TTEK
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IMPROVING TRADE VISIBILITY, DATA EXPLOITATION, AND BORDER VIRTUALIZATION
ADVANCEMENTS IN CUSTOMS ANALYTICS

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153 Customs Modernization Expert Cosultants

5105 Master Risk Rules Deductive and Inductive Rule Sets for Border Security

42 Countries with Onsite Delivery Experience

2000 Years of Domain Experience

33 Developers across 4+ Multi Million Dollar projects

10 Border Processing Technologies
Trader Registration
Declaration Processing
Cargo Control
In Bond Processing
Accounting & Payment
Risk Management Targeting & Selectivity
Single Window
Post Clearance Audit / Revenue Leakage
Inspection and Enforcement
Management Reporting

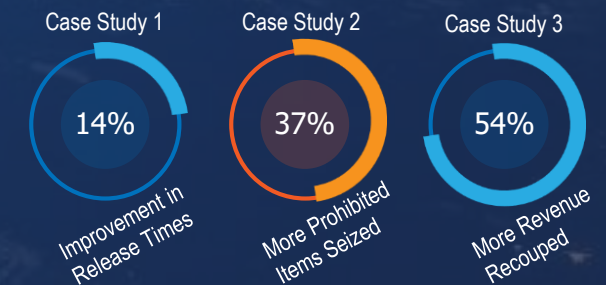**15** Million USD in new business 2018

TTEK!

