forth. Why should you do that?

One, to identify infrastructure connectivity gap; two, to check your routing path because you want to know how many ISP is affected if you have a disaster like we had yesterday. We want to know where or which Internet path is actually available, is the speed still good or not? And also, you can get a report on your connectivity and so instead of someone always sending information to say, yes, we are alive, you have something -- you already have a way to know if your connectivity is back or if the connectivity is down.

Something else that you can do is about -- one, it will promote the national and regional identity because you want people to use the country. For instance, when I was reading the tabletop exercise, I was a bit sad to see that the website for the government was wasp gov instead of.gov.geo. So that will have more web consent, and more and more web hosting and I put web hosting because it's not only web, but any infrastructure that can run in the country.

So, what you can do to ensure the security and resilience of your registry, first is to get at least a secondary, which means that you partner with someone that will have a copy of every single domain name that you have so in case of disaster you don't lose everything, and you can just go back to them and then they can give you back the old information.

Also, the fact that you promote the use of the dot country will encourage again the local web hosting, and why is because when you have a stable and secure registry, there is user confidence and people are confident that they can go for the local domain name.

And also, in case of disaster, no need for international bandwidth because the content is local, so as soon as -- I'm sorry, as long as infrastructure is available in the country, then people can access the content.

And also, yes, the user can always have access to the local content as soon as the -- I mean, as long as the infrastructure is available.

DNS infrastructure, most of the time when we look at DNS, like Domain name resolution from URL, how do we get to a website, this is what we see. We look at someone trying to access example.net so their laptop will contact the preferred DNS and then the preferred DNS will straight go to that DNS server who knows example.net.

But, in fact, it's not the reality. This is the reality. When you connect your preferred DNS infrastructure the root server, the root server will talk to another server, that server will talk to another server, and that's when you will be able to get the real information.

Why I'm showing this is just because if you want -- what you

can do for the critical infrastructure to be resilient is to deploy a copy of the root server in your country. There is in the world, 13 root server operators. You can approach them. Some do it for -- I mean, not really for free, but it's subsidized so they can deploy a copy of the root server in your country.

And also, we want to -- you want to have more iterative DNS in your country to make it simple for non-technical people. It means that you have DNS and you host, you actually manage your DNS, your name and everything from your country.

Most of the time what do we do? We actually subscribe to services out of the country, we go for paid services or for any services there, but in case you lose the international bandwidth, you no longer know how to access your website. Why? Because the information is hosted outside.

But if it is hosted here -- I mean, if it is hosted in your country, in the case of the tabletop exercise, if the DNS information is hosted in Gatonia, even without international bandwidth you can still get to local newspapers, government website, ETC,.

And so why you want the root server, the dot is the root server, the copy of the root server, you want it to be always available.

And also, the local website will always be found. And also, another thing that is very important, is what we call our DNS, which is the Reverse DNS. And DNS is from domain name to IP DNS. And our is from IP address to domain name. Why it is important? Because you want to fight spam. You want to be sure if someone spends a email saying, Cedrick@gov.geo, you want to be sure that it's really coming from gov.geo and not somewhere else.

In case of a disaster, sometimes you have some people who will try to spread some fake news or some wrong information, so there will be like in the middle use a fake web email address.

So ensuring the resilience of your DNS infrastructure is something very important. Internet exchange point, the good thing with Internet exchange point is that it helps to keep local content local.

You have to drawings. The first without ISP, and what's happening is the traffic is going outside of the country to come back into the country. When you have an IXP, the local content stays local. Why? Because ISPs talk to each other and they exchange information locally.

So if you -- what you can do is promote and enforce IXPs with open peering policy in your country, and then you would have enough traffic and then talk to CDNs, providers, so people that will bring you cash, you have CDN providers like Google, Facebook, and there are so many in the world, but what they want is to ensure that you have enough local traffic.

So if you promote IXPs, then they will be able to do that. Why do you want to do that? Because in case you no longer have

international bandwidth, people can still access to -- can still access information like Google web search, YouTube, and Facebook information, and you want to be able to -- I mean, you want to be able to still use social media. For instance, if you want to share information, and so that's a way to ensure that those are still available.

And you want to also strengthen your local hosting. And very important, no need for international bandwidth, so international bandwidth is cut, we can still talk inside because; first, you have the DNS infrastructure which is still in place; and second, you have ISPs talking to each other, and so no matter what ISP provider you are subscribed with, you can still talk to or access any local content.

So I want to thank you for your attention. And back to Elysa.
(Applause).
    >> ELYSA JONES: Thank you, Cedrick, for that very important, and I want you all to be thinking about how you're maintaining your Internet infrastructure in your countries, and have a question ready for Cedrick when we wrap up.

Darmen, would you like to go ahead next?
    >> DARMEN ELLAYAH: Thank you, Elysa, and thank you, again, Cedrick for this wonderful presentation. I wish to thank ICTA and ITU for this wonderful opportunity to allow me to make a presentation.

I'm just wondering what I'm doing here. I'm just an end user of what you produce the services; however, I wish also to congratulate ITU Team for this wonderful exercisewe ran yesterday. I have been able to work in a lot of simulation exercise, and I always find three types of people, the bigger group is those who make things happen, the other group, they see things happen and the last group is normally the minority, wondering just what happened.

And I hope we have been doing good yesterday, and that was a very good experience for many of us.

So my presentation --
    >> We have the correct presentation here but not here in front of us, if you could adjust, please. There we go.
    >> I'm tempted to skip my presentation.
    >> DARMEN ELLAYAH: In fact, I was told to make showcase of what Mauritius has been doing in terms of the use of ICT in disaster management, so next slide, please. Yeah.

So here we are, Mauritius. If you have good eyes, you can look at it, very far and very remote, and this is exactly why we're very vulnerable. Remote from all the resources that would be available worldwide, and also because we're very small, we're very prone as a small island, developing states, to calamities, disasters, and this region in the Indian Ocean we're famous to be visited by cyclones, and eight to nine cyclones a year. This year

we already have got nine I think. So we are almost at two-third of the cyclone or maybe half and we've already got the maximum.

The main hazards for Mauritius, as you can see, of course cyclone and then heavy torrential rain, flooding, flash flood, storm surging and as far as the slide doesn't mention, all the man-made disasters that we are also exposed to.

And according to a report 2017, we rank 13th on the highest risk worldwide, and we were 7th in terms of high of the exposure to hazards in the region, and if you go to World Risk Report, 2018, I think we have made progress in terms of coming from 13 to 15, and from 7 to 10th.

I'm just taking to show you if you have a opportunity to visit, you can see here, if the laser is working. Okay. You can't use laser on this display, but you can see it's the same picture taken at different times. You will see between four hours, so four hours later this is what we saw.

This is the reality of Mauritius being a tropical island, we have got climactic change from climate change but also microclimates. You must have seen probably yesterday in the morning was very fair weather. During the day it was hot. By 12:00 it was very humid, and at 1:00 or even earlier, we started getting heavy rainfall. Some regions in the north, in the south, and even on the eastern side experienced quite localized heavy rainfall yesterday, and some places were even flooded, so we had services who had to do some interventions yesterday in terms of evacuating or pumping out water in houses and yards, and even the National Emergency Operation Command was activated until the workshop was completed, was over here.

This is a very common scene for Mauritius, and it happens, so this is the reality that we face here. So as you can see we had 150 kilometers of rainfall in two hours and 11 lives were lost, cars damaged, businesses affected. Luckily it's not residential area, but a lot of people were affected, and unfortunately those people lost their lives.

Now, the lesson learned from this one was, in those days we didn't have a full flej disaster management center, but however the lack of information. It was raining since something around 11:00 or 11:30 but people didn't get the message, and what happened is people think that it's going to rain, it's going to stop, maybe some water accumulation and it's going to stop, but then all of a sudden we saw a flash flood.

The area is surrounded by a mountain range, and water coming from all the sides, diverted into the central city and this is what we experienced. Now, had we had an early-warning system or means of communication to alert people in time, we could have even minimized the losses of life and property.

And then we had the disaster management center, and the place

where I'm going to dwell more is the national emergency operation command where you see it in red. The National Emergency Operation Command is activated whenever we have an emergency or pending emergency, but then it is responsible, not only to manage the response of the operation, but also to issue alerts, to issue warnings and advisories to people who might be at risk.

I know most services have got their own SOPs and their own mandate, and they will forecast and advise and give advisories, but the impact base is managed by the National Emergency Operation Command because we've got people on the ground, responders on the ground, and they tell us what is happening. And then from there you issue alerts.

Up until now, we don't have a sort of emergency alert system, but then we are in the process. We are in the process since a picture of the -- multi-agency, responders, all government departments as well as private sector and NGOs involved, and then they are from there managing and coding, monitoring response of the operations, but at the same time it's mentioned for communication and information, we have got the information manager, and he's responsible to make sure all of these alerts and warnings are to people around.

Initially, it was very criss-cross and nobody was really sure which message to give, et cetera, but then when people are at risk they want to hear a single message from an authorized agency which is reliable, and so who is responsible to that. I think this is an issue to me and my people when we work in the office, a challenge that we face, because I usually use technology. If you have got a story to tell and you don't tell it, someone else will tell it and you won't like it.

So usually if you don't tell the right information and you don't get the information to people, they will get it from another source and that will be not information, but it will be misinformation and that's why it's very important, the aspect of always sending out information to people for life saving.

