



# Project for the strengthening of Spatial Data Infrastructures in the Caribbean

October 2016



**UN-GGIM:Americas**

REGIONAL COMMITTEE OF  
UNITED NATIONS  
ON GLOBAL GEOSPATIAL  
INFORMATION MANAGEMENT  
FOR THE AMERICAS

# UN-GGIM:Americas Caribbean Project

Third Session UN-GGIM:Americas  
October 5<sup>th</sup> 2016

Efraín Limones  
Director of Caribbean Project



**UN-GGIM**

United Nations Committee of Experts on  
Global Geospatial Information Management

[ggim.un.org](http://ggim.un.org)

# Strategic Aims for Caribbean Project

| Strategic Objective |                                          | Strategies                          |                                       | Monitoring Indicators                                | GOALS / Objective concrete |        |         |
|---------------------|------------------------------------------|-------------------------------------|---------------------------------------|------------------------------------------------------|----------------------------|--------|---------|
|                     |                                          |                                     |                                       |                                                      | minimum                    | medium | optimum |
| 1                   | Strengthen the Geodetic Network          | Increase Stations                   | Increase number of stations           | 5% Further in the region                             | 3%                         | 5%     | 10%     |
|                     |                                          |                                     | Increase data availability            |                                                      |                            |        |         |
|                     |                                          |                                     | Increase security location            |                                                      |                            |        |         |
| 2                   | Share Geographic Information             | Create Digital Map of the Caribbean | Increase the number of Geoportals     | 10% further in the region                            | 5%                         | 10%    | 15%     |
|                     |                                          |                                     | Increase dissemination of information |                                                      |                            |        |         |
|                     |                                          |                                     | Increase the number of users          |                                                      |                            |        |         |
| 3                   | Promote de use of Geographic Information | Construct The Land Cover Map        | Consider project countries            | 90% of the Land Cover in the region                  | 80%                        | 90%    | 100%    |
|                     |                                          |                                     | To ensure the quality of the project  |                                                      |                            |        |         |
|                     |                                          |                                     | Diseminate results in Geoportal       |                                                      |                            |        |         |
| 4                   | Capacity Building                        | Training in Geographic Skills       | Increase Basic skills                 | Participation of 90% of the countries in the project | 80%                        | 90%    | 100%    |
|                     |                                          |                                     | Increase intermediate skills          |                                                      |                            |        |         |
|                     |                                          |                                     | Increase transversal competences      |                                                      |                            |        |         |
| 5                   | Using Geographical Standards             | Aply standards in the process       | Increase in production processes      | 20% of the processes                                 | 10%                        | 20%    | 30%     |
|                     |                                          |                                     | Increase in integration processes     |                                                      |                            |        |         |
|                     |                                          |                                     | Increase in disemination processes    |                                                      |                            |        |         |
| 6                   | Update Computer Technology               | Renew Computers                     | Update servers                        | 2% of Equipment for Geographci Activities            | 1%                         | 2%     | 3%      |
|                     |                                          |                                     | Update computers                      |                                                      |                            |        |         |
|                     |                                          |                                     | Upgrade netw ork equipment            |                                                      |                            |        |         |
| 7                   | Geographic Metadata                      | Promote its application             | Trining on Metadata                   | 20% of the Countries in the Project                  | 10%                        | 20%    | 30%     |
|                     |                                          |                                     | Build a Regional Profile              |                                                      |                            |        |         |
|                     |                                          |                                     | Implement its use                     |                                                      |                            |        |         |



# Analysis by Thread

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## Capacity Building Programme