Technology for the Optimization of Customs and Border Processing

TTEK develops innovative and disruptive border management technologies using machine learning and predictive analytics - drawing upon artificial intelligence and blockchain methodologies.
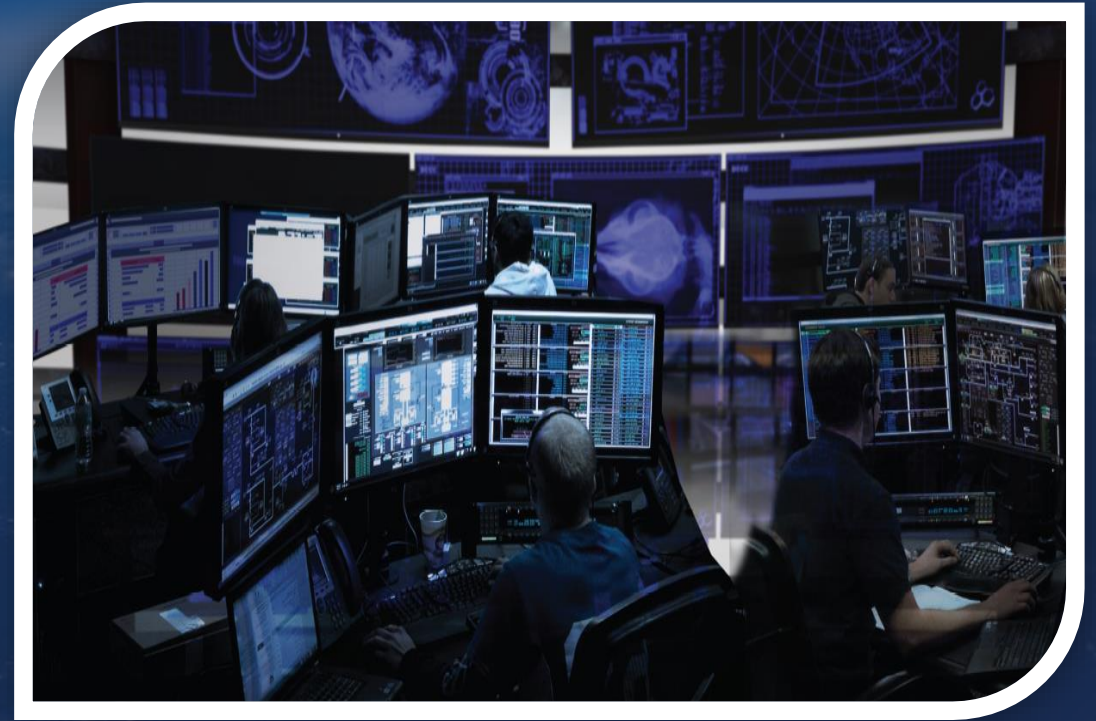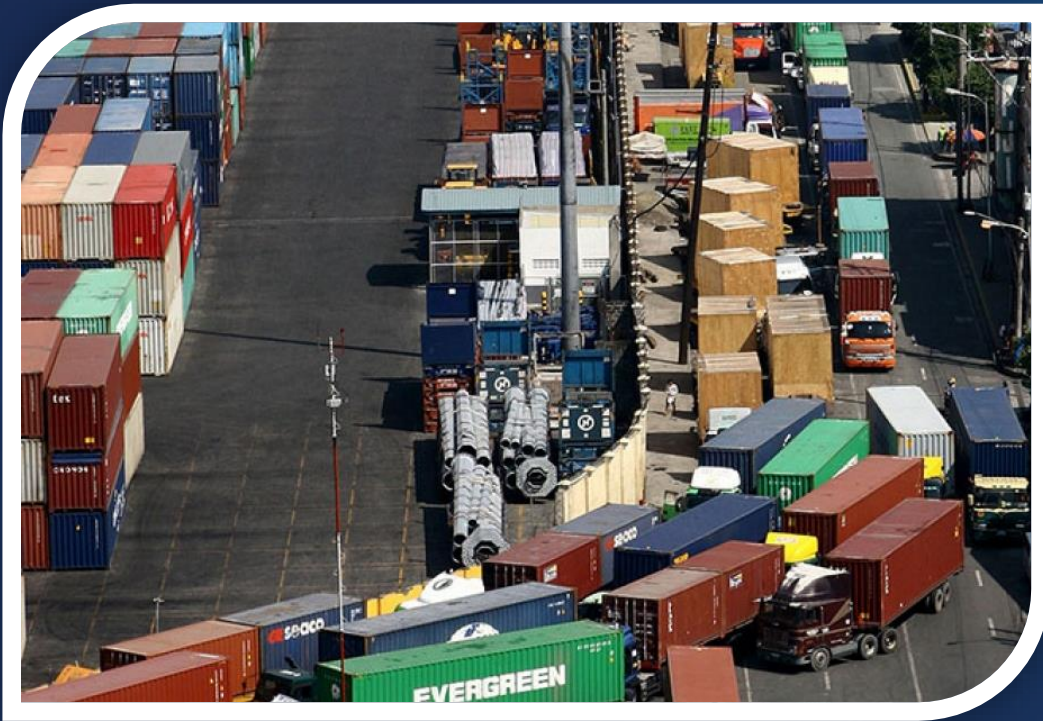
Simultaneously, TTEK border experts offer best practices, new ideas, and solutions for modern policies, programs, and systems. Our experts have been uniformed customs officers, intelligence officers and analysts, managers, supervisors, executives, and academics. We bridge strategic, tactical, and operational perspectives for customs modernization and trade facilitation with concepts, tools, and solutions that work in both developed and developing nations