Now recently two years back we started working on this project, the national multihousehold emergency alert system, where Elysa Jones has been working with us for this project, and we are now almost in the final phase of having a system, and the system will encompass many -- it will be protocol based but it will allow Mauritius to send multi-household emergency alerts to people from different channel of communication and very soon we're going to have it for television, for radio, for design, website, and so on. The second phase would be to have the CBC, the broadcast system, and with it during 2018 during a cyclone, tried to send alert messages for SMS and I think 1.3 million SMSs were sent, and then people -- it jumped the system and we got the message afterward because some people got the message, my wife got the message 24 hours after the

cyclone was gone, so just imagine if I got a flash flood what happens.

And then, of course, it will try to cater all of these on TV, radios, fax, email, all of that. And the cap will be, the cap aggregator should be able to do this, putting those information very quickly in a standard format for all the different channels of communication, including the social media, the mobile hub and so on.

So as I mentioned, there was an emergency alert app, and then we work a private/public partnership with (?) telecom and we develop one which also has been very widely used, and then of course I just wanted to mention the, not only opportunities but they're also challenges for us, a storm surge early warning system which we have developed like was mentioned, the system is six hours probabilistic and three days -- I'm sorry. Six hours deterministic and three days probabilistic.

We have got also established a meta-threat service with the region to provide satellite imagery of or for flood forecasting in the region, and we're working closely with the University of Mauritius on this project, and recently we had -- so that we would be able to communicate when we have got a total failure of the communication system. We have got a landslide monitoring system and warning system which is in place already, and then we also acquired a mobile command post which is equipped of all the communication systems, including of drone and including of the satellite phone.

Of course, we started using drone recently for surveys, rapid deployment of responders on the ground just to have an idea of what is happening. And there are a few other upcoming projects like I mentioned the early-warning system, the emergency alert system.

And then we have got a project which is almost on the final phase, now it's a Safe City Project where we'll be having core handling and dispatching capabilities, livestreaming in flood-prone areas, for example, or disaster-prone areas, and in which also included disaster management module and additional support system which will be helpful.

And of course as mentioned, we are going to implement the broadcast system, the flood monitoring and warning system, and of course use of IoT sensors which is an upcoming project in which we'll hopefully help us in better managing disasters.

Just to show you a bit of the preparedness measures that we have been doing, is training of community-base the disasters, the group on the top left. We have identified some 25 to 30, even 35 volunteers in different regions which are very prone to disasters such as flooding, storm surge, or even landslide. And we have got basic training into life saving and camp management so that they could be the first responders pending the arrival of the first responders, and then a lot of simulation exercise we're talking to

Franz before we came.

I think probably we're doing some 60 simulation exercises every year, and we have all the local authorities, with all the first responders and so on, including a port and airport, different scenarios and different emergencies, and maybe when we debrief, the point number one that raises all the time which is a challenge for all of us is communication and telecommunication. It is always an issue and we know we have been trying to see ways and means to address this issue, but of course it takes time to see it fully implemented.

And below you can see what is mentioned, it is equipped with wheelchair, it is equipped with satellite phone, landline, mobile phone, and so on which can be pushed on the ground in affected areas and maintain a line of communication as a incident command post to the National Emergency Operation Command or local emergency operation command, and yes we do a lot of sensitization, but very important is also we have got sort of SOP. We have got a sort of national -- we call it a national disaster scheme, 2015, which incorporates nine different scenarios and emergencies, and it gives a very broad detail, and maybe in a lot of detail, the role and responsibilities of each organization, inclusive of the private sector, inclusive of NGOs, and they know exactly what they have to do.

However, however, this is a good thing but we've got a lot to do, we have got a lot to improve. In terms of communication, I think this is what we have learned in the last three days. We need us, each country, we need to develop a national telecommunication emergency response plan. It's very important because we tend to believe that it's going to work, but when you get into the emergency and you become overwhelmed, then you realize that all your plans were good on paper, but when you put it in practice, it's always a challenge.

So I don't think I have got much to say. Thank you.
(Applause).

>> ELYSA JONES: Thank you, am Darmen for that tremendous presentation. They have done a great amount here in Mauritius but communication still rises to the top of being the one thing that needs to be done, the number of simulations and live exercises is 50 or 60 a year full-scale exercises and there is a lot we can learn from from what Mauritius has done so be sure to prepare your questions for when we finish.

Okay. Now we have Mr. Franz Russ to talk to us about satellite communications.

>> FRANZ RUSS: Distinguished delegates, ladies and gentlemen, complements to the ITU and Mauritius government for setting up the conference and opportunity to present solutions provided by the satellite industry.

While I'm working for satellite operator Intelsat, I'm here

today to represent the satellite operator association, a body similar to GSMA and representing the satellite communication industry at regulatory meetings, but also being in charge of training of thousands of recent installers.

There are multiple ways how satellite can provide early warning systems to affected countries allowing them to alert potential affected areas in due time and activate the disaster plan.

A few examples are collecting data from tsunamis boyance and analyzing results to affected country, monitoring and analyzing data such as rainfalls or dry spots, or tracking malaria or mosquito movements, predicted areas impacted by suspected flooding, monitoring and analyzing disaster-prone events while a constant earth observation of spotting hotspots in forests, tracking locusts, or increasingly security. The security, and that's an example we had in Congo, it became a reality of the satellite-based GSM at remote villages in East Congo was deployed while this violence occurred too often.

The safety aspect was quickly realized, enabling villages connected each other via WiFi and it stopped.

There are a lot of factors, or some key factors to improve disaster resiliency. Ensure early warning results are forwarded and disseminated completely and in time to affected areas.

Our communication challenge setup, allowing to communicate without delayed warnings to potential affected areas is financial disaster communication network, and our roles and responsibilities within government and its representative and respective stakeholders defined with clear point of contacts, is a network backup system in place for making the key authorities and stakeholders engaged in disaster relief, have a network backup system, can a network backup system be repurposed, and a repurposed communication system could be a very economic system, either partially, for example reallocating satellite capacity to a backup system during the time of a disaster, or completely using a existing satellite based network, maybe such as a school network.

Regular training and exercise, the National Disaster Communication Plan, and it means allocating and ensuring ongoing inspection and maintenance of allocated equipment put aside for disaster relief. That's a very, very important aspect because that is what very often fails. Plan and test re-tasking existing networks, for example such as ATM networks.

For example, you could add WiFi to an existing satellite-based network for quick communication and restoration during a disaster. Using regulatory blocks as outlined in the Convention, removing regulatory barriers related to licensing and appropriate type approval at least during the disaster improves available international relief resources and implementation of fast-track procedures for imimport and re-export.

This is the most common reason for delayed help and seems to be more cumbersome for the re-export after a disaster mission.

What is the impact of preparedness? It's demonstrated that a ton of investment for preparedness starts with a 4 to 1 and can be as high as 30 to 1. In other words, investing $1 in preparedness will save at least $4 in the cost of responding to the disaster.

At this point, I would like to congratulate the Government of Mauritius for the tremendous effort they made, and it seems to me that they could be used as a role model for how to be prepared for disasters.

All the existing examples in preparedness, yes, the Crisis Connectivity Charter in the satellite industry, could that be replicated on a country-by-country or regional basis? Absolutely. If pre-installed or re-purposed backup system or at a minimum by available ready, deployable satellite communication infrastructure.

In the following I'll go a little bit more in detail on the crisis charter on how the satellite industry is today prepared to help disasters.

The crisis charter was signed with the WFTC May of last year and the goal is to provide first responders the required communication for their mission. The satellite operators or integrators are proud of being ahead of any private other sector in achieving a full charter in emergency communication at no cost to you.

And now that the working structure and procedures are in place, it is open for other satcom companies to join. The coverage area of the donation covers the globe by multiple frequencies as provided by each charter secondary server operatesser, leading to superior resiliency and high level of redundancy. Here is the -- and here then lastly the coverage for satellite phones.

What are the charter's objectives? It's a pre-planned solution for a scalable Internet satellite based solution, serving up to nine disasters a year, and activation is triggered by the ETC.

And it means ensuring full operational satellite network up to the port of modem, and ETC takes over from there in the land-based, and can support up to a thousand humanitarian workers in the affected population.

The solution is deployable because it's pre-planned, it's pre-deployed within 24 hours with a minimum -- or with a mixture of NSF and NSF services and the dedicated bandwidth is free for the first three months.

As one point of contact per, in the ETC and training and capacity building is another example or task, so everything is prepared and trained, and several disaster simulations have already been executed by ETC first responders. All is set up for now for getting activated, and all of that as said is at no cost to ETC.

