Geo-Spatial Technologies for Customs

Pragmatics Solutions and Examples

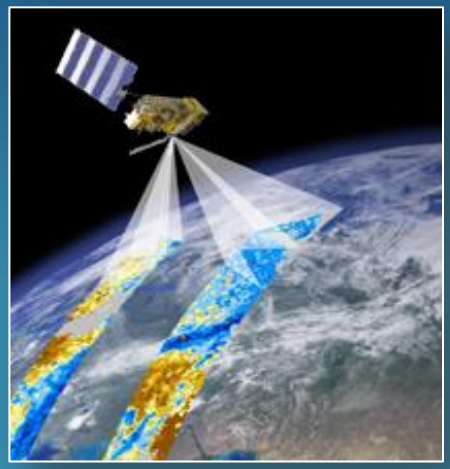
GE-Data

Tokyo, November 2nd 2017

Outline

Geographic Information Systems

- Concepts
- Requirements
- Some examples in Tunisia



GIS Combined with Remote Sensing
Some examples

- Truck Traffic assessment in Syria
- Informal Trade in Mali - Algeria
- Ports activity in Malaysia - Indonesia

“A map is worth a thousand words”

Rank	Country or territory	Density (inh./km²)
—	Mayotte (France)	641.7
1	Mauritius	624.0
2	Rwanda	440.8
3	Burundi	401.7
4	Comoros	363.1
—	Réunion (France)	342.8
5	Seychelles	211.0
6	Nigeria	197.2
7	São Tomé and Príncipe	189.8
8	Gambia	176.2
9	Uganda	165.4
10	Malawi	145.3
11	Cape Verde	129.2
12	Togo	128.6
13	Ghana	114.5
14	Benin	96.6
15	Egypt	91.4
16	Sierra Leone	89.9
17	Ethiopia	88.2
18	Kenya	79.0
19	Senegal	77.1
20	Morocco	77.0
21	Swaziland	74.1
22	Côte d'Ivoire	70.4
23	Lesotho	70.3
24	Tunisia	68.8
25	Burkina Faso	66.0
26	Tanzania	56.6
27	Guinea	51.3
28	Guinea-Bissau	51.1
29	Cameroon	49.1
30	South Africa	44.7
31	Eritrea	43.1
32	Madagascar	41.3
33	Liberia	40.4
34	Zimbabwe	39.9
35	Djibouti	38.6
36	Mozambique	34.9
37	Democratic Republic of the Congo	32.9

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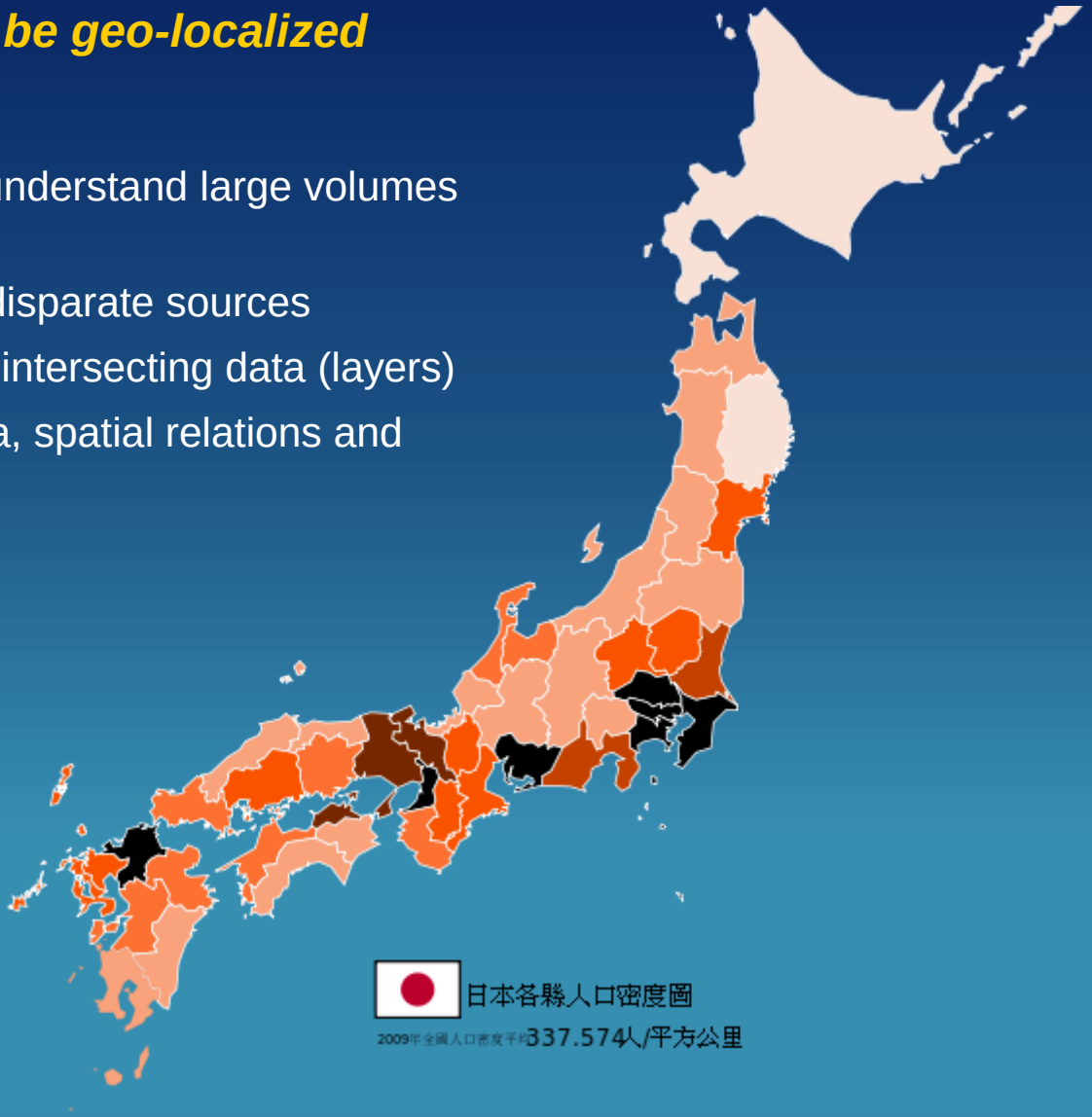
Geography

- ***80% of all information can be geo-localized***
- Geography allows us to
  - Handle, view, explore and understand large volumes of data
  - Integrate data from widely disparate sources
  - Perform spatial analysis by intersecting data (layers)
  - Put to evidence phenomena, spatial relations and trends
  - Reveal (spatial) intelligence
- ***Only very few industries do not use GIS …***



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Geomatics & GIS

A Geographic Information Systems (GIS) is the combination of :