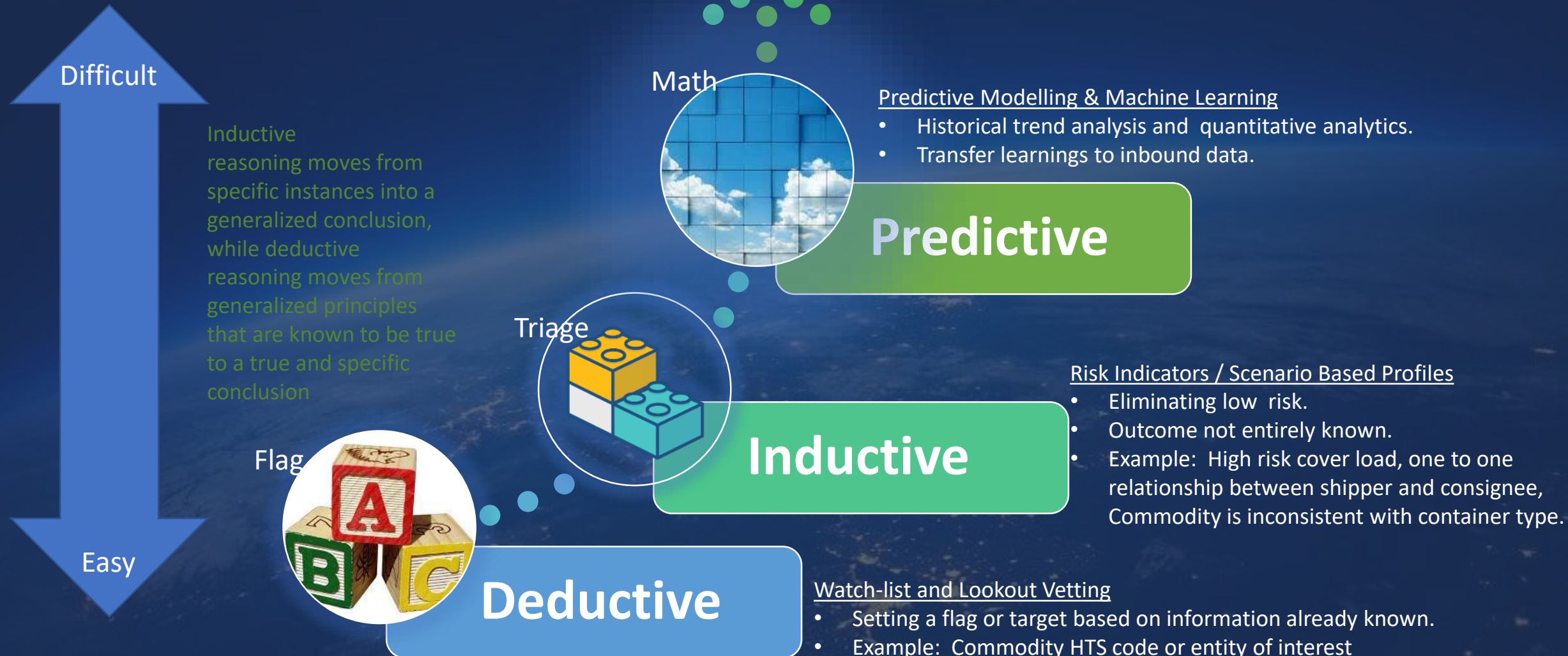## Trade Facilitation + Security = Economic Prosperity

We help our customers strategically and operationally balance trade facilitation with responsible enforcement. We have an objective to significantly reduce release times at the border and help interdict social-economic threats to health, safety, and security. We aim to lay a foundation with our solutions to help reduce and eliminate corrupt practices, and build integrity. Above all, we serve the citizens of our host country clients. We aim to do the right thing.

Case Study 1 — **14%** — Improvement in Release Times

Case Study 2 — **37%** — More Prohibited Items Seized

Case Study 3 — **54%** — More Revenue Recouped

Future of Border Management

The Past "As Is State" Business Transformation "To Be State" The Future

Logic Reasoning for Risk Determination

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Difficult

Inductive reasoning moves from specific instances into a generalized conclusion, while deductive reasoning moves from generalized principles that are known to be true to a true and specific conclusion

Easy

Math

Triage

Flag

Predictive

Predictive Modelling & Machine Learning
- Historical trend analysis and quantitative analytics.
- Transfer learnings to inbound data.

Inductive

Risk Indicators / Scenario Based Profiles
- Eliminating low risk.
- Outcome not entirely known.
- Example: High risk cover load, one to one relationship between shipper and consignee, Commodity is inconsistent with container type.

Deductive

Watch-list and Lookout Vetting
- Setting a flag or target based on information already known.
- Example: Commodity HTS code or entity of interest

Data Exploitation Conveyance Triage Step 1

Start with Conveyance (destined to your country, POE, or EEZ)

- Virtualize cross-border traffic using AIS, SAIS, LRIT, HFSWR, Sat Radar, and other data available.