What is the role of ETC? It is the logistical support. The
equipment is stored in Dubai for preparedness response depot in
Italy ready to transport to disaster areas, and transportation
within disaster areas and implementation of licensing.
     How was the Charter activated? Mainly, two steps. The first
step, ETC maintains the database of donated equipment and services,
including all the coverage areas as provided by each significant
tree, and they determines charter within 12 hour, determines, number
of locations and speed required.
     ETC consults database and narrows down viable offers based
upon mission need.
     On the second step, ETC works with each dignitary to confirm
what is available and makes solution to deploy. They hold
conference calls within 48 hours to review selection and solution
to be deployed.
     Right after, ETC transfers equipments to affected areas and
works with selected charter dignitaries to communication services.
     I would like to point out these superior robustness and
resiliency of satellite communication during disasters. It's an
easy and fast deployable light-weight equipment today with mostly
submeter -- the installation can be do in 15 minutes to 30 minutes.
If it's a larger dish maybe 1 or 2 hour, but that's maximum. If
you have trained people, then that is what they take care of.
     It's guaranteed in the coverage area with multiple
technologies in multiple frequencies, providing a huge resiliency.
It's proven, it highs a higher proven reliability than terrestrial
infrastructure and this is something that very often is not
believed, but that's a fact. And it benefits from the highest
throughput capacity thanks to high throughput satellites now
available on the market.
     I'd like to point out that the satellite industry has compared
significantly compared to 10 or even 5 years ago. It becomes an
integrated part of the communication chain, and addition to the
ground segment driving towards a user-friendly black and white
capability supported by new and common standards adhered to by all
mandators.
     My recommendations is increase the manners of the crisis
chartered to all ITU members, encourage Member States to approve
regulatory and faster disaster relief and cover especially those
in high-risk areas to constantly maintain a regular test and test
basis stock of satellite equipment in country, and promote online
sign of deployment of equipment, need to be deployable
satellite-based communication infrastructure to counter disasters.
Thank you very much.
     (Applause).
      >> ELYSA JONES: Thank you, Franz for that important
presentation about how satellite can support the needs of both

preparedness and response.

So I'd like to turn to the audience now and ask you for any questions that you have of our presenters today?

How many of your countries have resilience in your IP networks as Cedrick spoke of? Are you looking at keeping your data in country and using the mechanism that Cedrick spoke of? Yep? We have a question here in the front?

>> AUDIENCE MEMBER: Good morning. Cliff adder from -- and I was commenting we try to keep our data in country so we try to back up the data also in country, and we're trying to avoid exporting our data currently.

>> CEDRICK MBEYET: Thank you for your comment.

>> AUDIENCE MEMBER: I just wanted to reaffirm a comment that Cedrick made about the importance of Internet exchange points because in the case of the Haiti disaster in 2010, having had that Internet exchange point that had been there with the help of the NSRC, the Network Startup Research Center I believe -- or Resource Center out of the University of Washington, and I know the email traffic was able to continue in the country even after the network devastation. The only issue was that IXP then needed fuel, which we looked at helping with but; again, it was very important to the ability of people to communicate, just as you said.

>> CEDRICK MBEYET: Yes. Thank you for your comment, and just to reaffirm that IXPs are very important but unfortunately, most of the time they are run in country by volunteers and they face that issue of government not accompanying the IXP team or sometimes the regulation not very easy -- or I mean not made very easy for them.

>> ELYSA JONES: Thank you for that. So looking at the IXP then and seeing that we have resilience and backup for that IXP with fuel, of course, and then with expertise as well in case a disaster happens is a critical element.

Other questions, perhaps, for Darmen or Franz? Yes? Was there another question for Cedrick back in the back? Yes?

>> AUDIENCE MEMBER: My name is (?) from Liberia and my question has to do with the top level domain, the top-level domain realligation process has been a serious challenge especially taken from one ownership to another. It also has to do with lookup content building because if they are the top-level domain is not properly managed or not being hosted in the country, you find out you don't have enough local content in a web hosting.

So because of that, you want to go to through the re-delegation process but then there is a whole series of negotiations with the current manager or the current technical hosting agency that has been hosting your data outside of the country, and ICANN does not support host takeover in any way so you have to go through a very lenient process of re-delegation and so because of that the ISP with

no local content on it, it's just former equipment sitting there and nothing is happening. How can we address some of these issues, especially with the top-level domain as critical infrastructure for the country?

>> CEDRICK MBEYET: Thank you for your question. It's true that talking about top-level domains, at first when top-level domains started and ICANN was allowing anybody to get top-level domain for any country, but more and more they're encouraging countries to take back their top-level domain.

Now, to be able to encourage for more local content would be a strategy, a global strategy, and so you need to have the registry talking to operators to ensure that you have, first, the registry in place, and also, you have at least one of the operators having some infrastructure available in country to provide hosting.

Now, the issue will be the price, and most of the time because they don't have enough customers, the price will be high, so that's where the strategy comes in because if you have the government behind, the government able to subsidize subscriptions, then you can match the price that people will have outside, and then you can encourage people to have local content in country.

But also, don't forget that -- don't put all of your eggs in one basket. So you have the content on local, but also you can have a copy somewhere outside just in case, but that's just an idea.

There are so many things that you can do, but for me the most important is having a national strategy to push for people to first adopt a local domain and, second, to push for more content hosted locally.

You have the case, for instance, of Randa where they say that critical national data cannot be hosted outside, so that's something that I've put in place and now more and more you have data centers raising and people hosting content on local, so that's something also that Liberia can do. Thank you.

>> ELYSA JONES: Thank you for your questions and your responses. I appreciate everyone on the panel here that has provided information for us today. I think it's very important for us to understand the resiliency of the Internet and having the data in country and also having it backed up out of the country and having those redundancies. It's very important for resiliency. I thank Darmen for his presentation today, and now we've seen how wonderful Mauritius has done from the policy aspect to the legislative aspect to the operational aspect, and any country that is faced with this many disasters, having so many drills and exercises, that it just becomes part of the nature and part of what they do.

I'm also encouraged that you're looking to develop a National Emergency Telecommunication Plan because I think that's the next step, is to develop that plan so that not only are you prepared in all of these other ways, but run those drills and then as the drill

occurs, drop your VHF or drop one of those communication mechanisms that are critical, and then complete your drill.

These are some of the things that I've been involved in in other exercises, and it's tremendous to learn the value of those communications, and then how you're going to be resilient and able to request ensure in your after action that you've taken that into account. Great work they've done here in Mauritius.

And certainly, turning to Franz's presentation and what a wonderful job he did telling us about the capabilities of the satellite and so much coverage throughout the world, and I encourage you to engage in if you haven't already, the Tempara Convention so that we can get this equipment on board when you need it, but also have it in board as a preparedness act, so become resilient, plan your resilience early and don't wait until the disaster happens, but when the disaster happen, make sure you're prepared to bring in the resources that you need, that the ITU offers, and the Tempara Convention provides guidance for.

I think this has been a good session and I appreciate your attention. Any final questions before we close? All right. We've remained on time and we'll get on with our day. Thank you for your attention.

(Applause).

>> Thank you to the members of the panel and the moderator. A reminder again to vote for using the app that we've been using during the forum to vote for the sessions and we finish add few minutes early and coffee is being served outside and everyone is welcome just through the doors as usual for coffee and tea and snacks, and we resume on time for the next session. Thank you.

>> So if you would like to take your seats, ladies and gentlemen, we'll be starting very shortly.

(music).

>> My name is Sharon. I am the co-founder of Fenly Pacific. Since TC Winston one of the things that was organized whether or not you the weather watch program was to bridge the gap between women's leadership and those in decision-making and government responsible for disaster risk reduction response and preparedness.

It started like with one Blackberry and series of SMS messages and then being able to write messages and send and receive SMS messages, really showed that when you put technology in the hands of women, make it appropriate and accessible, you can do a lot.

Yes, women are at the community level leading, but they're not necessarily represented well in the government structures. One of the key messages I've been saying and as part of Fiji Government's policy and development of legislation is that it's got to be decentralized. It's not just adding women of all diversities or adding persons with disabilities or simply seeing them as oh, they're vulnerable and we need to help and protect them.

It's that these are the community leaders across Fiji, across the Pacific Region, and they've got to be involved.

>> Thank you. I'm very happy to wish everybody a Happy International Women's Day.

(Applause).

I'm glad to say we have a gender-balanced panel of speakers for this next session, and in celebration of International Women's Day, the men have removed their ties.

(laughter).

So we can be talking about transforming humanitarian response through ICT, so we're taking a slightly different direction in this panel, compared with what we've been discussing earlier in the week.

I think one of the big differences is that whereas when we're talking about emergency response, we're often talking in terms of hours, in terms of days. Whereas, when we think about the humanitarian response to say the refugee crisis or internally displaced people, we're thinking about a different timeframe of months, years, and in many cases, decades. We mentioned earlier the case of the refugee camp in Kenya which has been there for more than 20 years. So that's quite a big difference about how we think about using ICTs.

But a second big difference, I think concerns the sort of public reaction to humanitarian crises. When there is a natural disaster, the humanitarian response is always much good will, of volunteering, of instant response.

But in the case of the refugee crisis, the public response is often quite ambivalent. The phrase, "build a wall" comes to mind. That means that we, perhaps, have to think about the response in different ways.

In fact, many of the barriers that we face in making a response to humanitarian crises rerevolve around things like do we welcome refugees as a sort of long-term commitment or are we offering refugees services that will not encourage them to stay?

What I want to say is that we have to think about how we respond to public concerns over the refugee crisis, while at the same time,

taking a very philanthropic issue.

And we'll talk about issues that arise because of that.

I'm glad to see we have a interesting panel and I've seen the presentations in advance, and I can assure you that we're in for a very interesting session. We have Caryn, Frank, Clara and Charles. I'll introduce them all as they begin, but perhaps we'll begin with Frank. The managing Director of a program for NetHope, a new role he took up in November of last year that has actually been with NetHope, has been with them since 2005, and worked in a number of humanitarian responses around the world. He's based in Seattle, so perhaps no surprise that you spent at least 20 years in the software industry. Frank, over to you.

>> FRANK SCHOTT: Thank you. Good morning, and thank you to the ITU, again, and the Government of Mauritius for hosting us this week. This has been a terrific conference, and it's good to -- it's been great to meet many of you.

Let's see. Where is the clicker? There it is. So how many know anything about NetHope? Some of you. I'll do a quick introduction. NetHope, our mission statement is that we empower committed organizations to change the world through the power of technology, and there are a couple of key phrases there.