- A computer
- A software
- A database
- And trained staff

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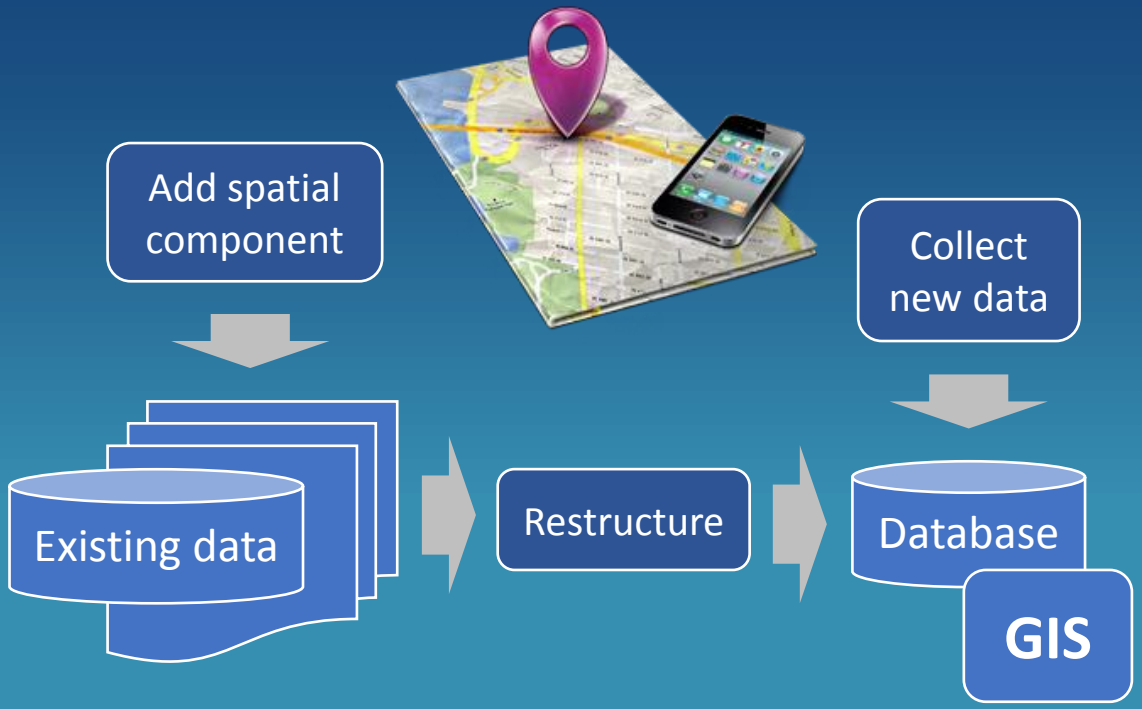
Introducing GIS

Typical situation

- Already “pre-historic” GIS in place (wall map with pin points)
- Much data available but stored in different formats, databases, paper files….
- Hardware underutilized (smart phones, computers, …)



Access to GIS

- Open source Software
- Computers are affordable
- Huge amounts of public georeferenced data
- Technical means to easily collect new data (smart phones..)
- Little investments required (HR, training, …)

Transitioning from Wall maps to Digital maps

A pragmatic approach can consist in :

1) Initiate **discussion**:

Break the paradigm

“What can you do Vs. What do you need for your daily activity”

2) Define your **needs (not your wants)** towards actions

For this Meeting / Report / Planning / ……....I need……

Transitioning from Wall maps to Digital maps

3) Add **spatial components** (link data to a Road, a City, a Region, a GPS point…)

Alsace	22°C	Soleil
Aquitaine Nord	23°C	Variable
Aquitaine Sud	23°C	Variable
Auvergne Nord	22°C	Soleil
Auvergne Sud	19°C	Soleil Voilé
Basse-Normandie Nord	20°C	Soleil
Basse-Normandie Sud	24°C	Soleil
Bourgogne Est	22°C	Soleil
Bourgogne Ouest	23°C	Soleil
Bretagne Est	23°C	Soleil
Bretagne Ouest	21°C	Soleil
Centre	22°C	Variable
Champagne-Ardenne Nord	22°C	Soleil
Champagne-Ardenne Sud	22°C	Variable
Corse	19°C	Soleil
Haute-Normandie	23°C	Soleil
Ile -de-France	24°C	Soleil
Languedoc-Roussillon Nord	21°C	Soleil Voilé
Languedoc-Roussillon Sud	19°C	Soleil
Limousin	21°C	Variable
Lorraine	22°C	Soleil
Midi-Pyrénées Est	21°C	Variable
Midi-Pyrénées Ouest	22°C	Variable
Nord-Pas-de-Calais	23°C	Soleil
Pays de la Loire	22°C	Soleil
Poitou-Charentes	21°C	Variable
Provence-Alpes-Côte d'Azur Est	19°C	Soleil Voilé
Provence-Alpes-Côte d'Azur Nord	21°C	Soleil
Provence-Alpes-Côte d'Azur Ouest	18°C	Soleil
Rhône-Alpes Est	21°C	Risque d'averses
Rhône-Alpes Ouest	22°C	Soleil

Think Geo

4) Train few staff : Hands-on real data not GIS theory!

To leverage cellphones to collect – relay information for free!

To maintain database and produce maps : Few days per month!

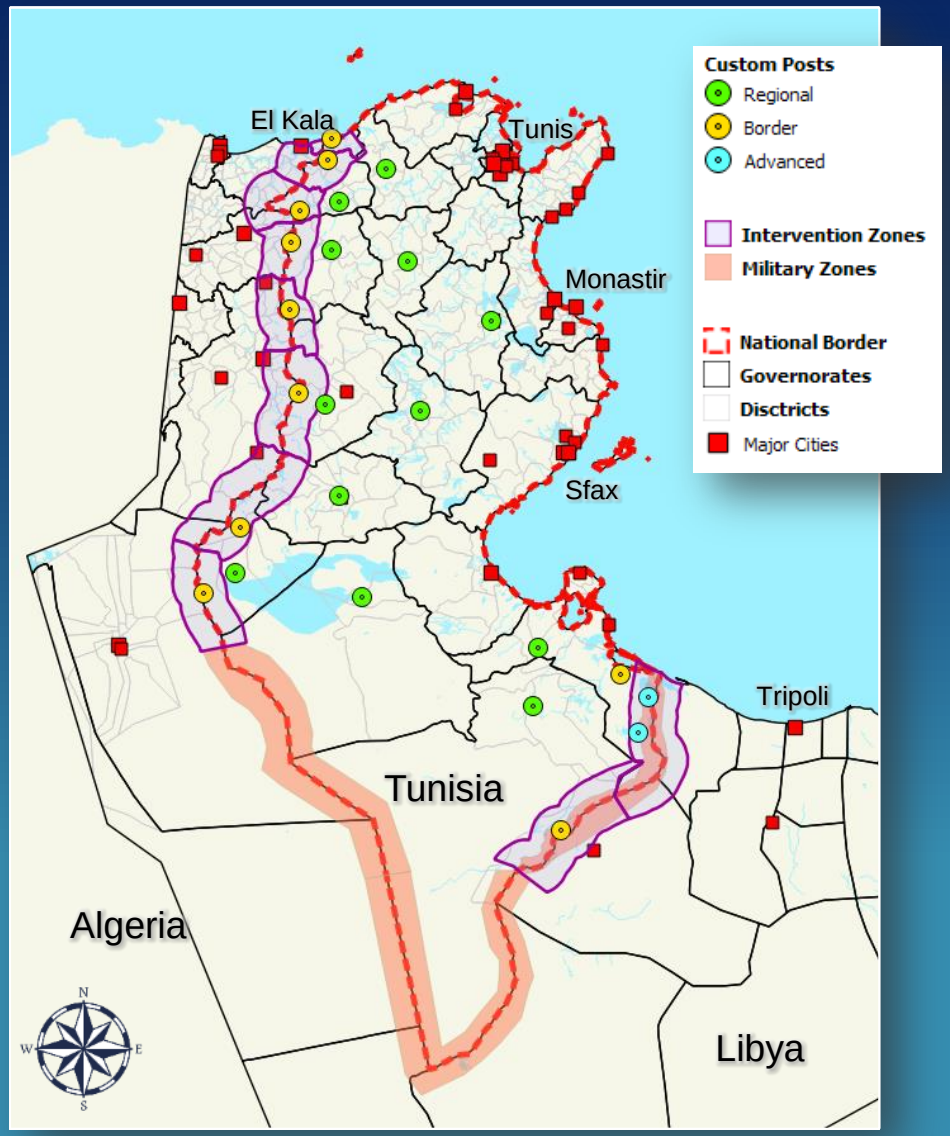
Most maps can be predefined or included in a dedicated module

5) **Start small** to evaluate ROI and gain Management Support:

50K$ would already do a lot!