## Geodetic Caribbean Network



## Land Cover Map



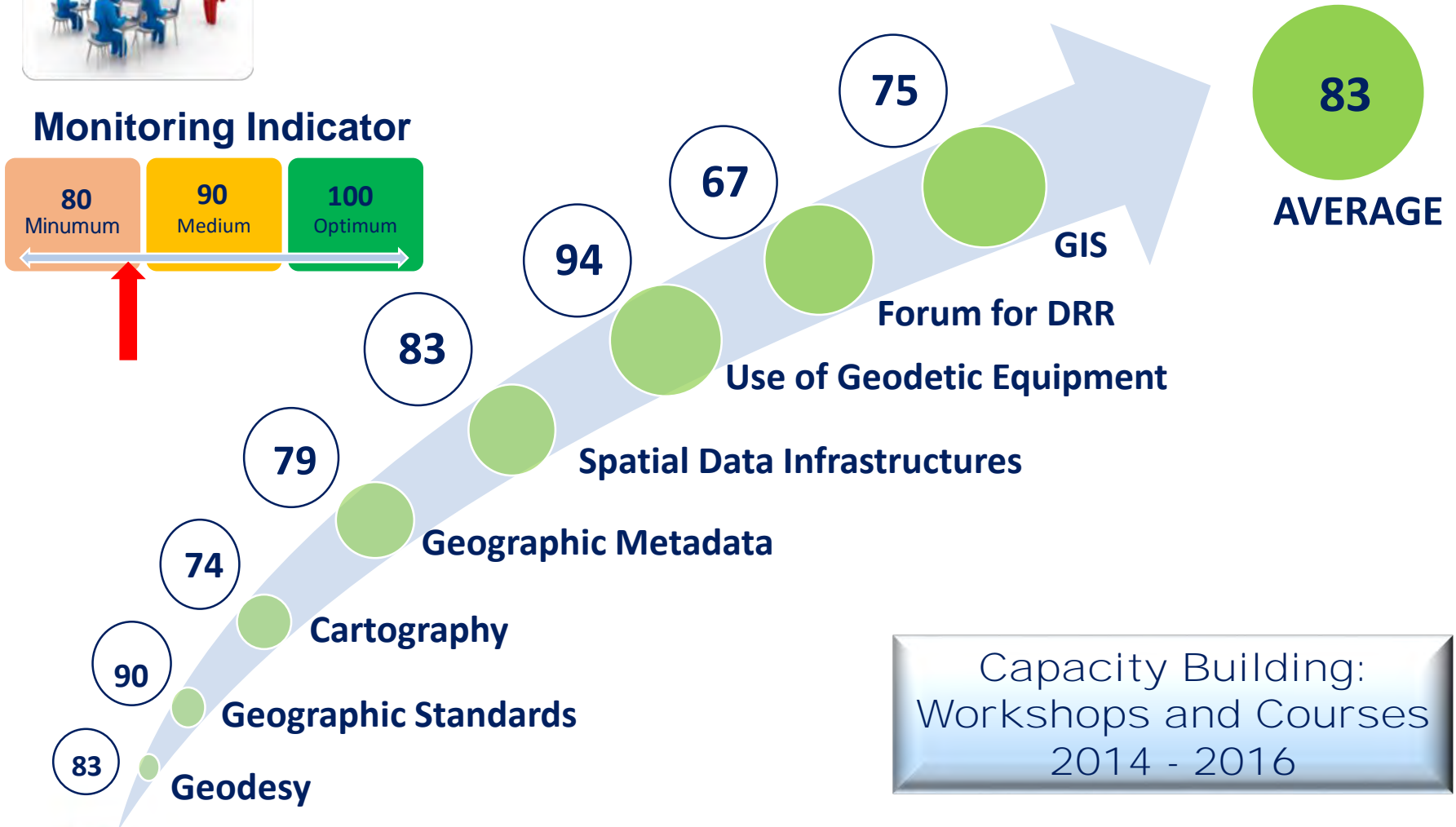
## Digital Map of the Caribbean



# Percentage of Participation



## Monitoring Indicator



Capacity Building:  
Workshops and Courses  
2014 - 2016





# Capacity Building Programme

## Future Activities

**Workshop on Land Cover Classification using MAD-Mex engine, November 28<sup>th</sup> to December 2<sup>nd</sup>, 2016 in UWI**

**Workshop Geographic Data Quality in Chile April 2017**

**BUILD A NEW CAPACITY BUILDING PROGRAMME INCLUDING NECESSITIES OF PITCA AND RM-GIR PROJECTS.**



# Design new capacitation programme



Use the experience of training with a focus on Spatial Data Infrastructures

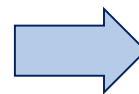


Use the experience of training with a focus on Disaster Management

UN-GGIM PROJECT



PITCA PROJECT



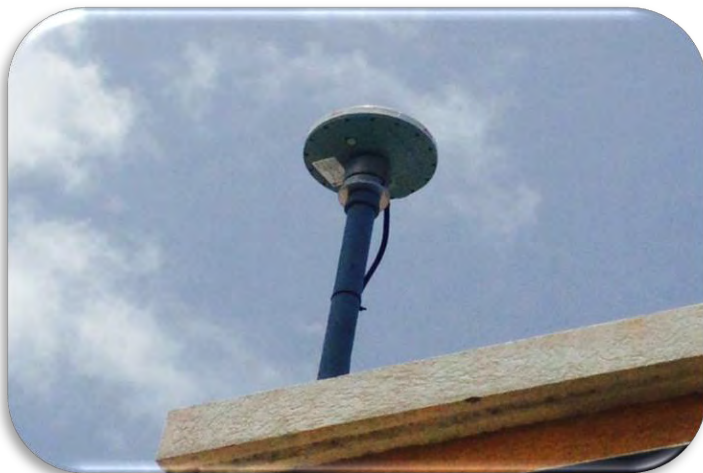
RM-GIR PROJECT

*implement new methodologies and tools*

**NEW CAPACITY BUILDING PROGRAMME 2017-2018**



# 16 GNSS Stations Installed and working







# Strengthen Geodetic Network



| CORS STATIONS REPORTED IN CARIBBEAN REGION | TOTAL     | TYPE      |           | STATUS    |           | REFERENCE INSTITUTION |           |           |
|--------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------------------|-----------|-----------|
|                                            | REPORTED  | GPS       | GNSS      | ACTIVE    | INACTIVE  | UNAVCO                | NOAA      | SIRGAS    |
| <b>Total</b>                               | <b>48</b> | <b>17</b> | <b>31</b> | <b>30</b> | <b>18</b> | <b>44</b>             | <b>19</b> | <b>11</b> |



**16 Stations installed (GNSS); 33% more, compared to those reported in active mode**

## Monitoring Indicator





# Strengthen Geodetic Network

## Future Activities

**Install Data Centre in UWI**

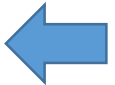
**Process the final coordinates for each GNSS station**

**Integrate and share RINEX files from each station to D.C. by ftp**

**Define a reference frame to process data for the Network**

**Incorporate stations to SIRGAS Continental Network**

**Promote the adoption of a common framework for the Caribbean**





# Install Data Centre in UWI

Here are some links to other pages associated with GPS and GAMIT/GLOBK:

- [Scripps Orbit and Permanent Array Center \(SOPAC\)](#)
- [University Navstar Consortium \(UNAVCO\)](#)
- [International GPS service for Geodynamics \(IGS\)](#)
- [Southern California Integrated GPS Network \(SCIGN\)](#)
- [US Geological Survey \(USGS\) Pasadena](#)
- [Southern California Earthquake Center \(SCEC\)](#)
- [International Association of Geodesy \(IAG\)](#)
- [National Geodetic Survey \(NGS\)](#)
- [HartRAO Space Geodesy Programme](#)



## GAMIT



Programs to process phase data, to estimate three-dimensional relative positions of ground stations and satellite orbits



## GLOBK

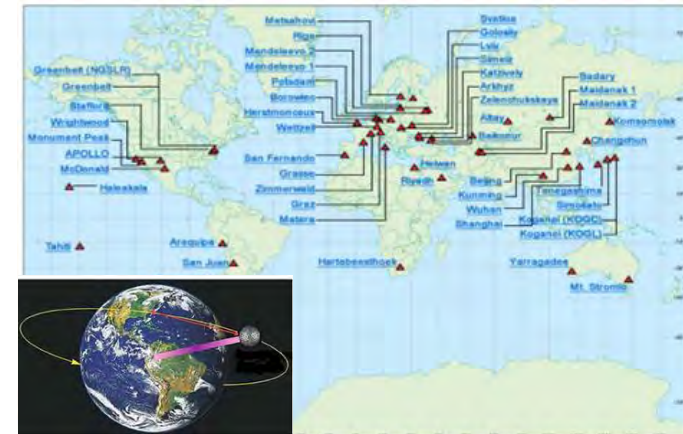


Figura 2. Red de estaciones SLR/LLR.