First of all, the power of technology. We're exclusively focused on communication and information technology in our work, but also it's this other important phrase here is committed organizations, and the first set of committed organizations are NetHope Member NGOs and all together we have 56 NetHope Member NGOs, names that many of you know, and collectively they spend 30 billion dollars a year on international aid, and so they're really the big international NGOs and we work with them on information and communications technologies interventions.

But there is another set of committed organizations that are part of the NetHope ecosystem, and these are also names that you'll know, the Blue Chip technology companies, Microsoft, Cisco, Facebook, Ericson, financial services like MasterCard and visa, organizations like USAID and the Gate's Foundation and Vulcan all very interested in international development, and we work with them and our members around the use of information and communications technologies.

We're probably best known for our work in emergencies, and that's because, like many NGOs, that's when the spotlight is on us. And some of the emergencies that we work on are refugee related, and so what I would like to do is kind of share three different emergency settings with you and talk about the work that we did with connectivity and information services.

So the first -- the first case study, if you will, is on the shores of Greece, and refugees were arriving on the shores of Greece, and our Member Organizations working with them, IRC and Mercy Corps

said the refugees are thirsty for connectivity, and there was actually a story in the New York Times that ran where the reporter went to the shores of Greece and was talking to the refugees as they were getting off the boat, and the very first question the refugees asked is where am I, and the very second question was, do you have WiFi?

Many of them were carrying their cell phones in these little plastic baggies as if they were precious gold, and the importance in those first minutes ashore was, do you have WiFi?

Why did they want WiFi? Probably the most obvious reason is first of all to connect with family and friends and to say, I made it. But then there is a whole set of other questions that they would ask, such as, where is it safe to go next? What kinds of services are available? How can I apply for asylum?

And so what we did with the help of Mercy Corps and IRC is set up WiFi hotspots for refugees on the islands, but then also information pages that were available on sign-in that would essentially tell them the information that the NGOs wanted to share with them.

Well, as time went on, refugees started migrating, and as they were migrating, the need to provide information to them changed from the information that was being provided in the Greek isles. We set up 85 migration and charging stations along the route and when refugees reached the transit center or location was, they would get an information page or pages that would be geographically contextual to where they were and, basically guide them to the next place where they're going.

Well, obviously, circumstances changed, the boarders shut down, refugees began moving into settlements, and so our work changed. Refugees still wanted to be connected, and so we began setting up permanent WiFi solutions in the camps, and this is a camp where I spent a fair amount of time just outside of Athens, and you see the children huddled around phones, probably playing games on the phones. No schools yet in the camps, and so the kids had to do something to pass time.

You saw women gathered around charging stations charging their phones, and there was one story that really struck me. We saw a woman on her phone, and she was alternately laughing, smiling, and crying. We got to chatting with her. She told us her story. She fled Syria with her husband, her three children, and her neighbor asked her to take their two children to safe passage to Greece.

So she's sitting in Greece with her husband and five kids, and her husband goes ahead to Germany to look for a permanent place to live, and they shut the boarders down.

She says every morning, I use this phone to talk to my husband and to talk to the parents of the kids that I'm taking care of. She says, this phone keeps me alive.

So we used to think of the utility of a phone and helping refugees with information, but clearly there is the connection that's made. It's not reunification as we would like it where it's physical reunification but it's virtual reunification, so the psycho social aspects of being able to connect with family and friends, this woman said it kept her alive.

I'm going to talk a little bit about a non-refugee situation because I think it illustrates an opportunity that we're actually taking advantage of now in other refugee and migrant situations, and the situation we talked a lot about Hurricane Maria and what not, and we began helping mobile network operators restore communications capabilities and making sure the emergency response organizations had them, and the mayor of one town said, would you be willing to set up a WiFi hotspot in the middle of our town square for the community? We did that.

Before you knew it, in two weeks, we had requests from I think 35 jurisdictions to install WiFi hotspots for the community. So, we did that. And then we stood up a Facebook page. We called it Information is Aid, and we worked with Internews to populate the Facebook page with news you can use. The news you can use changed over time, but it was wildly successful. And thanks to Facebook, we were able to use the platform to target Puerto Rican citizens with specialized messages about the Information as Aid page and within six months we had 150,000 people following the Information as Aid page, in all likelihood most of them were living in Puerto Rico, but there were probably some others following them. And we had all together 1.1 million unique users in the first year.

So using the platform, using free WiFi, and using the platform to bring information and news you can use to the affected community is definitely something we want to build on, and having the ubiquitous Facebook platform and being able to essentially put up the page within a minute, made it something that helped us with getting the solution out there very quickly.

The last case study I'll talk about is what's taking place right now in Colombia. We know that people are migrating through Colombia and the characteristics are remarkably similar to what we saw in Greece with largely women and children migrating through the country, needing connectivity for that psychosocial support, and needing connectivity to make safe passage to the next location.

And so far, we've established 35 WiFi hotspots and charging stations, and unfortunately because of funding constraints, we don't have enough to address the 150 additional requests for WiFi and hotspots throughout the country that are coming in.

So I'd like to maybe close with a couple of things. One is about the challenges, so most of -- although we're working in many cases in austere places, the challenges are rarely technical. There are some things that are hard technically at times, but one

of them is host government regulations or requirements.

Maybe there are two things to call out here. One is if given a choice, we would always buy equipment in country, but often times equipment isn't available in country and we have to import it. And I would say that if you are working on disaster preparedness and you're at the government level, one thing you might think about is perhaps a temporary moratorium on some of the requirements around import because we've had cases where equipment is sitting in customs for as long as two months and that makes it very hard to deliver services to the people when they're most in need.

Another is the challenge around getting SIM cards in country and there are certain countries around the world where refugees have a very difficult time getting SIM cards, and that just makes our work and the work of the NGOs much more difficult. Another challenge, and certainly we've encountered this in a big way in Greece, is the requirements around what you do with personally identifiable information and because of the GDPR Guidelines, we have a very heightened awareness around personally identifiable information, and our -- I mean, we have to gather IP addresses and MAC addresses, but we don't have to keep them.

So one of our tactics is to purge that data as quickly as we no longer need it, which often times is within 30 days. But we have been asked by others to provide them with that information and so that they can track the movement of the affected population, and that puts us in a difficult position and so far we haven't done that.

Which gets us to the next point which is around information-sharing protocols. Who do we share information with and what are the safeguards of passing information from one party to the next?

And then finally is financial sustainability. Thanks to the generosity in most cases of the mobile network operators, we're able to offer these services for free to refugees, but ultimately there has to be a transition to a economic model that's viable for the mobile network operators, and that transition is always difficult because you've offered somebody something for free and now you're taking it away.

So, I'm going to close -- I'm going to close with this is my Formula One slide because I talk a lot about what NetHope did, but in all of these cases there are some very, very important partners that helped make all of this happen.

I've mentioned Cisco and Microsoft and Facebook and Google. I've mentioned Ericson, the Emergency Telecom Cluster and UNHCR are invaluable partners in all of this, and working within the ecosystem with the partners, we get so much leverage by working together. The expertise that the tech sector brings is over the top in terms of what we could possibly purchase on our own or have in house. That's certainly true for the NGOs that we're working with, IRC, Danish

Refugee Council, Mercy Corps, the local operators are always
critical and always part of the solution, and certainly the
satellite providers are important, and then we do get some
considerable funding from USAID from time to time for this, and so
it's all part of an ecosystem and kind of pulling it together for
the benefit, ultimately, of the affected community but working
through all the partners.

So with that I'll turn it back to you, Tim.

(Applause).

>> TIMOTHY KELLY: Thanks, Frank. You choose some hotspots
around the world to work in, so happy to introduce our next speaker,
Clara Van Praag, the Program Coordinator at the UNHCR, and her
precise job title is humanitarian Education Accelerator, I'm not
sure if that means you speak very fast.

She spent more than 10 years there and in the innovation sector
and based previously in Nairobi. Clara?

>> CLARA VAN PRAAG: All right. So I guess it's going to
magically appear? Great.

So as Tim said, I work with the UNHCR innovation service and
as such I'll talk to you a bit about the work we do related to
connectivity, data, and how we make this work for the community that
we're serving.

Over the last two days, our focus has been very much on sudden
onset emergencies, and but what happens when these emergencies lead
to long-term displacement of people?

Currently globally there are over 68.5 million forcibly
displaced people in need of protection, and 25.4 of them have crossed
international boarders making them refugees. UNHCR is mandated to
coordinate and provide services to 19.9 million of these.

The power of ICT gives us an opportunity to provide better
services, from enhancing the way we communicate to receiving data
from the refugees themselves to leveraging the power of ICT in
artificial intelligence, Big Data, digital identities, or access
to financial services.

One of our flagship initiatives is the connectivity for
refugees portfolio, as we believe that access to connectivity is
a right. Our research has shown that while many refugees have
connectivity, they are particularly in rural areas half as likely
to access this connectivity compared to the hosting populations.

Where some of this relates to a lack of infrastructure, a lack
of mobile devices, it can also be due to the policy and regulatory
environment and adoption barriers such as digital literacy.

So we frame the challenge of connectivity -- of connecting
refugees as a right's issue, and so I'll just read this statement
as well.

All refugees and hosting populations, regardless of age,
gender, or demographic group, have the right to access mobile and

Internet connectivity to build brighter futures for themselves, their families, and the world.