Tunisia Demonstrator

Tunisia – Reference Data Layers



- Land & Sea
- Tunisian border
- Water
- Administrative boundaries 1
- Administrative boundaries 2
- Cities
- Road network
- Rail roads
- Customs Posts
- Intervention zones

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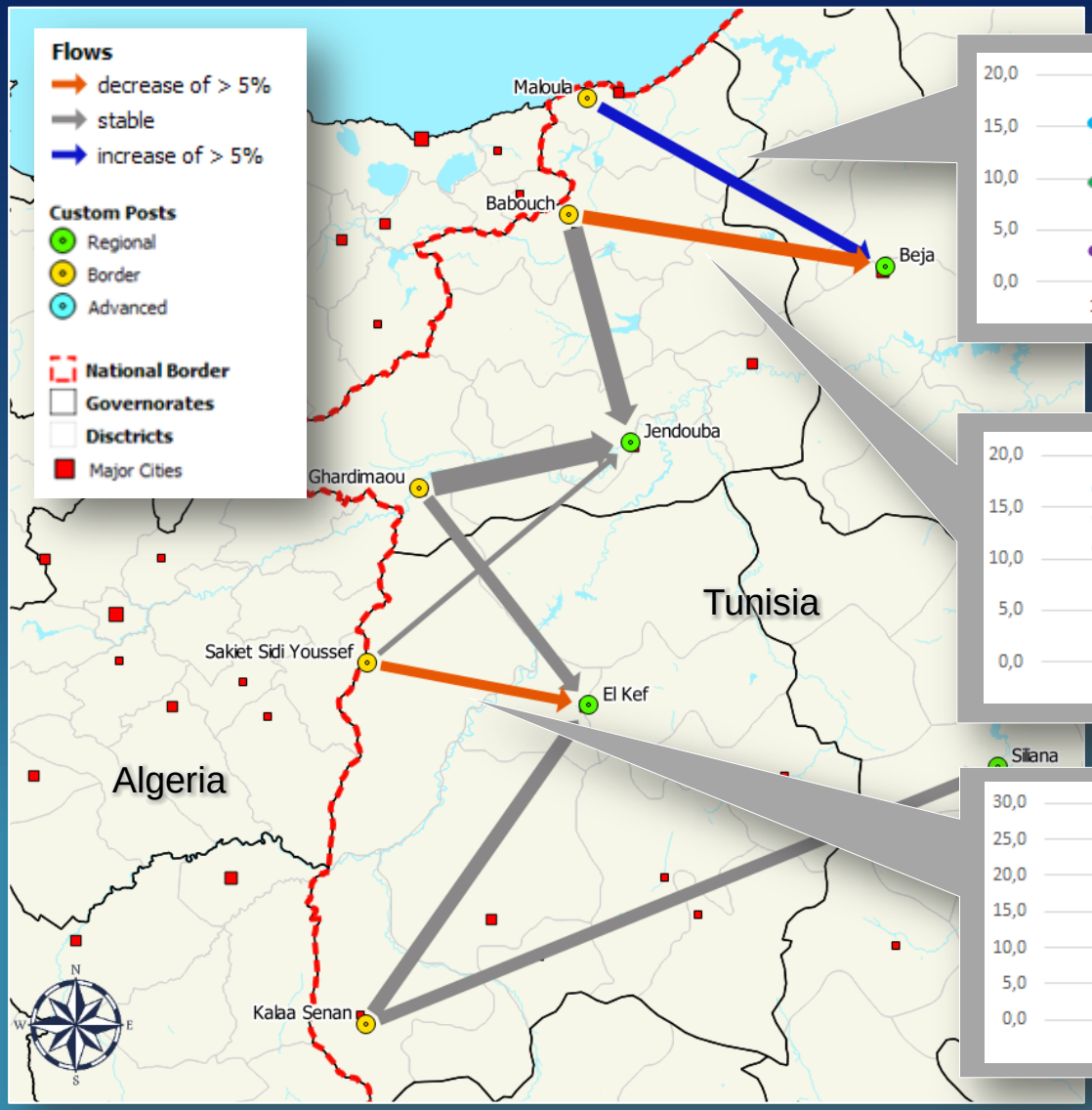
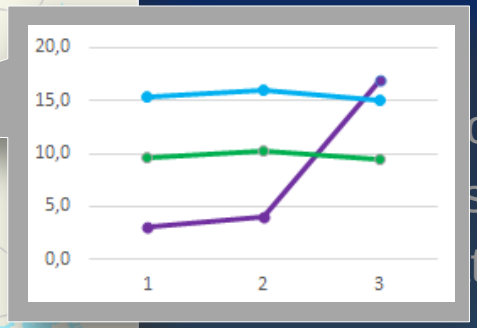
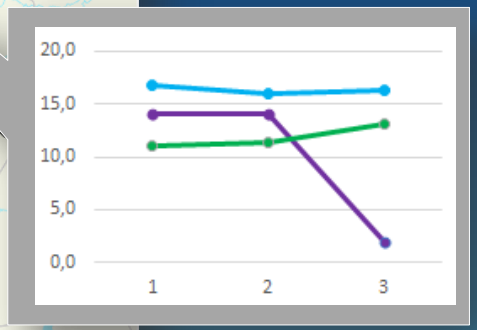
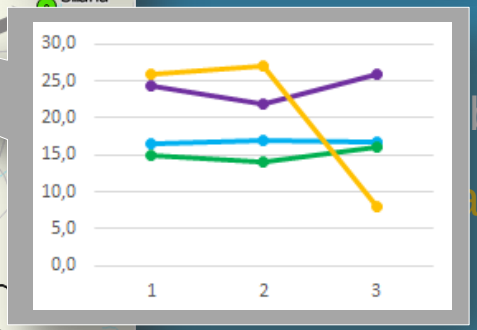
Tunisia – Monitoring Flows









flows:

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- ....

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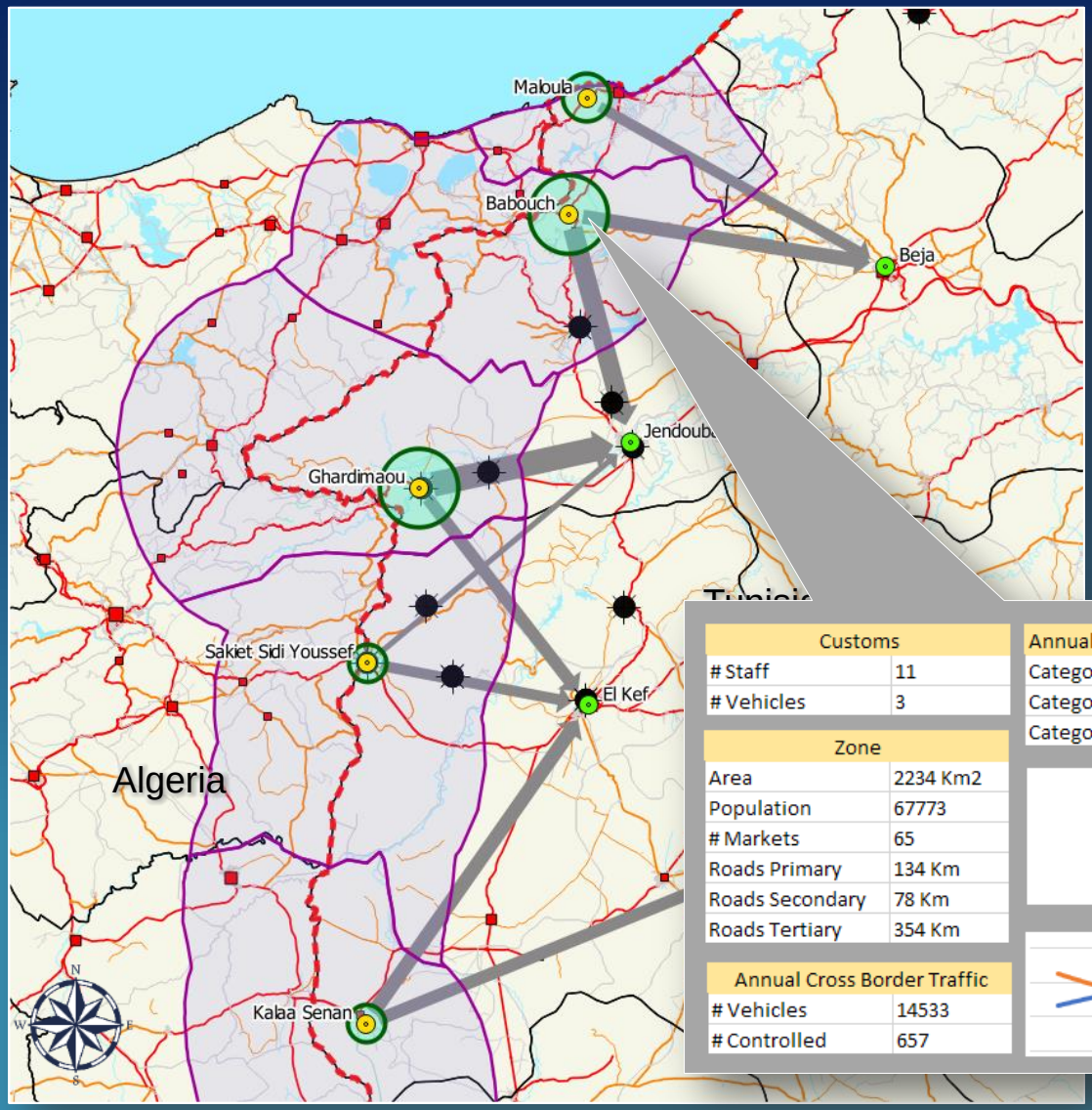
Tunisia – Delimitation of Intervention Zones