# Integrate and share RINEX files from each station to D.C.

<ftp://server.3.al.group-net.es>

**Depositos de la RGNA**

Conexión | Acerca de

| Servidor FTP Receptor    | Servidor FTP RGNA                           | Parámetros de Configuración                                                                                     | Lista de Espera |
|--------------------------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------|
| Dirección: 192.168.254.2 | Dirección: 200.23.8.120                     | Ruta en PC de archivos RINEX: c:\ftpRGNA\                                                                       |                 |
| Puerto: 21               | Puerto: 21                                  | Ruta de archivos RINEX: SD Card/Data/                                                                           |                 |
| Cuenta: Admin            | Cuenta: rgnaoax2                            | Nombre de la sesión en el receptor: RGNA                                                                        |                 |
| Contraseña: [ocultada]   | Contraseña: [ocultada]                      | Nombre del Sitio (4 digitos): OAX2                                                                              |                 |
|                          | <input type="checkbox"/> Usa Servidor Proxy | Minuto de Transferencia FTP: 2                                                                                  |                 |
|                          | Servidor Proxy: [ocultada]                  | Diferencia en Horas del Horario Local vs GMT: 5                                                                 |                 |
|                          | Puerto del servidor Proxy: [ocultada]       | Formato del directorio de depósito de datos en el servidor FTP:<br>ddMMM (Numerico y Alfabetico) Ejemplo: 14ENE |                 |

**Depósito Activado**


Ventana de Mensajes

09-08-2016 07:02:00 p. m.: Archivo que se intentara depositar: OAX2222x.zip  
09-08-2016 07:02:01 p. m.: SD Card/Data/RGNA/OAX2/2016/08/09/OAX2222x.16o.zip, Archivo y Ruta en el servidor FTP del receptor  
09-08-2016 07:02:03 p. m.: Depósito realizado: OAX2222x.zip  
09-08-2016 08:02:00 p. m.: Archivo que se intentara depositar: OAX2223a.zip  
09-08-2016 08:02:00 p. m.: SD Card/Data/RGNA/OAX2/2016/08/10/OAX2223a.16o.zip, Archivo y Ruta en el servidor FTP del receptor  
09-08-2016 08:02:02 p. m.: Depósito realizado: OAX2223a.zip  
09-08-2016 09:02:00 p. m.: Archivo que se intentara depositar: OAX2223b.zip






# Define a reference frame to process data for the Network



International Terrestrial Reference Frame



Search by DOMES number :

## ITRF solutions

ITRF solutions available here consist in sets of station positions and velocities with their variance/covariance matrices. Recently with the release of the ITRF2005 , Earth Orientation Parameters (EOPs) have simultaneously been combined with station coordinates. The numbers (yy) following the designation "ITRF" specify the last year when data was used during frame processing. For more details, please see part 4 of the [IERS technical note n°32](#).

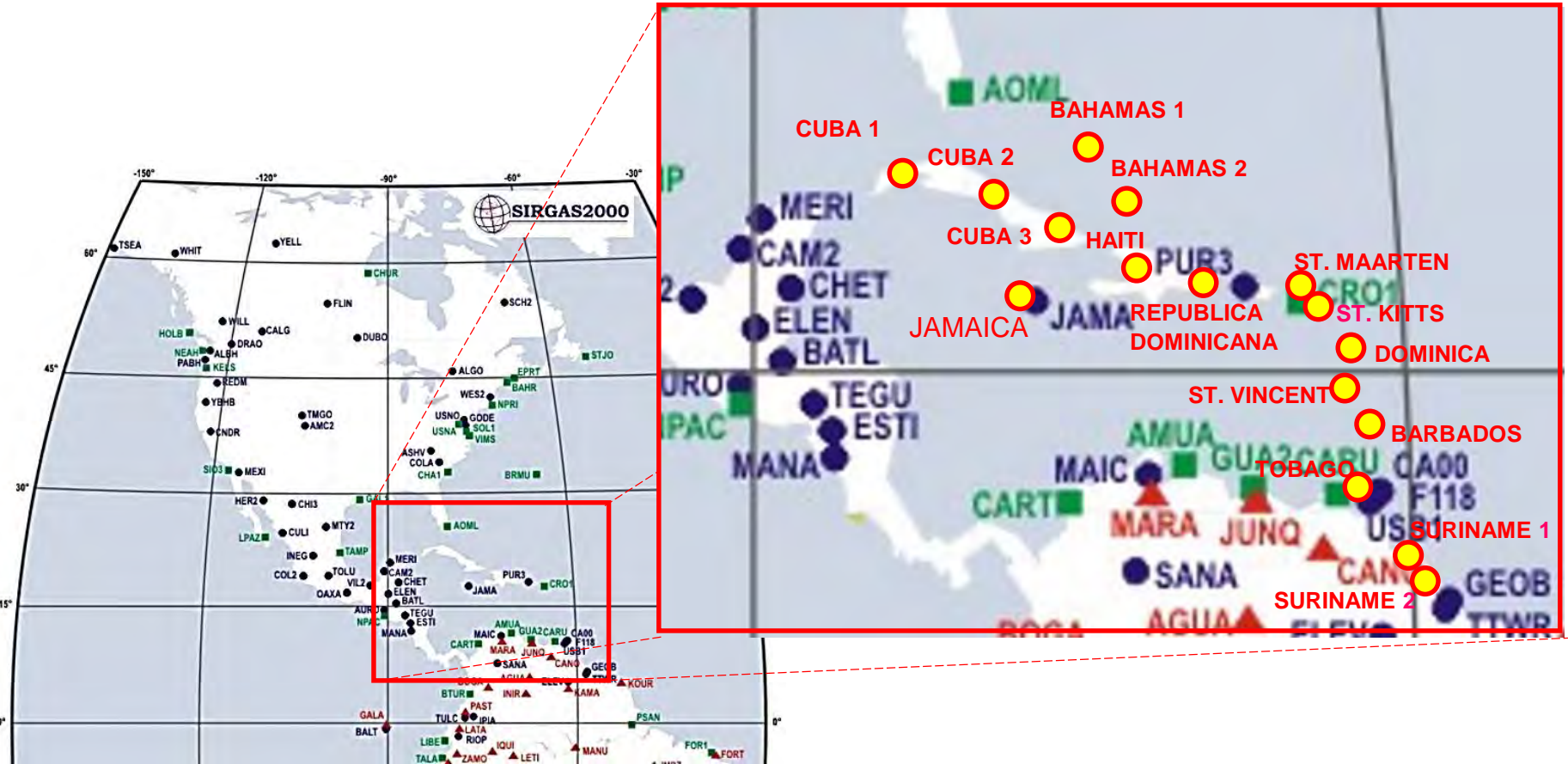
### ITRF solutions available :