Dignity is a very important component, and everybody should be able to choose how and when they would like to connect.

We have undertaken a number of market assessments looking at access to handsets, credit, coverage, and we've produced basic coverage mappings to assist us in providing services from feedback tools to payment options.

In 2018, we embarked upon a research agenda in partnership with the GSMA and their Mobile for humanitarian Innovation Program that we heard a little about yesterday, and this is bringing a lot of insight to the barriers of connectivity and highlights the need of the vulnerable populations.

UNHCR is not alone in doing this, and these insights allow us to build upon the partnerships with the private sector companies and telecom operators to build up sustainable business models for users and companies alike.

Connectivity for Refugees has looked at specific projects with companies here today. We've been working with mobile operators in the Uganda Communication Commission to co-chair a platform, we convened a technical connectivity working group to enhance the working efforts and operational effectiveness in addressing network coverage in Uganda and this is something that could be replicated in multiple refugee-hosting countries because it allows us to work together with key partners and stakeholders to ensure that we provide this right to connectivity for the refugees.

Earlier this month, we also launched this research report called Displaced and Disconnected. It's research that was undertaken in 20 countries on the regulatory environment in respect to telecommunication. Key findings have shown that significant identification barriers remain. Without a government-issued ID card refugees cannot meet the know-your-customer records and cannot buysome IM cards or have access to mobile banks. These are excompliewd or criminalize vulnerable populations due to the blackmarket transactions. We have to broaden the recognized forms of identification, such as those produced by UNHCR with a view to longer-term inclusion in host-country national systems.

The average amount of time a person remains displaced has now grown to 20 years. Tim mentioned earlier, we're no longer talking about 5 days or 10 days or 1 year. 20 years without being able to have a valid ID card which would enable you to access services is something that we have to change.

So we need to clarify the existing requirements, we need to harmonize regulations, and we need to coordinate a cross-government and humanitarian partners and explore a system of tiered ID requirements. We need to facilitate faster registration,

documentation, and we also need to remember the protection of data.

So, rolling out solutions such as digital identities, remains a problem because of data protection issues and we need to figure out solutions to this.

Over the last few days we've also spoken about understanding the communication ecosystem, and this is completely valid in refugee settlements. As humanitarians we need to rethink the way we provide information, the way we receive information, and the way information gets passed within different communities.

Frank talked a lot about the fact that refugees use their mobile devices to connect with their families, connect with their friends, and to understand this whole ecosystem, we need to take into account all of the available tools, so be it radio, TV, mobile devices, or even non-text methodologies so that we can increase our accountability to the population we are providing services for.

In this picture, you can see on each end there are suggestion boxes, which is how we used to traditionally request for feedback from our communities of concern. In the last 10 years the proliferation of mobile devices has increased dramatically, almost even though not every refugee obviously has a mobile device, they will have access to one. And if we are able to use these new technologies to provide information and receive information back, we can actually build much better services that respond to the needs expressed by the community.

We've launched a series of assessment tools that ask key questions related to, do you have access to a mobile device, what are your preferred platforms, is it Twitter or Facebook or Instagram orwhat'sup or a multitude of other things such as just using traditional SMS or calling somebody? What kind of access to credit do you have? What sources of information do you trust?

We saw on the first day an example of if the source of information is not trusted, people don't react, so assessing these key challenges helps us to build better solutions.

Connectivity has also given us a diversified livelihood and education opportunities to some very remote populations. This type of skills building is absolutely necessary to connect these populations to the global marketplace.

For example, in a camp in Kenya, there was a refugee entrepreneur that built his own cell tower from scrap metal and negotiated his own contract with a cell provider who recognized the opportunity. This shows us that refugees are craving to build their connectivity opportunities so that they can also be part and parcel of today's 21 Century skill sets.

What stop the coverage is not the coverage but the regulatory environment and access I mentioned linked to ID cards. In the growing economy, refugees must have exposure to the global world and this can only come through an enabling environment.

I also wanted to touch briefly upon how increased connectivity assists us in our work through the use of Big Data and the application of artificial intelligence.

Before the massive outflow of displaced people in the Venezuela crisis, our teams were already manually monitoring social media and news articles to see which or how many incidents of violence were reported and human rights abuses, so we developed an artificial intelligence tool that allowed us to pick up key words and phrases and through a much quicker analysis of a much larger volume of data, we were able to ascertain the category of people most likely affected.

This, in the beginning phases of these incidents, it was mostly religious leaders and the indigenous groups, and so this informational loud us to adjust and develop clear policy guidelines for neighboring countries who would be tasked with the role of undertaking refugee status determination. This community had high levels of connectivity, which allowed us to receive high volumes of data.

When we attempted toot the same in the Great Lakes Region, displacement predictions were very difficult as there was not a large enough population using connectivity or had the digital literacy skills to do so.

This links us to needing to understand the information and communication landscape so that we can better utilize the tools we have available to us to build the solutions.

We have also built other artificial intelligence tools to understand and predict the dynamics of forced displacement. The Jetson Models were used in Somalia and required us to analyze Big Data sets, water levels, price of goats, and this was also information we were able to receive from our partners such as FAO, the meteorological organizations, we used satellite imagery as well to build a historical database for the machine learning.

Yesterday, we also heard that the tools and data are only as valuable as the people behind them, which is also true for any artificial intelligence tool.

We had to teach the artificial intelligence tool eight year's worth of data in order to accurately predict what could cause displacement, and so after several months of machine learning, we started to get very accurate predictions of internal displacement, and this allowed us to preposition supplies and preposition services in areas where internally displaced people were moving to.

In Turkey, we were also able to measure integration and segregation of refugees through mobile data mapping this was done together with the UN Global Pulse is. Allowed us to develop durable solutions. The Big Data and artificial intelligence will ultimately allow us to make better evidence-based decisions in our programming.

So to sum up, the creation of an enabling environment for connectivity will build opportunities for refugees and allow humanitarian organizations to supply better programming. This can be done through leveraging the strength of public/private sector partnerships and enhancing the engagement of all key stakeholders.

On our website we also have multiple stories of how we use high tech solutions, low tech solutions, as well as no tech solutions to build sustainable information and communication ecosystems, so please do have a look or connect with me because it's opportunities like this that allows us to talk to each other and hopefully build upon the strength that we each bring to the table.

(Applause).

>> TIMOTHY KELLY: Thanks, Clara. That's really fascinating, particularly some of the pioneering work you're doing using Big Data for analysis of social media, so let's move to our third speaker, Caryn Saslow, a Research Associate at the United Nations Institute for Training and Research and working on Operational Satellite Applications Program, so I guess that makes you a rocket scientist? You certainly have enough acronyms in your job title to have a good hand in scrabble, I think, yeah.

So you've been working as a geospatial analyst in humanitarian support, human rights and security and you're based in the lovely City of Geneva, so thank you.

>> CARYN SASLOW: All right, so thank you very much, Tim. And I'd also like to thank the ITU and ICTA as well. This has been a very interesting past few days and it's been a pleasure to be with you.

So today I'm going to be talking about UNOSATs work through the humanitarian response through technology and geospatial technology, so provide a brief introduction to the UNOSAT, the applicational satellite applications program, part of the United Nations Institute for training and research or UNITAR and created in 2001 and since then released over 3,000 analytical products, we serve sister UN agencies, national governments, as well as others, and our main activities are in providing satellite imagery analysis as well as capacity development.

As Tim mentioned we are located just outside of Geneva at the European Organization for Nuclear Research or CERN in order to really benefit from their excellent computing facilities.

So since we've been talking a lot about natural disasters these past few days I thought I would share a video with you about our typical response to disasters.

(music).

So why do we use satellite imagery? Satellite imagery is a great resource with benefits, such as that it's an objective view from above. It's also quantifiable and we can use geospatial information systems to measure different features and extract

information from it. It's also accessible and safe so as we've talked about in natural disasters, transportation networks, for instance can be affected and therefore satellite imagery provides a really good overview of what a situation might be like as well as a secure way of doing so in complex affected areas.

It does, of course, have some limitations for what we call optical satellite imagery, which is imagery in color. It's limited by weather conditions such as clouds or haze as well as the time of day, so at nighttime, we don't have images in that sense.

Also, the revisit time can be a limitation as not all satellites are imaging the entirety of the earth each and every day. Also, imagery can be costly and at the end of the day, there is really a need for field validation. Even though each year the technology is improving with satellite images and the resolution is getting better and better, still we are not going to have the exact same kind of granularity with satellite imagery that we could have by just being in the fields.

And to point out these two images here, on the top this is Alzatar Camp in Jordan and on the top in 2012 and bottom 2016, so just to illustrate the kind of power of this kind of technology and seeing the evolution of large-scale developments.

So we have satellite imagery, and we analyze it to create geospatial data and maps. One of the kinds of maps that we make are what we refer to as static maps, which usually come in the form of PDFs, and these are really ideal for low-bandwidth environments, so they can be just accessed, printed, and looked at or put on the wall.

As today we're discussing internal displacement, UNOSAT has done quite a lot of work in assessing and monitoring refugees in internal displacement so this is an example of one of the maps we made toward the end of October, in October of 2018, and it's showing the boarder crossing shelters there, which is just between Jordan and Syria, and the darker areas show clusters more densely populated with shelters and the lighter areas less so. You can see kind of a close-up picture of one of the more densely populated areas on the right corner, and we've been monitoring this area since 2014 when there were 90 shelters, and as of October of 2018, there were over 10,000.

So it's been quite an interesting case study.