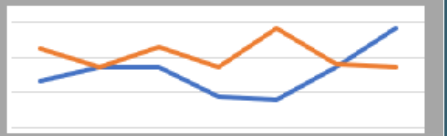


Customs	
# Staff	11
# Vehicles	3

Zone	
Area	2234 Km2
Population	67773
# Markets	65
Roads Primary	134 Km
Roads Secondary	78 Km
Roads Tertiary	354 Km

Annual Cross Border Traffic	
# Vehicles	14533
# Controlled	657

Annual Flow	Vol.	# Decl.
Category 1	23443	133
Category 1	734	65
Category 1	677	23



Rationalize delimitation of intervention zones, based on geo-spatial criteria:

- Flows
- Activity
- Incidents
- Road network length

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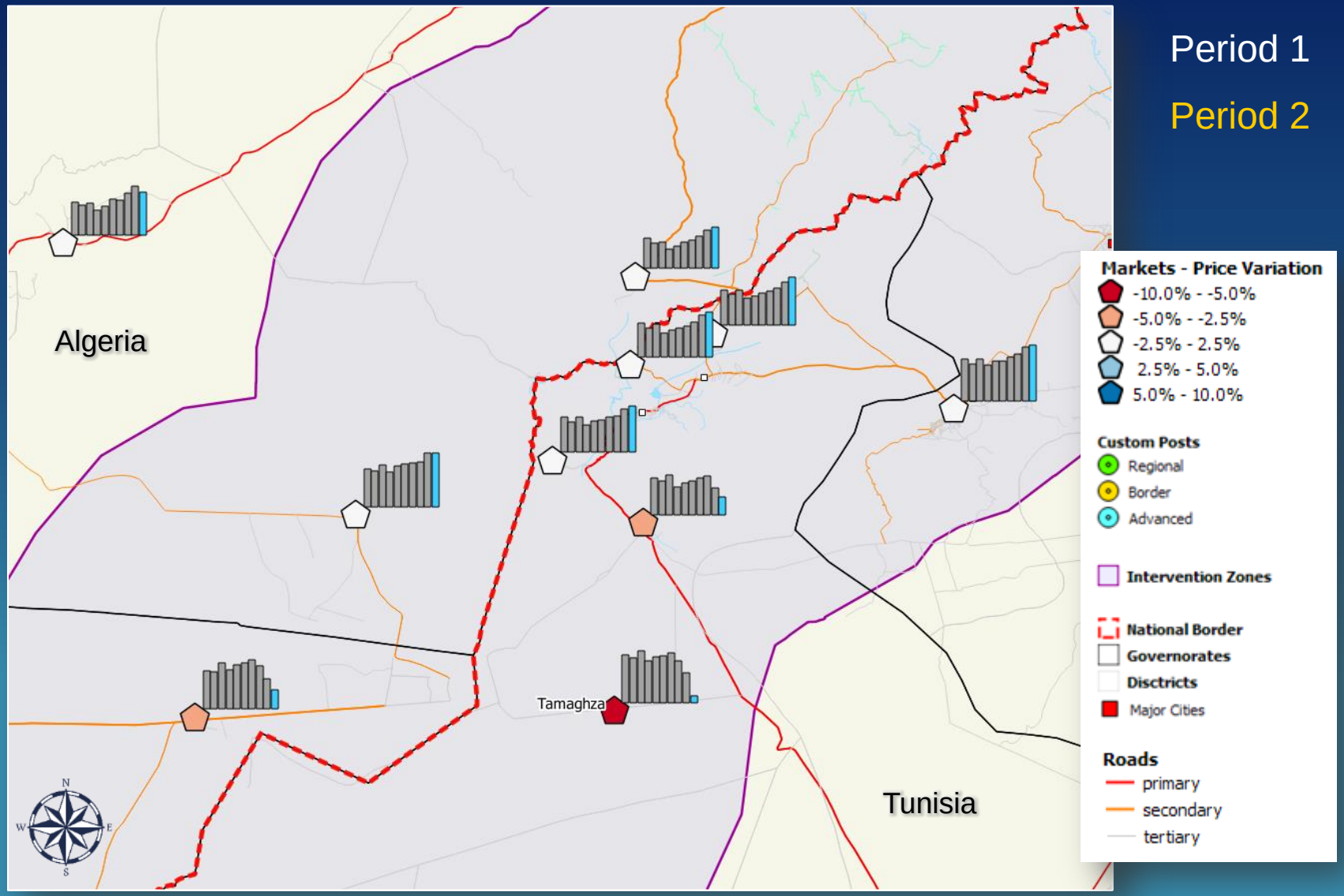
Tunisia – Monitoring Markets



Period 1

Period 2

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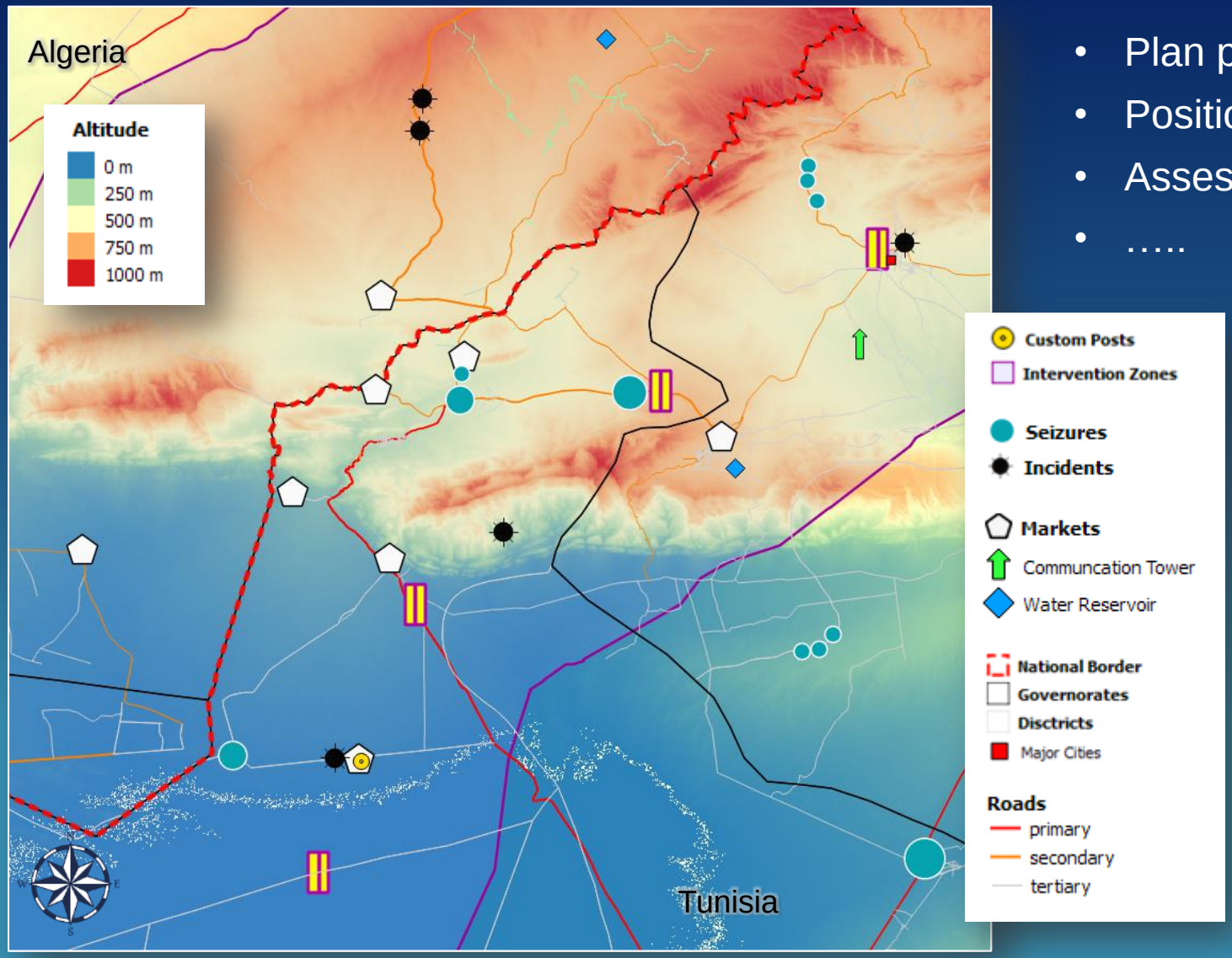
Tunisia – Local Operations & Logistics