- ▷ ITRF2014
- ▷ ITRF2008
- ▷ ITRF2005
- ▷ ITRF2000
- ▷ ITRF97
- ▷ ITRF96
- ▷ ITRF94
- ▷ ITRF93
- ▷ ITRF92

- ITRS and ITRF**
- ITRF NEWS
- General concepts
- Splinter meeting
- ITRF Products**
- ITRF solutions
- Transformation parameters
- VO Corner
- Domes Numbers**
- DOMES description
- DOMES request
- IERS Network**
- Network description
- Local surveys
- Site Information and Selection
- Get ITRF coord.**
- Get coordinates
- Selected points
- ITRF Mailing list**
- FAQ



# Incorporate stations to SIRGAS Continental Network



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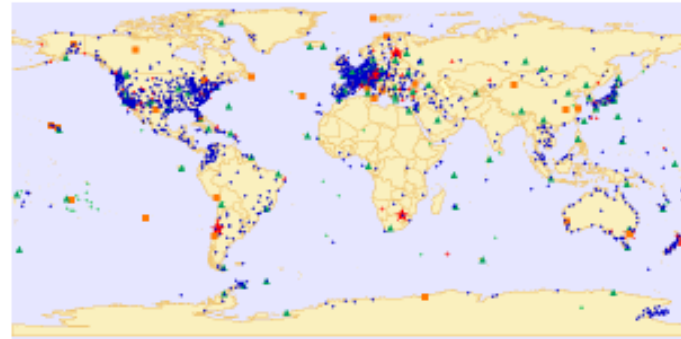
ggim.un.org



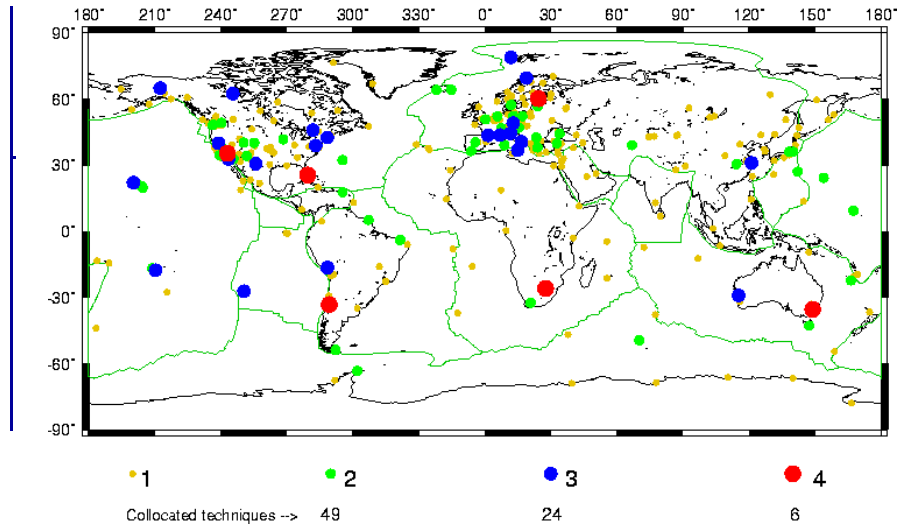
# Promote the adoption of a common framework for the Caribbean

## Welcome to the ITRF web site

The objective of this web site is to distribute the International Terrestrial Reference Frame (ITRF) products. ITRF94, ITRF96, ITRF97, ITRF2000, ITRF2005 and ITRF2008 solutions are available for download. It also contains the description and list of all the IERS stations.



ITRF97 and Collocated techniques





# Coverage of satellite images



**Satellite Imagery of RapidEye**  
220,474 Km<sup>2</sup>



**Satellite Imagery of ZY3**  
For countries Island in the Project

**90% of Land Cover in the region**

## Monitoring Indicator



| Coverage of satellite images   | Km <sup>2</sup> |
|--------------------------------|-----------------|
| St. Maarten                    | 41              |
| St. Kitts and Nevis            | 276             |
| Grenada                        | 370             |
| St. Vincent and the Grenadines | 406             |
| Antigua and Barbuda            | 444             |
| Barbados                       | 449             |
| St. Lucia                      | 628             |
| Dominica                       | 773             |
| Martinique                     | 1,157           |
| Guadeloupe                     | 1,682           |
| Trinidad and Tobago            | 5391            |
| Jamaica                        | 11,001          |
| Bahamas                        | 13,255          |
| Haití                          | 26,949          |
| República Dominicana           | 47,973          |
| Cuba                           | 109,674         |
| <b>Total Area</b>              | <b>220,474</b>  |
| Suriname                       | 163,821         |
| Guyana                         | 214,970         |
| Belice                         | 22,966          |