We also do a lot of what we call dynamic mapping, and that's mainly for areas that have high bandwidth. We can create web maps that allow for a lot more interactivity and functionality, and so this is an example of one such map that we made to cover informal settlements of Syrian refugees in the Becca Region of Lebanon. You can see where it's very colorful, that's the main map area and it has geospatial data in different forms. The user can click on the data and then they have a pop-up that arises, and if they zoom in

and out or pan as well through the map, there are the information
and the statistics on the bottom that will change dynamically as
well, and then we can have other panels that allow them to choose
which layers of data they want to visualize.

They can also change the year of the analysis and imagery they
see, so this is really a great tool and it could be some food for
thought as well for the format to -- for the disaster connectivity
map session that we were discussing a few days ago.

A tool that we use for ground truthing and field validation
is called UN Assign, it's an Open Source application that's for
smartphones and it was designed to work in areas with low bandwidth.
It essentially supports emergency response with geo-referenced
photos and text, and it's integrated into our live web map, and so
this has been successfully used since 2014 during operations in
places such as Venuatu, Haiti, Nepal, and others. To show you an
example of what that might look like in a live map. You might
remember in 2018 there was part of a dam that collapsed and caused
some flash floods and so this is showing satellite imagery that we
did and the blue icons are UN-assigned icons and the pop-up is what
you would see if you click on one of those. It's showing an area
that is a roadside camp and at that time they were clearing space
for temporary shelters.

To avoid duplicating analyses, particularly in the case of
major disasters, we also use what we call Global Disaster Alert and
Coordination System Satellite Mapping Coordination System, which
is a bit of a mouthful, but basically this is to make sure that we
are really coordinating our work, so you'll see the polygons are
showing areas with satellite imagery analysis completed, and of
course when this was operational, we would also have these in other
colors to show areas that were in progress, being analyzed at the
moment, and then in red others that were planned.

We can also add information like what organization or agency
is working on analyzing which area.

And for mainstreaming data collection, a really great
resource which was also mentioned in one of the sessions earlier
is called HDX, the Humanitarian Data Exchange run by UNOCHA and this
has a lot of information on it. For instance, if you search just
UNOSAT you will find over 700 of our different datasets in various
formats.

Recently we've also been involved in artificial intelligence
work and satellite imagery, and so we've done work with the UN Global
Pulse as well and this work has been essentially trying to automate
the analysis process of identifying shelters, so this is a video
where you can see initially there is a grid. This is the tool that
has been developed, and so there is a grid, and the analyst would
digitize structures in a few of the cells, and then the tool would
learn from that. It would use that as a training dataset and then

it would digitize the rest.

This isn't something that we anticipate would be a replacement for analysts, but it would certainly help to augment their ability in analyzing imagery, so say instead of analyzing two camps in three days perhaps, a analyst could analyze in three hours.

It does come with significant challenges, so the example shown before was more of a -- more of an organized camps, but camps can come in many different shapes and sizes and so these are a few examples of structures from camps in different areas and you can already see that they're quite different, and with satellite imagery even if you have one location, if you have two different satellite images of it they can be very different, so that could be due to the angle of acquisition at which the image was taken or atmospheric interference.

And generally, in our analyses, we aim for 90-95% accuracy. The tool has not yet consistently really come close to this, so it's quite a work in progress.

And just to finish up, I wanted to share with you some of the platforms on which we share our publicly available data and maps, so there is our website, of course, there is the international charter on space and major disasters, HDX, as I mentioned, Relief Web, GDAX and then the GDAX SMCS.

Thank you very much for your time.

(Applause).

>> TIMOTHY KELLY: Thanks, Caryn. Some really beautiful map, I'm sure you're never short of wonderful images to put on your office walls, and a good reminder of the sort of rapid improvement in the tools that are available to us.

So our last speaker is Charles Yorke, he's a regional coordinatefor the Ghana Refugee Board. His brief biography says he has strong negotiation abilities, so maybe when we get to 12 minutes with your limit you'll be negotiating for extra time.

He also has a first-class degree in philosophy, so we'll address all the questions to you, I think.

And I think most relevant of all for this session, he's worked as a refugee camp manager, in particular at the time of the Liberiaen Refugee Crisis, so Charles very interested to hear your presentation.

>> CHARLES YORKE: Good morning, and I've already been introduced, so I will just talk about the mandates of my agency. The mandates of my agency is to ensure that Ghana's obligation, the obligation to the 1951 Convention relating to the protection of refugees is followed always. We live up to it, so that's the main mandate of my agency.

But most of the things that I'm going to say have already been mentioned but the two speakers in front of me, so I wouldn't have to go through the backgrounds because we've talked about, I mean,

the refugees and the fact that when refugees cross the international boarder to the host country, usually they don't have access to mobile networks, and it's regulations in the countries also don't permit them to have access to the mobile network so they become disconnected.

They also talk about the fact that institutions, what do they do? What I want to start with is that -- I'm starting with my conclusion and then I'll come up could my beginning, that for as to transform the humanitarian response, there are some conditions that must be available for us to be able to transform the humanitarian response through ICT.

And we talk about availability of ICT, and I say the availability of ICT tools is a necessary condition, but not as efficient of condition for us to be able to transform the UN general response that we have now, but the sufficient condition for us to transform the response is enabling a environment that the government or the host countries and its partners will create. So that's my conclusion, that's the message I would want to put across.

So ICTs, tools may be available, but if the government doesn't create the necessary environment, then we will not be able to use the drones, the access to mobile net and all of that to be able to transform the way we have been delivering our responses to the refugee crisis.

So I will start by coming down to what Ghana has done, the specific partnerships that Ghana has formed to create an environment for the ICT tools to be used to transform the humanitarian response to the refugee crisis.

First of all, Ghana recognized the fact that it is a right, it's a human right for anybody within the confines of or within the Territory of Ghana to acquire a mobile network, to have access to mobile network.

So what Ghana did was that at the time of the influx, Ghana negotiated with the Ministry of Communication and the NCA to be able to wave their requirement for every foreigner to produce his or her national passport. Before.you can be able to register and buy a mobile network or access to have mobile network in the country.

So we were able to wave that and then use the refugee ID card as the requirement for refugees to be registered, for refugees willing and able, to be able to procure mobile chips and then mobile phones and be able to communicate.

So by so doing, we created an enabling environment for refugees to have access to connectivity from the time they entered the country and were registered, so I mean that the only difference -- or the only thing was by the time they entered and then the time they are recognized as refugees.

And then what Ghana did was that we also gave them prima facie recognition based on the fact that the numbers were huge and we knew

what was happening back in their countries, and we have as a liberal asylum system we were able to recognize as refugee, so didn't take long to be recognized as refugees, and they had access to mobile network.

After having access to mobile network, after having access to mobile network, we are faced with the situation where you have a lot of refugees coming in. You have limited resources. How do you -- I mean, which tools do you use to be able to transform or change the traditional way of doing things to be able to cover a lot of people at the shortest time possible and with limited resources?

I want to talk about digital payments at this point. One of the refugees had access to their local networks, and as time goes on we register them on to the digital payments platform in their country because you have access to the mobile local networks, and automatically you can register if you so choose to the mobile and digital payments platform.

When that happened, what has happened is that as we go forward and we.face challenges and are delivering services to refugees, such as distribution of food, shelter, education, materials, and basically household items, what we have done is to use cash-based interventions by sending the money to refugees directly.

So if the cost of procuring building materials or the shelter materials is say 100, it is divided into 3, the first part is paid to you via mobile phone, so you wouldn't need an officer to carry the money or to go and buy the materials and bring to the refugee camp. The refugees are then empowered by giving them the money to go and buy the items to come and put up their own houses, and they're empowered and they're the forefront of the delivery of services.

Then, when it comes to educational materials, what we saw was that parents -- the school uniforms were distributed to the refugees, and so when the uniform gets torn, the parents saw that gonna government items so they should come and fix it. We saw all these things.

Then we changed, okay, how much does it cost to cure the school uniforms and give to the parent, okay, 50, so we give the 50 tender and we think a particular child deserves a school uniform, gives through the mobile money or just a payment platform to the parent, and now the parent is able to procure and once they bought it themselves and give to the children when the school uniform is torn they mend it, and they wouldn't wait for the gone Ghana government to come and mend it for them. So this is how it has changed through delivering the services through the digital payment platform.

Then I'll also talk about the fact that we have granted refugees access to Internet. They will have to buy credit before they commit costs and buy data before they can use the Internet.

Now, these are refugees who may not be having -- may not be

working or may not be profit be ally working. How do they keep buying data to be able to utilize the Internet?

So we partnered with Intelsat and Franz was here and he did the presentation before me, and we partnered with Intelsat and UNACL to provide broadband satellite, so free WiFi at one of the camps, with he start out with one of the camps, free WiFi. So the barrier to access to Internet, which became financial, so this wasn't regulation, but financial. The financial ability determines how the refugee gets access to that data, and so this financial barrier was also removed through the partnership with Intelsat to be able to provide connectivity, free WiFi on the camp.

And then it is distributed to the refugees, one gigabyte per week for refugees, 1 gigabyte her week and then you can go and use Facebook or What's up or whatever you want to use to be able to communicate. What they usually do is communicate and follow up with news portals from their home country to see what's happening there. They get first-hand information, they don't even wait for you to come and tell them country of origin information. They know. They know what is happening and they're able to process, so this is one of the ways by ways we're able to change the way we do things because traditionally you have to, you the officer would have to lend the country of origin information, and then you come and tell the refugees.