- Plan patrol tours
- Position road blocks
- Assess security
- …..

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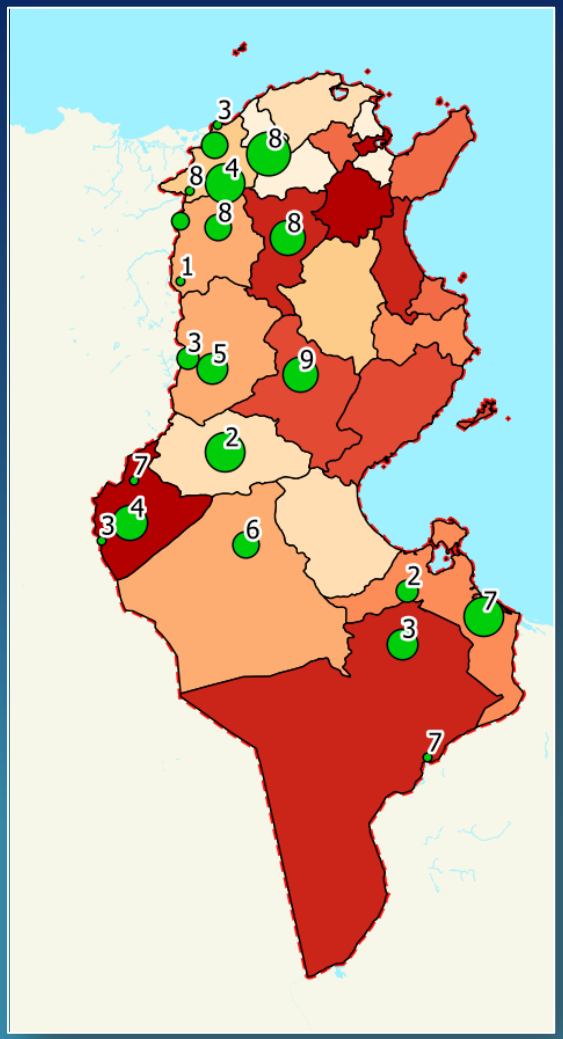
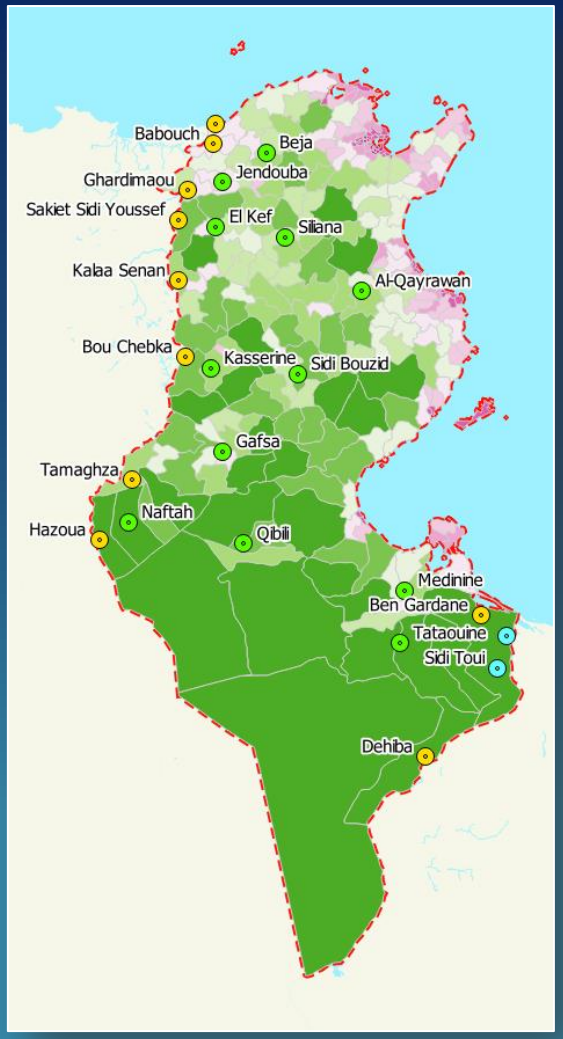
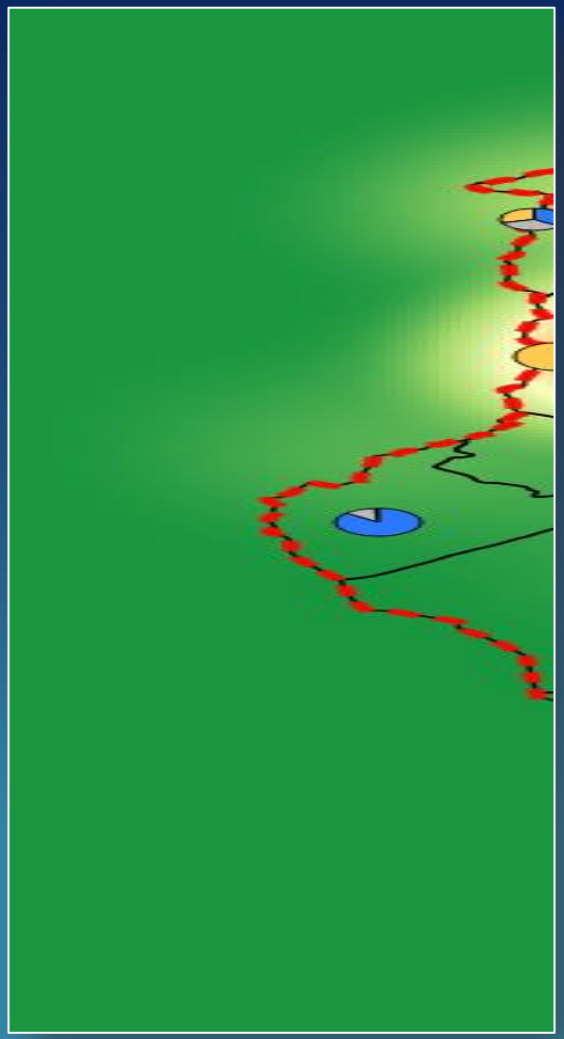
Reporting