# Land Cover Map

## Future Activities

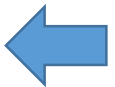
**Workshop on Land Cover Classification using MAD-MEX engine**

**Give each country processed maps based on the Land Cover 30 m.**

**Define the timeline to verify the result of the initial classification**

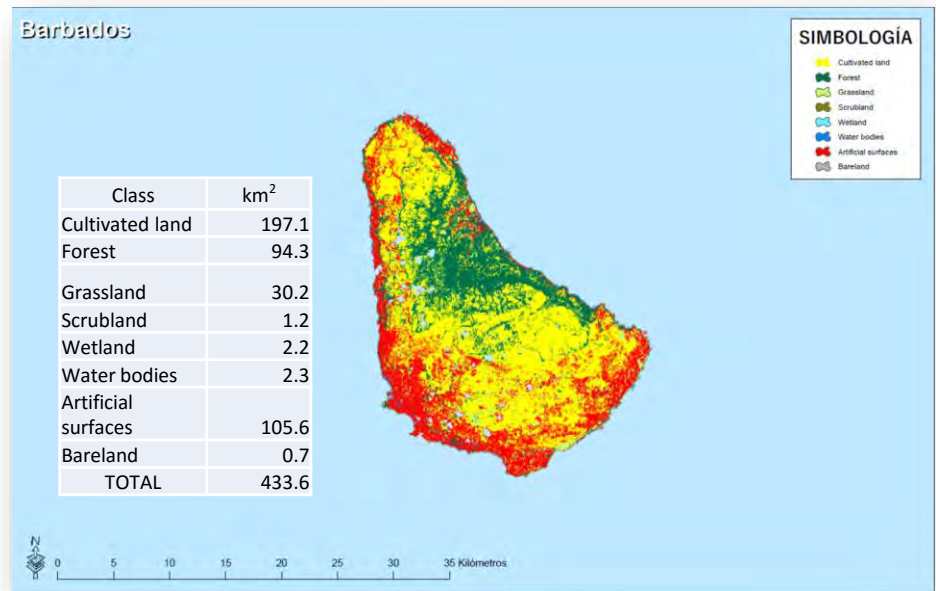
**Post-process the image coverage considering corrections**