Sometimes they think you're coached to come in and tell them that they should go back. But when they have access to connectivity and they don't have to pay and they're able to follow the news portals in their country, they're able to know what exactly is happening and able to make independent decisions, so this is one of the ways by the way we have changed the way we originally do things to put the refugees at the forefront and this has been made possible by the enabling environment that had been created.

One significant related to that is the Vacu foundation, as we have talked about the fact that about 80% of refugees are hosted in low-income countries and I can tell you in the low-income countries about 80% are also hosted in the low income areas or low income countries so you can imagine low income areas in low income countries, and so teachers they're in places where teachers don't even accept posting to -- how do you, I mean, educate school children within those areas?

So what the foundation has a project that they have best teachers in their urban areas in the original capitals and they broadcast live lessons to classrooms in the refugee camps in the host communities.

So refugees will be sitting in their classrooms and they'll be receiving instruction live, and this is ongoing in most of the deprived communities in Ghana, and this has been made possible because there is Internet connectivity on the account.

And then in terms of health services, there is this project in Ghana where we are using drones to transport essential medical supplies to deprived areas, and as I made mention earlier, refugees mostly in the deprived areas, and so access to health services also becomes a problem.

Now, with this project, which includes where refugees are posted, what is happening is that the healthcare services that are delivered or available to refugees have been improved through the use of this disruptive technology, so that's one thing that's going on in Ghana that's ready to note as part of the way of demonstrating how establishing connectivity and then creating the enabling environment helps to transform the humanitarian response.

Clara has talked about this work and I'll skip to be able to meet my time. I want to talk about digital identity. In Ghana now, in Ghana now, we have progressively reached the level where every house has a digital address. Every house has a digital address, and we are now at the level where a unique digital identity is being created for everybody, and what the agency has done is to advocate for refugees to be included, so we are working on the principle that we're not leaving anybody behind. Whether you are from Ghana or not, once you're in the Territory of Ghana, you should not be left behind in the developmental processes in the country.

So refugees, we have negotiated with the NCA and then the National Identification Authority, and fortunately the National Identification Authority, the Secretary is the chairman of the Ghana Refugee Board so it was easier for us to add the refugees to the national process, the agenda that refers to digital identity, so refugees are going to have digital identity, they're going to have digital identity cards that they will be using to access all the e-services, the e-government services that are available to people from Ghana. All we are doing in Ghana is all services available to them are also available to refugees.

And one unique thing about Ghana is that in some countries where refugees are not allowed to mingle with the local population. In Ghana it's different, free movement of presence, once you're in the Territory of Ghana you're free to move anywhere you want to move. You're not camped, though you are in a settlement because that is where you can get free access to water, free access to other amenities. If you move to the urban areas, you have to pay for yourself, so if you have the ability to pay, then you are free to leave anywhere you want to live. So that free movement for refugees with access to digital identity will be able to access all e-government services which in turn, it's a way of integrating the responses that we have to give to the refugee situation into the national system and make sure that nobody is left behind, there is no discrimination against refugees because they are refugees, because they are human beings like us as we have always said.

But the future language that we have is especially with the establishment of the broadband satellite on the camp because a lot of people are accessing, the speed becomes slow, and so easily when you do the speed test it's very slow, and those who are utilizing the services for online courses, I mean, they are lagging behind in the progress of their courses because sometimes it buffers for over 30 minutes and then your session is closed, and then you have to -- you're not able to meet the quota within a week and so that's one thing that we are facing.

And then one thing that is once you are trying to do or change the way -- the traditional way of delivering services to refugees through ICT, what you are doing is that not every refugee has a smartphone or has a phone, so if you see a refugee, you can -- we have waved the requirement and you can buy a mobile chip.

Now, when the person buys a chip, where does the person put in the chip to be able to communicate, and so if we -- if you concentrate on putting away the traditional way of doing things and go on innovation and innovation and using ICT, what we would be doing is leaving a lot of people behind because not every refugee has a mobile phone to be able to access all the services I've talked about. What happens to those who don't have mobile phones? That's one main challenge that we have to be careful in how we get happy to use the innovations to change our traditional way of doing things.

And then as we talked about the (?), in a sense when you look at the refugee community, it was mostly everyone that had phones were male or those from urban areas. What about those that are the women and those who are from the -- who also crossed the board tore seek refuge? And maybe not use of smartphones or mobile phones.

So as you are changing the traditional way of doing things you have to be wary of these things so that you bring everybody, and you have to mitigation to bring everybody together.

So the few solutions I have are that we must invest together within our ICT infrastructure so we have strong signals to be able to transform the traditional way of doing things and take advantage of the extensive ICT tools to change the way we do things to improve the efficiency and effectiveness of our response.

Then integrating all the programs that we are doing, like I talked about what we are doing nationally and how we have included refugees. It should not be special disposition for refugees or special for host community people. What will happen is that they will feel discriminated, and when the one you've given to the refugees are better than the ones in the host community, then you will have classes, so these are the things that we have to be wary of. We need to integrate all the services we're rendering into the national system so that they're all equal, and then it will be more sustainable in that way because if we have not integrated the Intelsat connection on the camp, what will happen is that if it

breaks down, we have to call Intelsat. If it breaks down, if there is a problem, then it's not Ghana government or UNHCL but it's Intelsat or call Intelsat to come and fix it, so there is a need for integration of these services that we do so that we ensure sustainability.

And then the last one is to intensify the partners. We need to get more. We cannot do it alone. Ghana cannot do it alone. Intelsat and other satellite companies cannot do it alone. We need more people and get more people on board to deliver the services. So at this point I will pause here and take my seat. When questions come relating to what I have talked about, then I will be able to respond. Thank you very much.

(Applause).

>> TIMOTHY KELLY: Thanks, Charles. I think those are some very useful suggestions and practical ideas, particularly on the importance of treating host communities and refugees with equal treatment.

So we've reached the point of our session where we've finished the four formal presentations, and thanks to all the speakers for being so disciplined about timekeeping. That gives us time for an open dialogue, question and answer. I'm hoping that you've all got lots of questions or else I'm going to have to think of some myself.

So who would like to take the floor? I'm looking in hope at the audience? Yes, sir?

>> AUDIENCE MEMBER: Hi, Joe from the U.S. Department of State. In the presentations and particularly the NetHope presentation, the idea of a barrier to deployment, equipment sitting on docks, is exactly the kind of thing that keeps me awake at night when I think of that communications ecosystem, that communications response ecosystem, that all of those partnerships that are required that rush in to provide that help.

So just with the help of the panel or any panelists, I'm hoping to understand are there certain things that you've identified that are barriers, do you need certain contacts, is there an issue of prioritization, is there -- could this be some -- could the refugee situation be something that might be addressed in NATPs, national mercy telecom plans. I'll stop there but any thoughts are welcome.

>> TIMOTHY KELLY: Which really reminds us about the complexity of many of the situations that we're dealing with. Should we take a few more questions from the audience? Yeah?

>> AUDIENCE MEMBER: My name is Alex from Facebook. I had a question if we could get a bit more information how private sector partners could contribute to the humanitarian data exchange.

>> TIMOTHY KELLY: Yeah, very practical question. Yes, sir at the front?

>> AUDIENCE MEMBER: Yeah, I've got two questions and probably directed to Frank. The first one relates to the issue that

you mentioned concerning importation of equipment and facilitation.

In past disasters, there have been occasions where some private sector players, local partners were caught importing equipment to expand their network, and then charging, bypassing the license integration and probably you could give a comment on that if you have had any experience? The case in point is that of Haiti, where an operator came across the border and started charging for services and issuing services and the AFP caught them and approached us to intervene.

The second one relates to what has been termed as politics of food where the UN goes in, provides food for free or relevant telecommunication services, and the local communities that they have set their businesses around the same logistics or probably food or telecommunications and they're paying a license or they survive on the basis of the business that they're in, they start complaining that you are undercutting us, so I don't know whether you've got any comment on that?

>> TIMOTHY KELLY: That's a great set of questions. I think we'll pause here and take some responses from our panelists before we come back for some more questions. Frank, would you like to?

>> FRANK SCHOTT: Yeah. I think your question was around the free services, whether it's telecommunications or food or whatever, and having that undermine the kind of local economy, and I think that's something we're incredibly alert to and the first place we go when we're in a new geography is to the local mobile network operators to try to understand what it's going to take to -- and we do this with our partners at Ericson and Cisco and others, but what's needed to help you get back on your feet?

In the meantime though, while the mobile network operator is getting back on their feet, which sometimes can take two weeks, four weeks, six weeks in rural areas sometimes months, we're looking at other solutions that we can bring in that will be available to emergency responders, and more recently the communities that are down.

But the minute that services are back up and running, we typically redeploy those assets to other locations, and then we decommission things. So in a case like Puerto Rico, unfortunately we were there longer than any of us would have liked, but all of the equipment has been decommissioned and moved back to the warehouses now, so making the local economy work in helping the local mobile network operators is really a top priority, and we wish we could do it faster, and often times that equipment that's sitting in customs would enable us to do it faster. I don't have the right answer necessarily. I don't necessarily think you give a blanket waiver that says all telecommunications equipment gets in free, but I think there has to be some kind of expedited process to get those kinds of critical assets into the theater so that they can be put

to work.

>> TIMOTHY KELLY: That's why we have the Tempar Convention. So there is a question on the humanitarian data exchange? Who wants to answer that one? Clara?