- E.g. View of Persian Gulf, Physical borders and Exclusive Economic Zones.
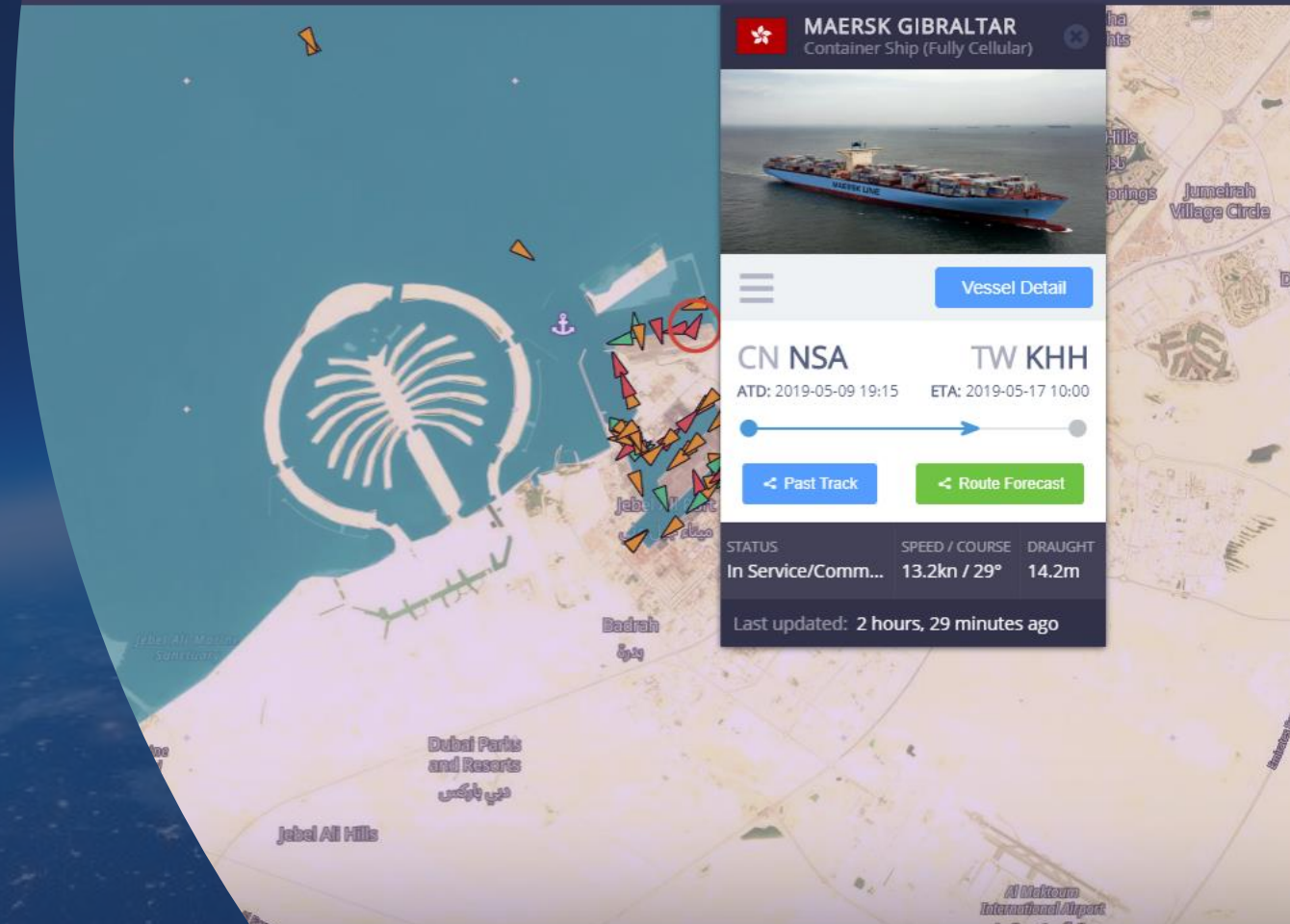
- Conveyances automatically risk assessed.