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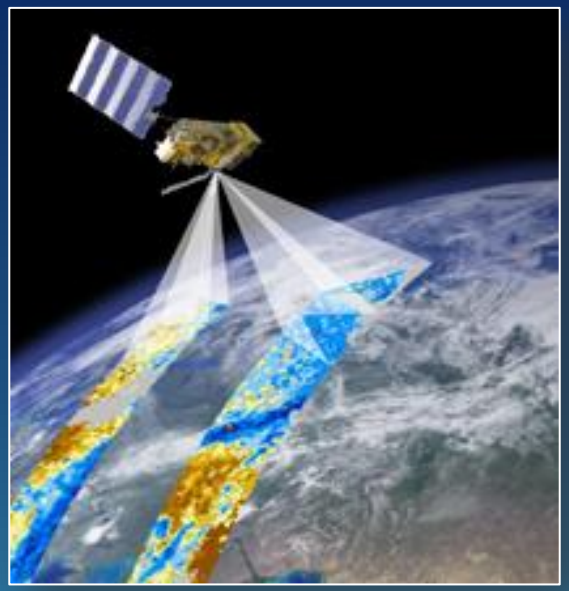
Remote Sensing

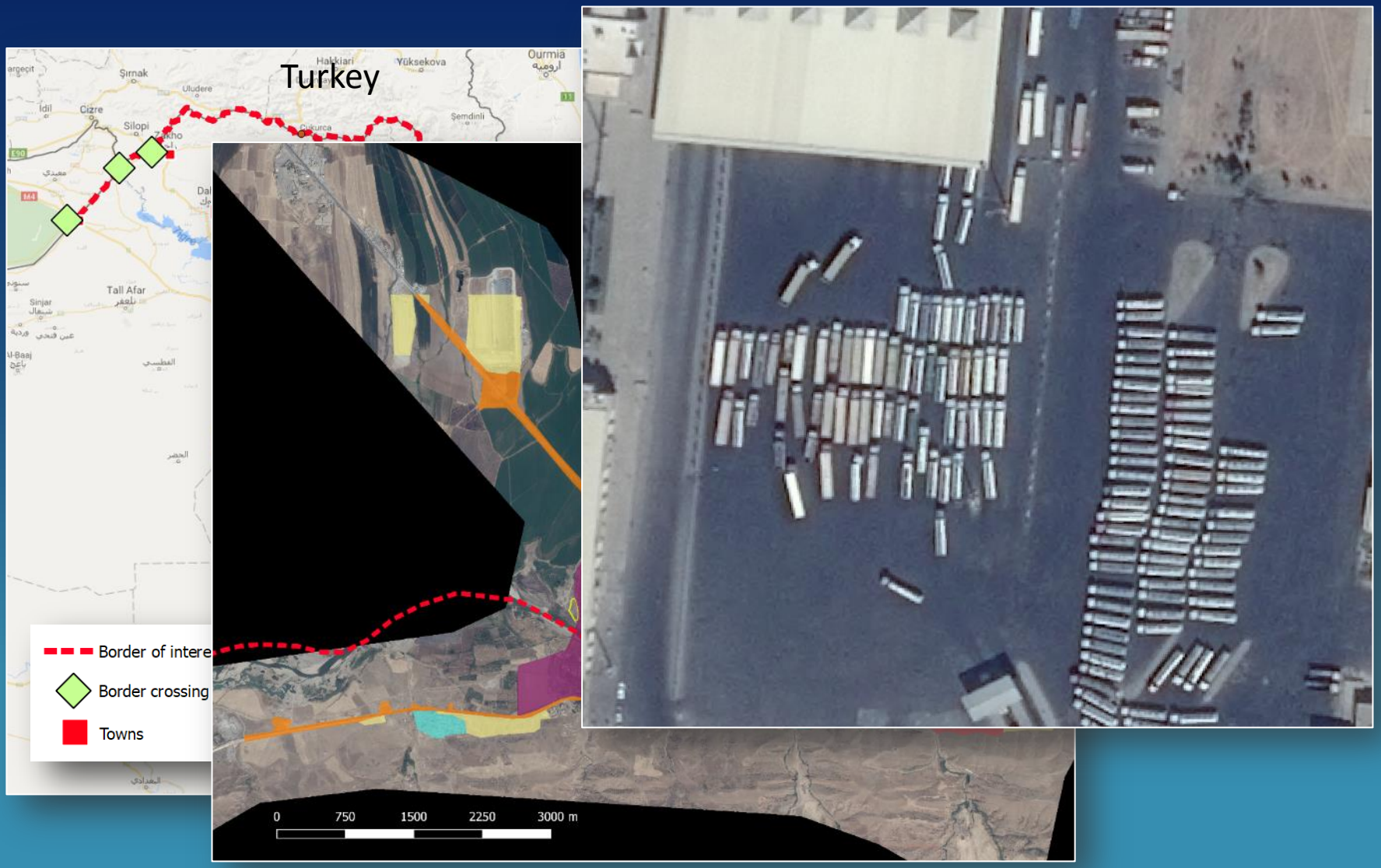
Remote Sensing



- Earth Observation by imaging the earth surface from the sky
- Water, Environment, Meteorology, Agriculture, Military, Urban, ….
- 1100 operational satellites, of which 25% for EO
- Different characteristics
  - *Orbit/Altitude*
  - *Image size/resolution*
- RS is acquiring the right images, processing and extracting information

- Objectif and fact based source of information
- Access to remote / dangerous areas

Cross Border Truck Traffic Assessment



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Cross Border Truck Traffic Assessment

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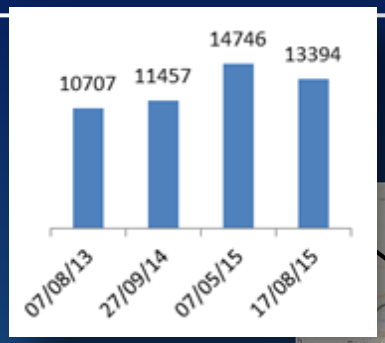
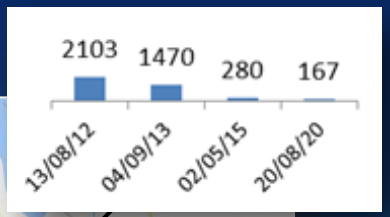
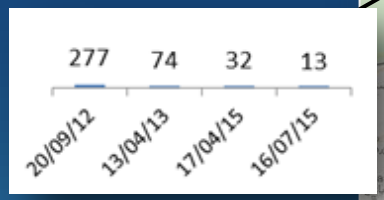
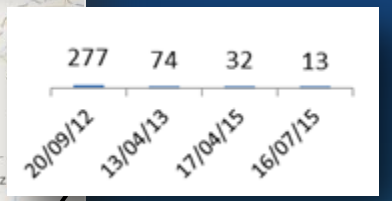
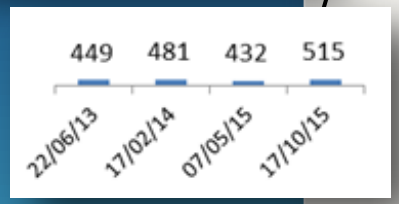
Cross Border Truck Traffic Assessment