**Integrate Regional Land Cover Map**





# Give each country processed maps based on the Global Land Cover 30 m



**MAD-MEX Engine**



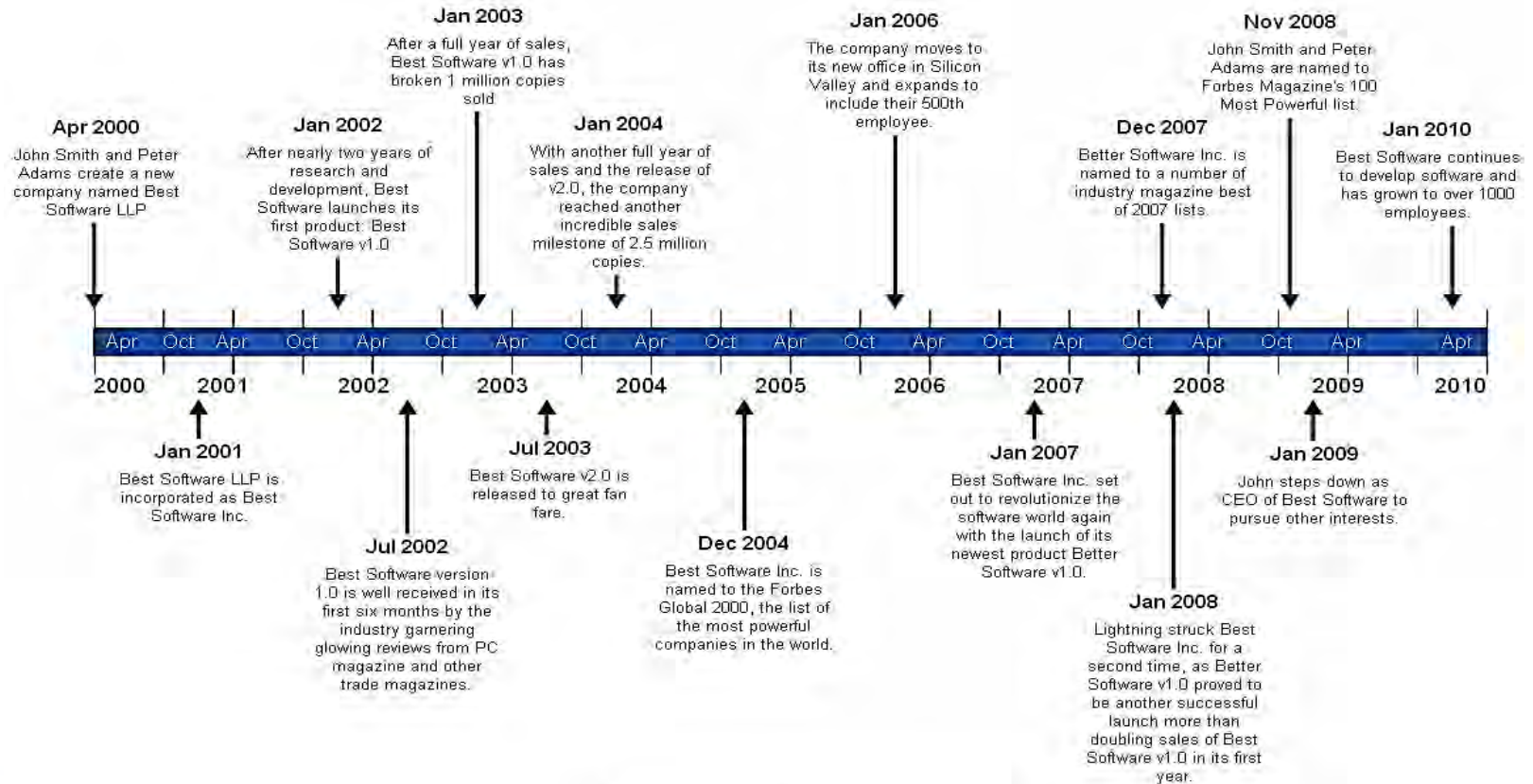
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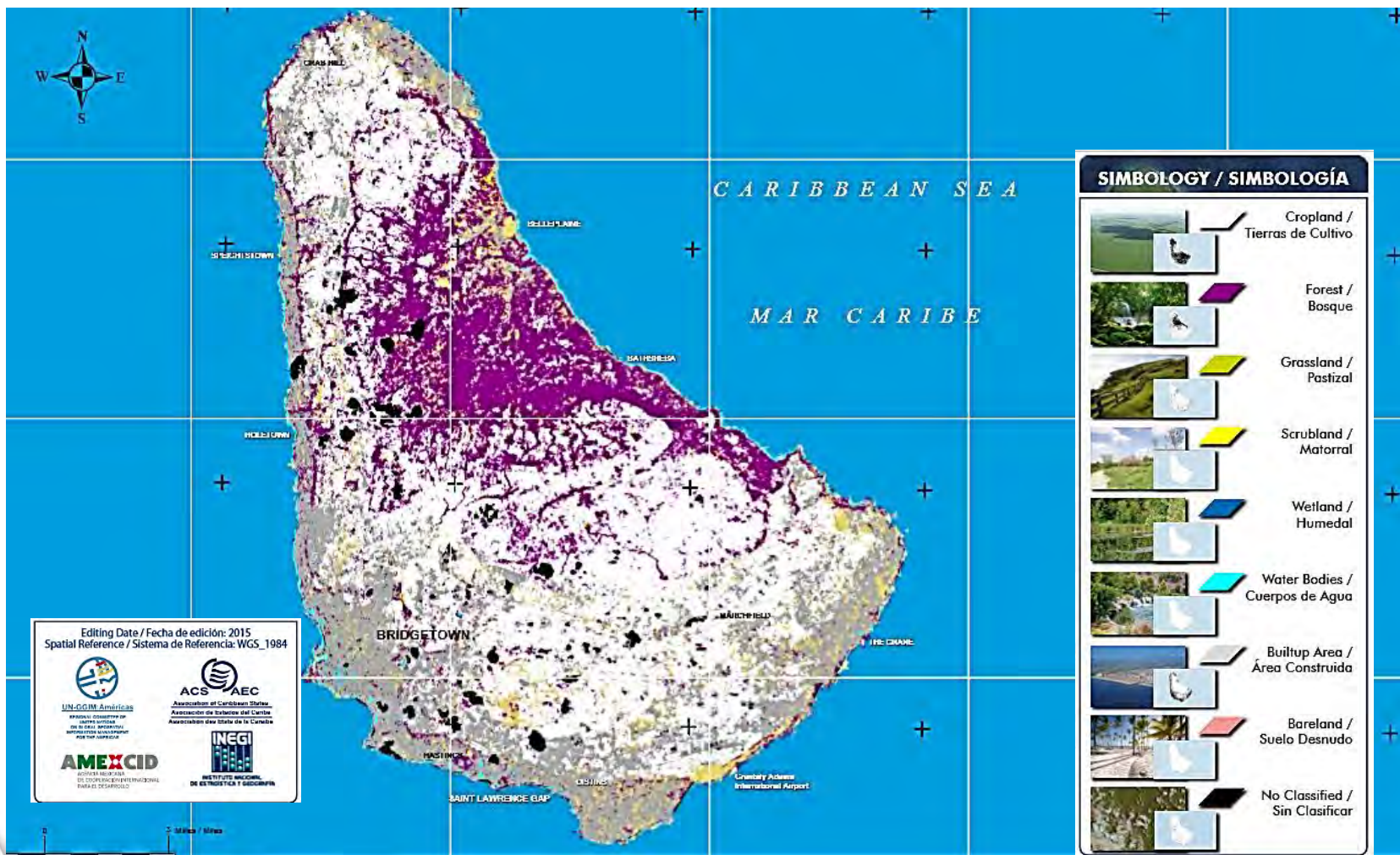
# Define the timeline to verify the result of the initial classification



Created with Timeline Maker Professional. Produced on Jul 14 2011



# Post-process the image coverage considering corrections





# Integrate Regional Land Cover Map



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# Caribbean Digital Map

## Running Activities

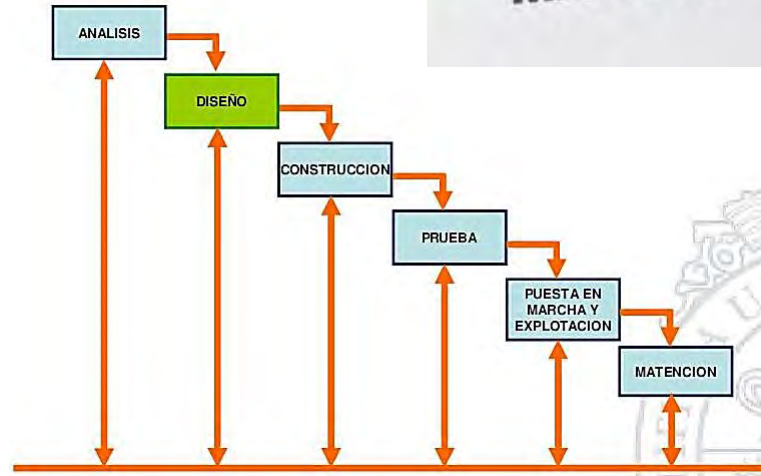
### Bidding Process to purchase Servers



### Translation of System and Manuals



### System Development





# Digital Map of Caribbean Future Activities

**Workshop on Construction of Geoportals**

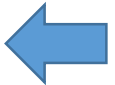
**Make an inventory of statistical and geographical information**