>> CLARA VAN PRAAG: Sure. I think it's actually an easy one because within UNHCR we take data protection seriously so any data we share is fully anonymous, and that's an easy way to ensure that we respect the data privacy rules and regulations, but before that happens, we obviously have to put in place a memorandum of understanding so that there are strict guidelines that both partners have to adhere to, and I think Charles, maybe you also wanted to add something to that?

>> CHARLES YORKE: Mine is actually on the question -- the first question that came. At least from the government side, I've had a different experience with this situation. It seems what happens is that the companies that are bringing the items in, sometimes that's the first time the government is hearing from them, and there is this issue of trust. As was talked about, if we find experiences where others have used the pretext of coming to support affected people to bring in goods without paying the charges, then we have to be cautious, so if that's the first time we are hearing from you, then we have to do some investigation to know who you are and whether your ininventions are genuine. These are things that cause the delay.

So what we can do, is if you're monitoring or monitoring the system and you are seeing the situation developing here, can you start engaging the government, you can start showing yourself to the government and this is what we do in all instance.

So when the situation happens and you go there, they already know you, and then it will be easier for you to be able to pass the teams through and than the first time they see you with intentions that you want to help. They would want to investigate.

>> TIMOTHY KELLY: Caryn, anything to add?

>> CARYN SASLOW: Yeah. I suppose in response to Alex's question about the private sector contributions to HCX, at UNOSAT whenever we have publicly available data we publish to the website as well as HCX. We have a quality control process we go through. I think it would be excellent to have more private sector contributions to HCX as well. I think it would be the UN office for humanitarian affairs who is running the platform who would be the best agency to consult.

>> TIMOTHY KELLY: Let's take another round of questions. I see one question on the back at the right. Please go ahead, Kim.

>> KIM MALLALIEU: Yes. Kim Mallalieu. My question is, the agreements that you have between agencies, are there a balance of templates of these agreements and MoUs, particularly, for example, for the exchange of data between organizations?

>> TIMOTHY KELLY: Thanks for your precise question. Any other questions before we return to our panel?

I had one question, actually, Frank. In your presentation you talked about news can you use and the fact that when refugees arrive in a country or on a coastline their first question is, where am I, and their second question is, can I get free WiFi?

What kind of information do you find is most useful for refugees and displaced persons?

I think you may be able to respond to also the first question.

>> FRANK SCHOTT: Yeah, so in terms of the news you can use, not surprisingly it depends on the context of the emergency and that's one reason we always work with local actors who are essentially kind of shaping the news that's provided.

In a migration situation such as we had in Greece and we have today in Colombia, the use case is most often for connectivity and connecting with family and friends, but from a news standpoint, it's mostly about safe passage, seeking asylum, you know, very practical kinds of things.

When you then find refugees in a more static setting such as camps, as we saw in Greece, it begins transitioning to things like, where can I get work, what's happening in my home country? You still have the psychosocial connections that they want to make.

Puerto Rico was totally different. The first three months, it was almost like three different emergencies in terms of context. The first three months were -- we could see from the Facebook platform that information about where you could get gas, where you could -- which ATMs were open, which stores were open with refrigeration, and the first three months those were the stories that were getting liked and shared.

Then in right after the first of the year, so say Month 4, it was all about the hot news was around schools opening, and that was the information. And I remember one day the numbers on the Facebook Platform went off the charts and it was because we had shown a school that had finally gotten electricity, and they were showing the kids out in the courtyard dancing and cheering.

And that sort of transitioned into about Month 5 and 6 where the stories of hope and resilience and the stories of people getting back on their feet were the ones being shared.

We went through almost three different cycles of news, and that's one of the reasons why you want local people on the ground delivering that news that you can use because they've got their ears to the ground and they know what the community -- and they can watch the Facebook dashboard and kind of see what's being shared and what's being liked.

>> TIMOTHY KELLY: Would anyone like to respond to Kim's question about what kind of templates or MoUs might exist?

>> Sure. So I think it really depends how the data is going

to be used, how it's going to be presented. And so it often can be also a very lengthy process to formulate the MOUs, so a basic template would obviously exist, but then when you go into the further details of what you're going to do with that data, how you're going to visualize it, who you're going to share it with, this is what can be months and months of negotiations, but it is possible, and I think maybe Caryn you can also address that a little bit.

>> CARYN SASLOW: Sure. Well, UNOSAT is, of course, a lot smaller than UNHCR, so we're mainly project and request based, and so the agreements that we have with regards to data exchange would come from the partners who are requesting that we analyze certain areas for them. And in some cases we -- in many cases actually, we have the permission to share the data and in other cases it's of a more confidential nature.

In the case of natural disasters, we're part of the international charter on space and major disasters, so that's already a framework that we are involved in and by which we can share the satellite-derived data as well.

>> TIMOTHY KELLY: I think there is a question again right at the back? Please go ahead.

>> Sure. Thank you. Could any of you comment on how you engage local tech ecosystems when you arrive on the ground. I'll use an example here to illustrate. 10 years ago we all know in Kenya, the first ICT humanitarian response to a crisis in a country. However, what I'm hearing being described is a lot of global companies sort of like parachuting in to respond, but how have you figured out about engaging local tech systems and local hubs and that kind of thing, and then secondly how agency of local actors is integrated into the infrastructure that you're able to set up during these response mechanisms?

>> TIMOTHY KELLY: That sounds like a question to Charles to me.

>> CHARLES YORKE: The latter part of the question, it was a question that I also asked, a question that I also give. It's one thing that we have to take note of. It was advice I give to the satellite companies that when you are entering into the country to establish these connectivities, I mean, these things, you need to partner with a local -- I mean, a local -- a similar local agency or company that's into the same kind of thing that you are doing, so that when you are not there, they're able to ensure sustainability.

So it's also an advice that I give to the tech companies, so maybe they will be able to respond to it as when they come, but with Intelsat, it was well planned and well coordinated, so we were able to take care of that but I mean for the other operations, I may not be able to speak to. Thank you.

>> Within innovation services we very much believe in local

solutions to local challenges, so the first thing we always set out to do is really have an understanding of your local ecosystem, see what already exists there, see what solutions already exist, and build upon those local solutions, and that is something that we promote across the board whenever we do have outside companies that approach us and say we would love to bring this project or this idea into -- into this particular camp setting, then we always ask them to take a step back and really have and due that thorough desk review and talk to the people on the ground and see what we can build upon.

     And then if they are still interested to bring their tech solution, we always suggest that first of all, try and form the partnerships with the people who already exist and who might already be providing that service, and then build upon that and create a partnership that builds upon each other's strengths.

     >> TIMOTHY KELLY: Thanks. I think we're actually approaching the end of our time, and so it falls to me to try to conclude what has been a very rich and complex discussion.

     I think we heard today that serving refugees and internally displaced people is going to be a long-term problem. It's not something that can be solved overnight, but it has important shortterm and urgent things. Frank, your presentation reminds us that demand for connectivity is almost like a universal right or universal demand throughout the world and what refugees want is often what we want in our own lives as well.

     We heard the policies that are introduced with the best of intentions can sometimes have unintended consequences for refugees and IDP, and Clara in your presentation you talked about the difficulties that refugees have in showing their legal identity and being able to get SIM cards, for instance, so I think this reminds us that we need to have flexible approaches and laws which are sufficiently flexible to be able to accommodate both the security implementations, but also the humanitarian implementations.

     Similarly with privacy and data protection concerns, while on the one hand we want to have very good data protection, we also need flexibility.

     Caryn, in your presentation you reminded us how the technology which can serve refugees can also serve those who serve refugees, and you reminded us, I think, of how much more sophisticated the tools that are available to us have become in recent years, so I think that reminded me that I need to go back to my own training to sort of refresh my knowledge of what's available.

     And then Charles, in your presentation, you really emphasized this issue of the need to treat host communities and refugee populations alike without any discrimination. I think you talked in particular about the usefulness of digital payments, mobile money to enhance resilience and how we can improve ICTs to improve -- or use ICTs to improve the quality of life for all of us.

So finally, just before we end, and I don't know if our colleagues at the back have a slide for this, but I wanted to mention that the Global Broadband Plan for refugee Inclusion has been published this week and there is a slide, I think, which shows the URL. I hope it will be available shortly.

This is a year-long effort that we at the World Bank have been involved with with other agencies, including UNHCR and NetHope. It's been published this week and it's 280-page document so it's not a quick read, but it's a very worthwhile read. There, I think you can see on the screen now the URL, which is WWW.broadbandforrefugees.org and contains many studies and we're proud to be one of the funding partners for this and I hope it will be a very useful tool for those of you or those of us that work in this area.

And with those closing words, I'd like to thank all of our panelists. I'd like to thank our translators and also remotely thank our captioners. I think the captioners have done a really excellent job this week, and we very much are in their debt. With that we close the session. Thank you.

(Applause).

>> So just to remind you, we do now have a side event which I think is about to be introduced.

(session completed at 1:59 a.m. CST)

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>> Thank you very much panelists. We have some very important housekeeping messages to be the side event is announced. Today is International Women's Day. We have a special lunch, and as usual at 12:30 in the same restaurant, but lunch will have a little bit less time for today. We have a mini-function in the restaurant to celebrate International Women's Day, and but we need to be back in the hall sharp at 1:30 so that we can finish everything that's going to happen after lunch.

So basically, that's the main announcement, so we need to be back in the hall at 1:30 and lunch will be a little bit shorter. Then the side event is coming up and the presentation is by Kelly O'Keefe.

(session completed at 2:00 a.m. CST).