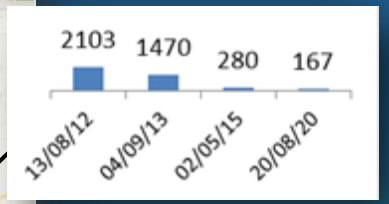


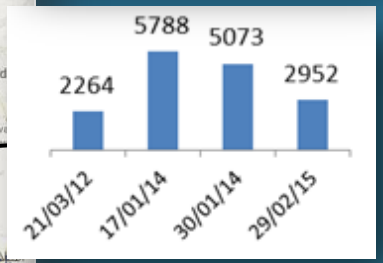


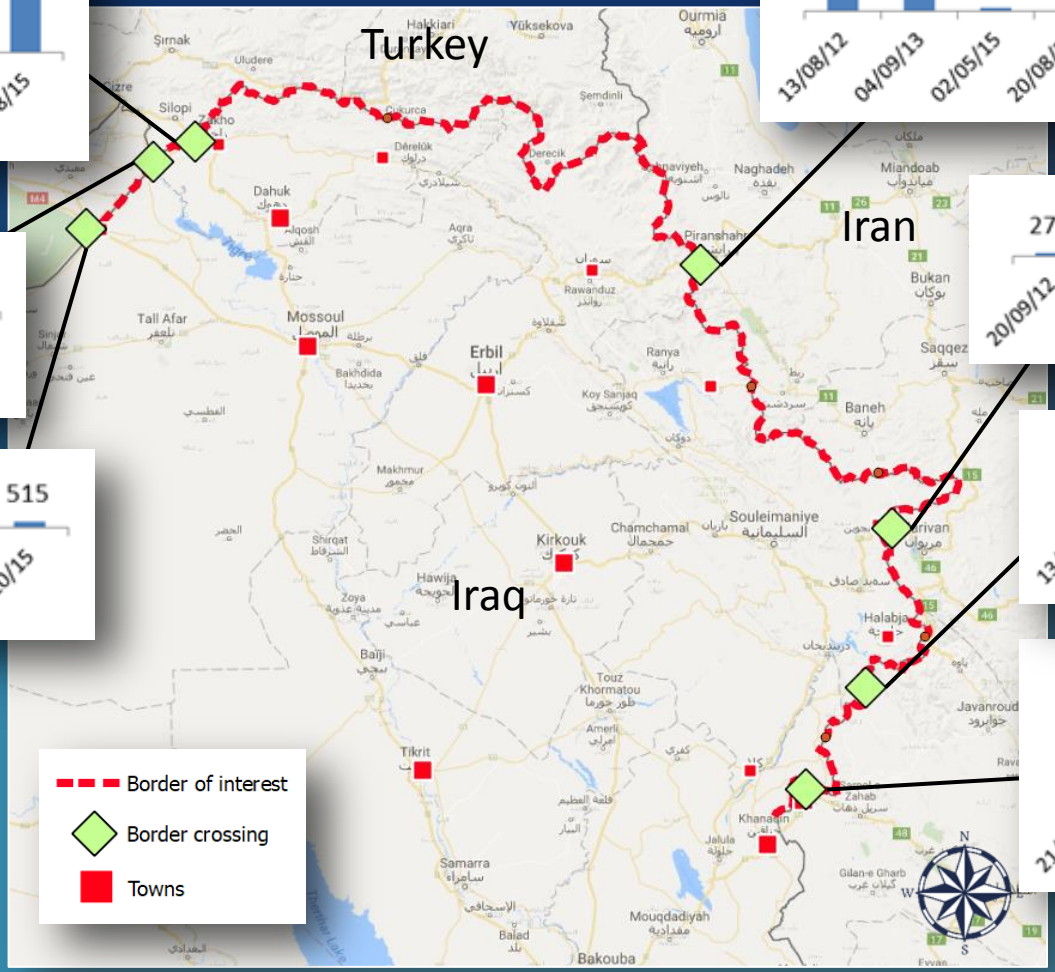












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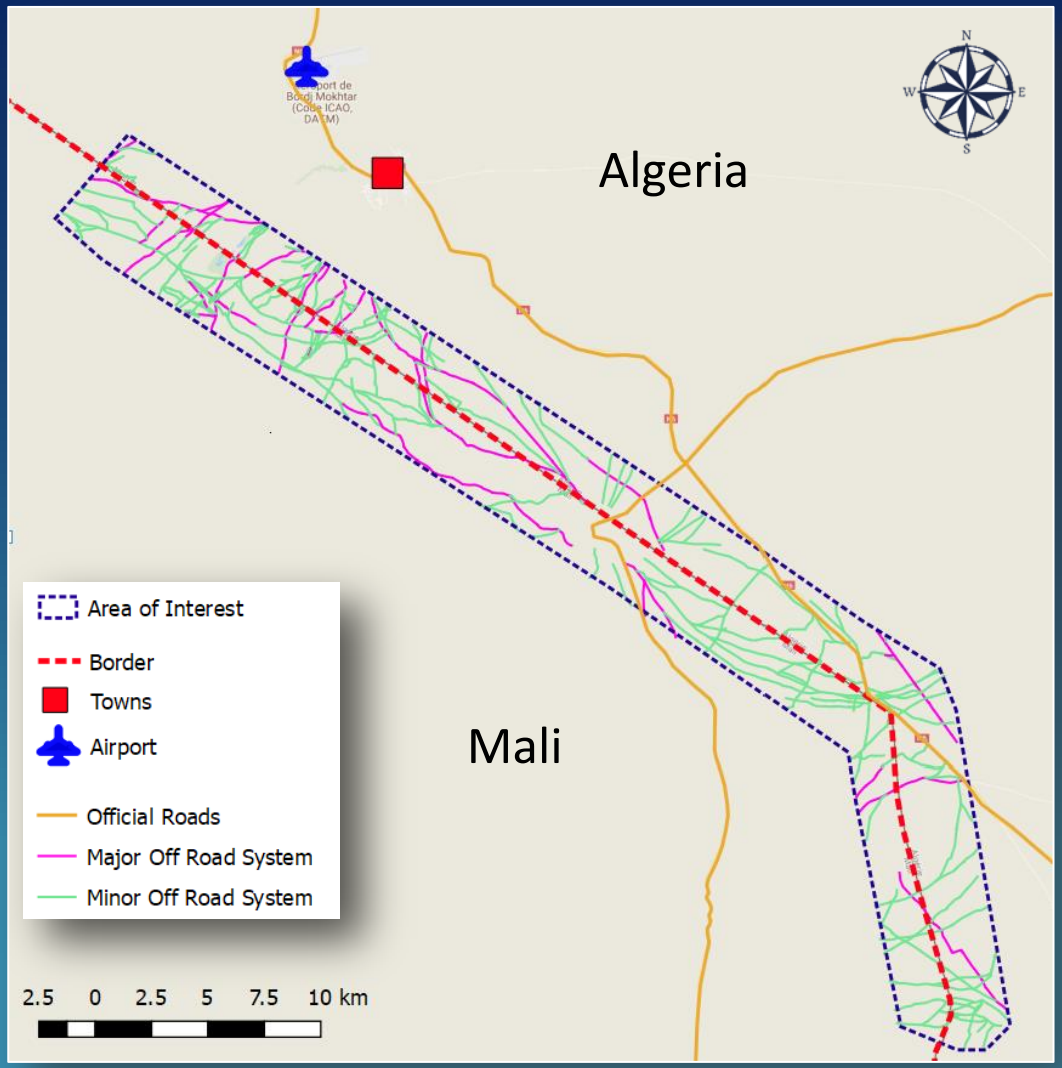
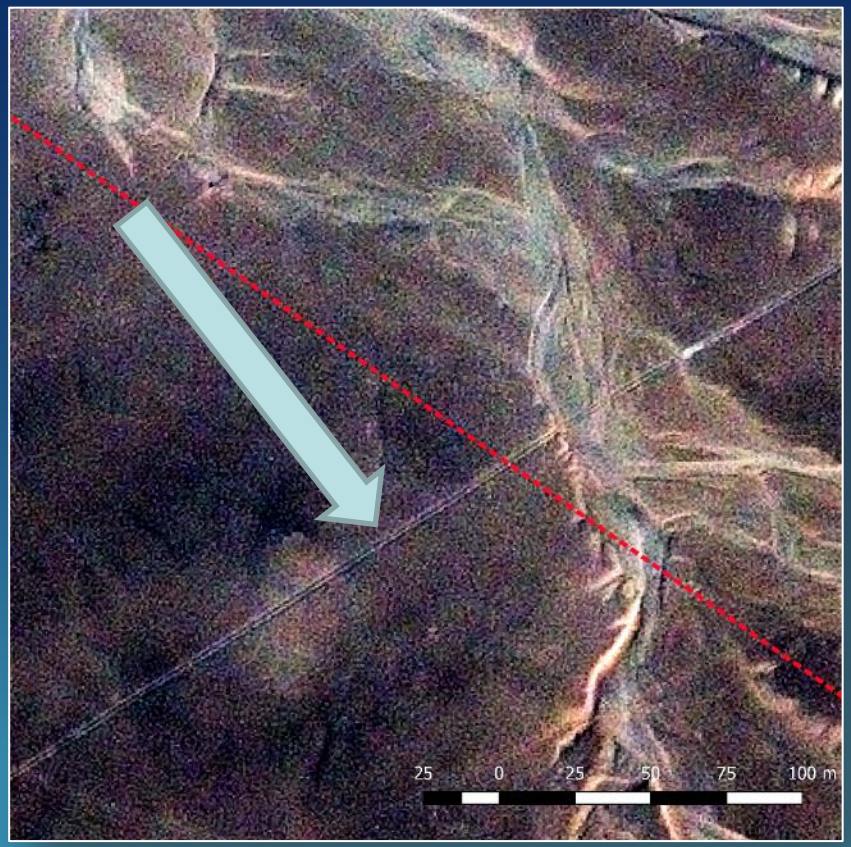
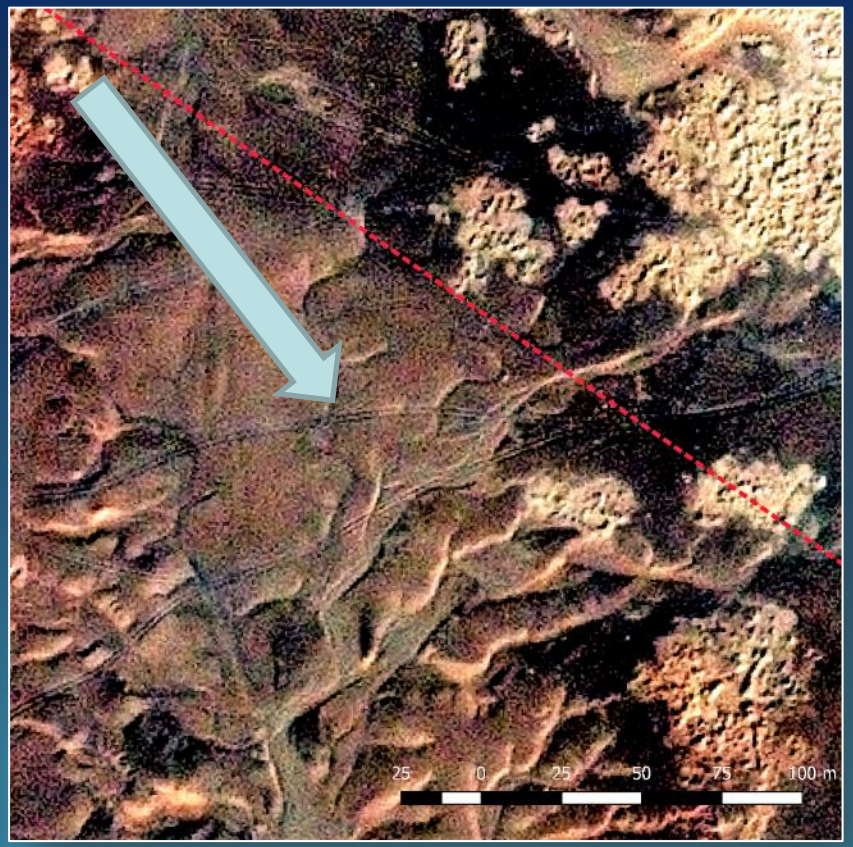
Informal Roads Detection