**Implement Digital Map of Caribbean, individuals and regional**

**Promote definition of Metadata Profile for region**

**Define and structure the information to be integrated to the systems**

**Disseminate Information**





# Make an inventory of statistical and geographical information



Inicio Dashboard CRM Ventas Compras Fabricación Almacenes Finanzas RRHH

**Enlaces**

- Inventario
- Requisicións
- Extrías
- Seguimiento de artículos

**Inventario**  
Almacenes - Inventario

[Todos los elementos] Vistas - Acciones - Informes

Filtro

Estado: Stock disponible Almacén: Finished Product Artículo:

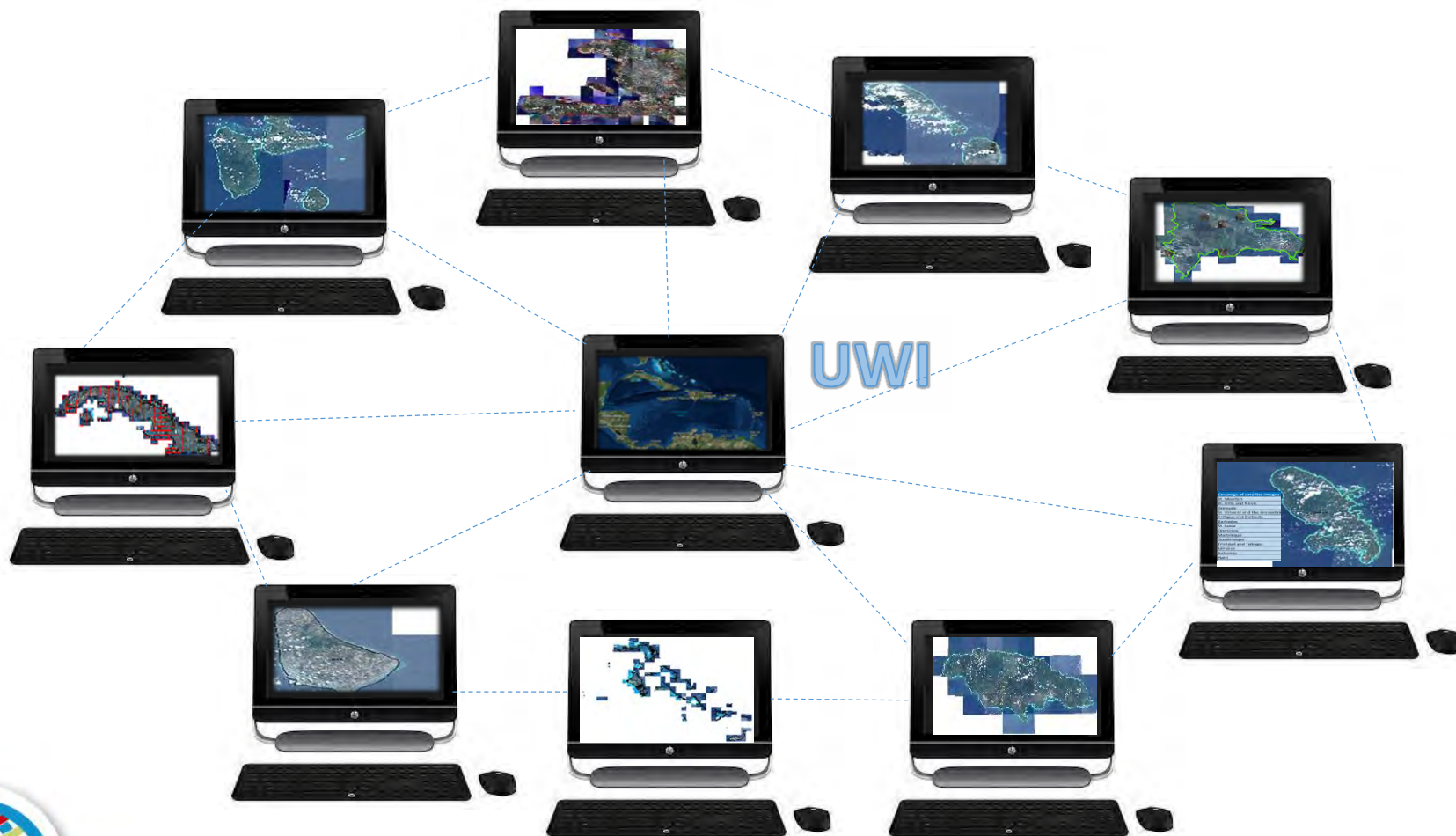
Lista de artículos:

| Artículo                                              | Almacén       | Stock      | Disponble  | Peso          |
|-------------------------------------------------------|---------------|------------|------------|---------------|
| MEA 100 - ST 62                                       | Perfiles      | 12         | 12         | 301,464 kg    |
| MEA 100 - ST 62                                       | Perfiles      | 7          | 7          | 410,328 kg    |
| PE 220 - Acero                                        | Perfiles      | 8          | 8          | 801,600 kg    |
| PE 220 - Acero                                        | Perfiles      | 9          | 9          | 1,442,880 kg  |
| AB000002 - Granite stainless 00 mesh                  | Raw Materials | 7,000 kg   | 7,000 kg   | 0,000 kg      |
| CM000001 - Screen for doors                           | Raw Materials | 500        | 500        | 5,000 kg      |
| CM000002 - vinyl for doors                            | Raw Materials | 540        | 540        | 0,000 kg      |
| CM000004 - Tavnite 10'x15'                            | Raw Materials | 625        | 625        | 0,000 kg      |
| CM000005 - Acandela M5                                | Raw Materials | 3,250      | 3,250      | 0,000 kg      |
| CM000011 - Cais termica 20                            | Raw Materials | 112        | 0          | 0,000 kg      |
| CM000014                                              | Raw Materials | 15         | 15         | 0,000 kg      |
| ES-00105 - Motores eléctricos C-1E                    | Raw Materials | 1,255      | 1,255      | 0,000 kg      |
| VS-2048 - Flat Washers - Stainless steel 18-8 - 5'x5' | Raw Materials | 45         | 45         | 0,000 kg      |
| AB000002 - Granite stainless 00 mesh                  | Raw Materials | 665,000 kg | 665,000 kg | 0,000 kg      |
| Chapa M                                               | Sheets        | 5          | 4          | 11,250 kg     |
| MEH100Acers                                           | Sheets        | 6          | 6          | 129,600 kg    |
| SHT000002 - AP12 1500x1500x5                          | Sheets        | 606        | 606        | 53,858,250 kg |
| SHT000003 - AMa3 1500x1250x2                          | Sheets        | 470        | 470        | 4,755,750 kg  |
| SHT000004 - AMa3 1250x1250x2                          | Sheets        | 1,250      | 1,250      | 22,148,437 kg |
| SHT000005 - AB6 1250x1500x2                           | Sheets        | 125        | 125        | 1,771,675 kg  |