Origin → Pre-Load → 96hrs → 48hrs → 24hrs → Arrival → Post-Arrival
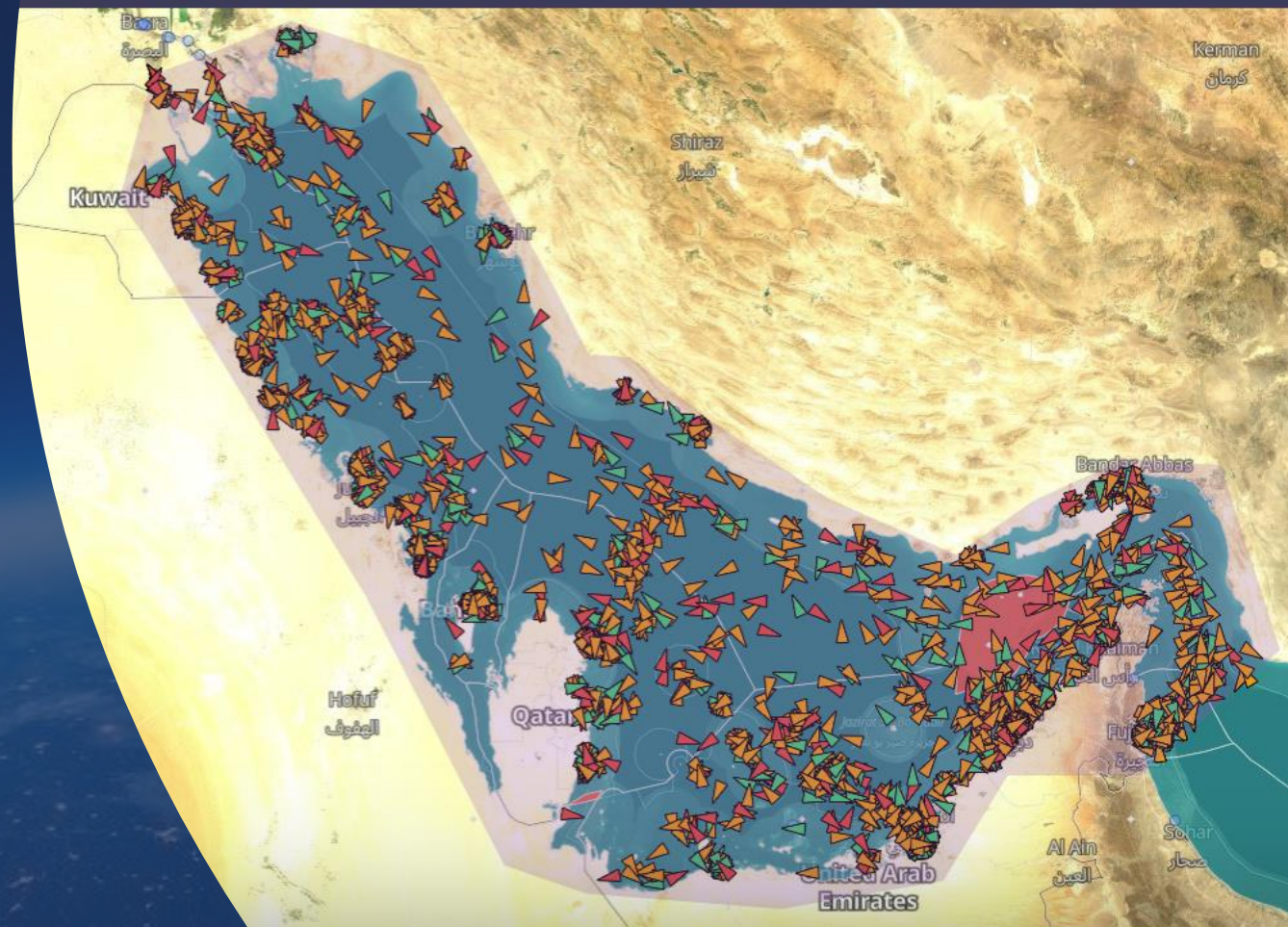
VESSEL TYPE	MMSI	GROSS TONNAGE	DEADWEIGHT TON
Research Survey Vessel	355843000	338	250
Platform Supply Ship		669	853
General Cargo Ship	677022000	1586	2399
...rts Tanker	636092698	2143	3798
	374107000	225	137
	422012400	448	650

Data Exploitation Conveyance Triage Step 2

The next step is to select high risk (red) vessel based on known risk profiles, intelligence indicators, inductive rules, anomalies, and risk scoring.