- Assessment of informal roads on the border between Mali and Algeria
- Semi-automatic interpretation of 50 cm resolution satellite images
- 41 informal border crossings identified over a border length of 70 Km

Informal Roads Detection





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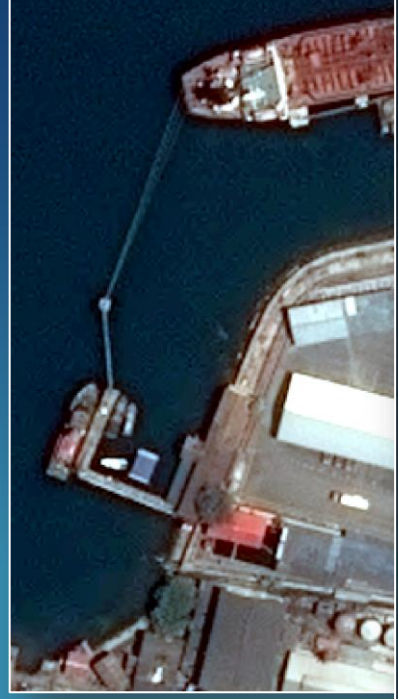
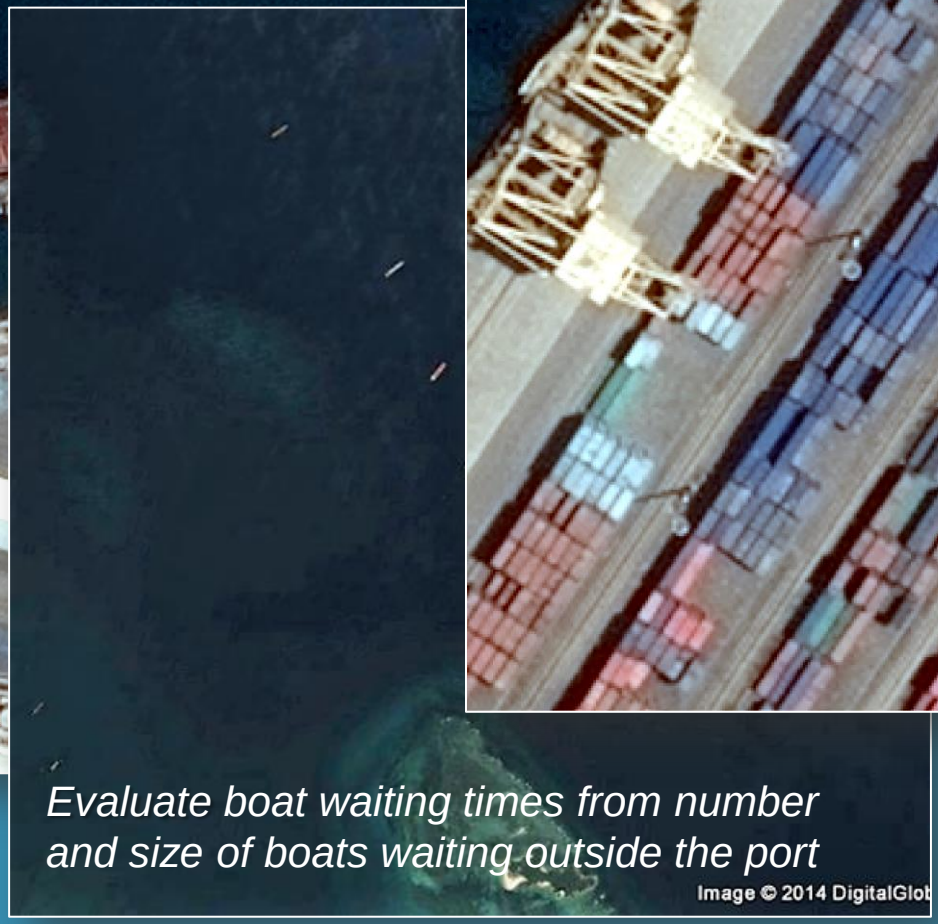
Monitoring Ports

Inventory existing infrastructure type and position



Count containers and storage capacity



Evaluate boat waiting times from number and size of boats waiting outside the port

Major Benefits for Customs

- Border Post Management for Local Operations
  - Optimize Staff and resources
  - Better targeting of locations to control
- Smart Reporting :
  - Great support to initiate discussion with local population – Get Intel
  - Send enhanced report to your Management - Other border posts – Security
  - A powerful economy monitoring tool
- Formalize knowledge formal and Informal
  - Build a legacy of Information in your insitution
- Intel: Reveal intel / Unusual behaviors – Produce Intel Reports

- Transparency should help in reducing corruption….

Conclusions

- Huge gain by introducing geography
  - Communication
    - Internally
    - Externally
    - Cross border: map are universal (bypass language barrier)
  - Decision Aid: assess performance, reallocate resources, organize operations
  - Create (reveal) geo-intelligence
  - Detect irregularities (monitoring)
  - Strategy, Tactics, Operations
  - Capture and store field knowledge / expertise, build historical database


Contact
Questions?
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