# Implement Digital Maps of Caribbean, individual and regional



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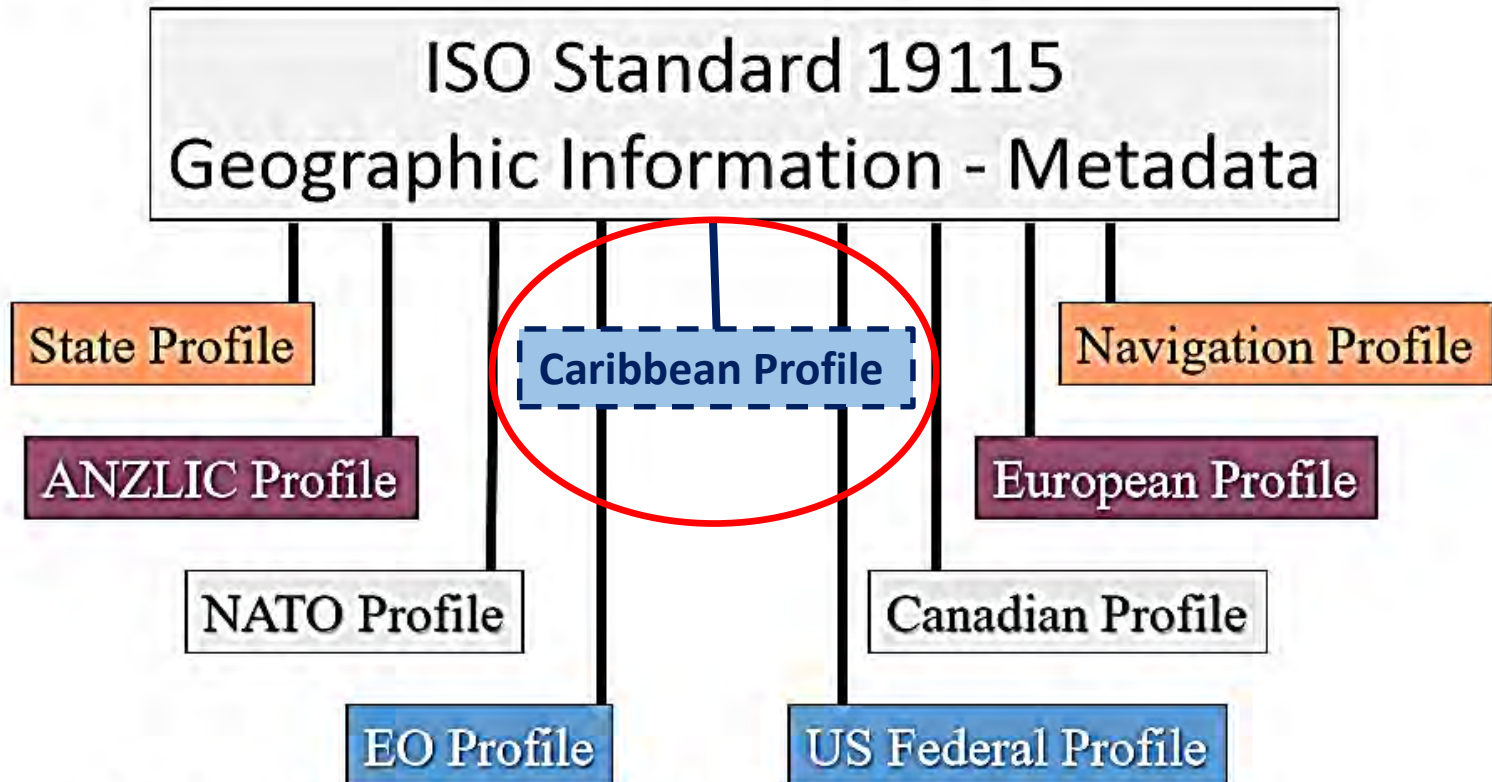
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## Promote definition of Metadata Profile for region

Regional, national, & organizational profiles



Profiles Enable Interoperability Between Communities



Define and structure the information to be integrated to the systems



This is a special type of information

It's geographic information



| 1 | id | nombre  | Address                                 | City       | State           | Country |
|---|----|---------|-----------------------------------------|------------|-----------------|---------|
| 2 | 1  | Aurelio | Calle del Universo, 3, Valladolid       | Valladolid | Castilla y León | Spain   |
| 3 | 2  | Diego   | Calle de la Constelación, 1, Valladolid | Valladolid | Castilla y León | Spain   |
| 4 | 3  | Iker    | Calle de la Nebulosa, 7, Valladolid     | Valladolid | Castilla y León | Spain   |
| 5 |    |         |                                         |            |                 |         |



# Disseminate information



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REGIONAL COMMITTEE OF  
UNITED NATIONS  
ON GLOBAL GEOGRAPHICAL  
INFORMATION MANAGEMENT  
FOR THE AMERICAS



Association of Caribbean States  
Asociación de Estados del Caribe  
Associación des Etats de la Caraïbe



INSTITUTO NACIONAL  
DE ESTADÍSTICA Y GEOGRAFÍA



Caribbean  
Digital Map



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**Thanks for your attention**

**Project for the strengthening of Spatial  
Data Infrastructures in the Caribbean**

October 2016