Begin to review track history and previous movements, vessel ownership, and identifiers.

	MAERSK GIBRALTAR
	Container Ship (Fully Cellular)

Vessel Detail

CN NSA	TW KHH
ATD: 2019-05-09 19:15	ETA: 2019-05-17 10:00

Past Track | Route Forecast

STATUS	SPEED / COURSE	DRAUGHT
In Service/Comm...	13.2kn / 29°	14.2m

Last updated: 2 hours, 29 minutes ago

PE ⇕	MMSI ⇕	GROSS TONNAGE ⇕	DEADWEIGHT TONNAGE ⇕
ully Cellular)	422031600	75395	81112
nker	636011215	25202	43716
	372386000	3711	4999
	371386000	685	1229
	408558000	1915	2806
620	113042	119130	

Origin → Pre-Load → 96hrs → 48hrs → 24hrs → Arrival → Post-Arrival

Data Exploitation
Conveyance Triage Step 3

Research movement history.

- Does the routing make sense?

- Any visits to high risk ports of call?

- Any unscheduled stoppages?

- Any deviations from historical voyages or trade routes?

- Mid ocean rendezvous with smaller vessels?

Origin → Pre-Load → 96hrs → 48hrs → 24hrs → Arrival → Post-Arrival
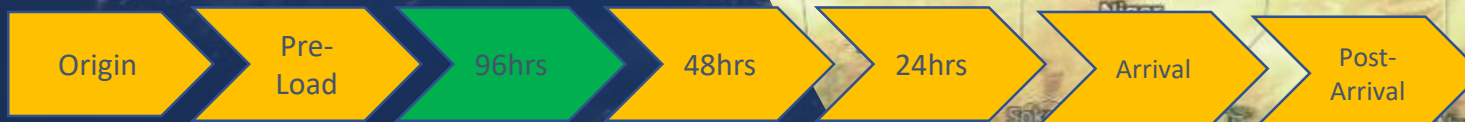
Data Exploitation Conveyance Triage Step 4

Research Vessel:

- Identifiers, dimensions, capacities,

- Ownership, owner, operator, technical manager, ship manager, group benficial owner

- Positional data and movement history

- Name changes, flag changes, status, casualties, and inspections

Conference Baku 2019
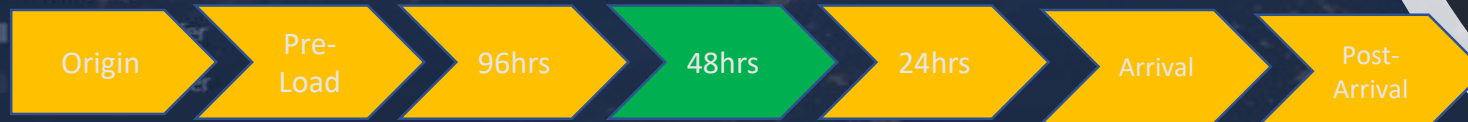
Data Exploitation
Cargo Triage Step 5

Review Bayplan

What does a Bayplan offer?

- Visibility into all containers on board vessel,
- Place of Receipt, Port of Load, Port of Discharge, Place of Destination
- Container details and type, length
- Container Number
- Locations: Tier, Cell, Row
- Dangerous Goods?
- Unreported Cargo?

BAY **022** | ROW **09** | TIER **08**

| Origin | Pre-Load | 96hrs | 48hrs | 24hrs | Arrival | Post-Arrival |

"Proprietary and Confidential"

WCO IT/TI Conference Baku 2019

Data Exploitation Cargo Triage Step 6

- Drill into / Review Cargo Reports for all shipments on vessel.

- Do the containers cross reference with the bayplan? (unmanifested?)

- Are any commodities inconsistent with container type?

- Do any one to many relationships exist?

- Source countries of interest?
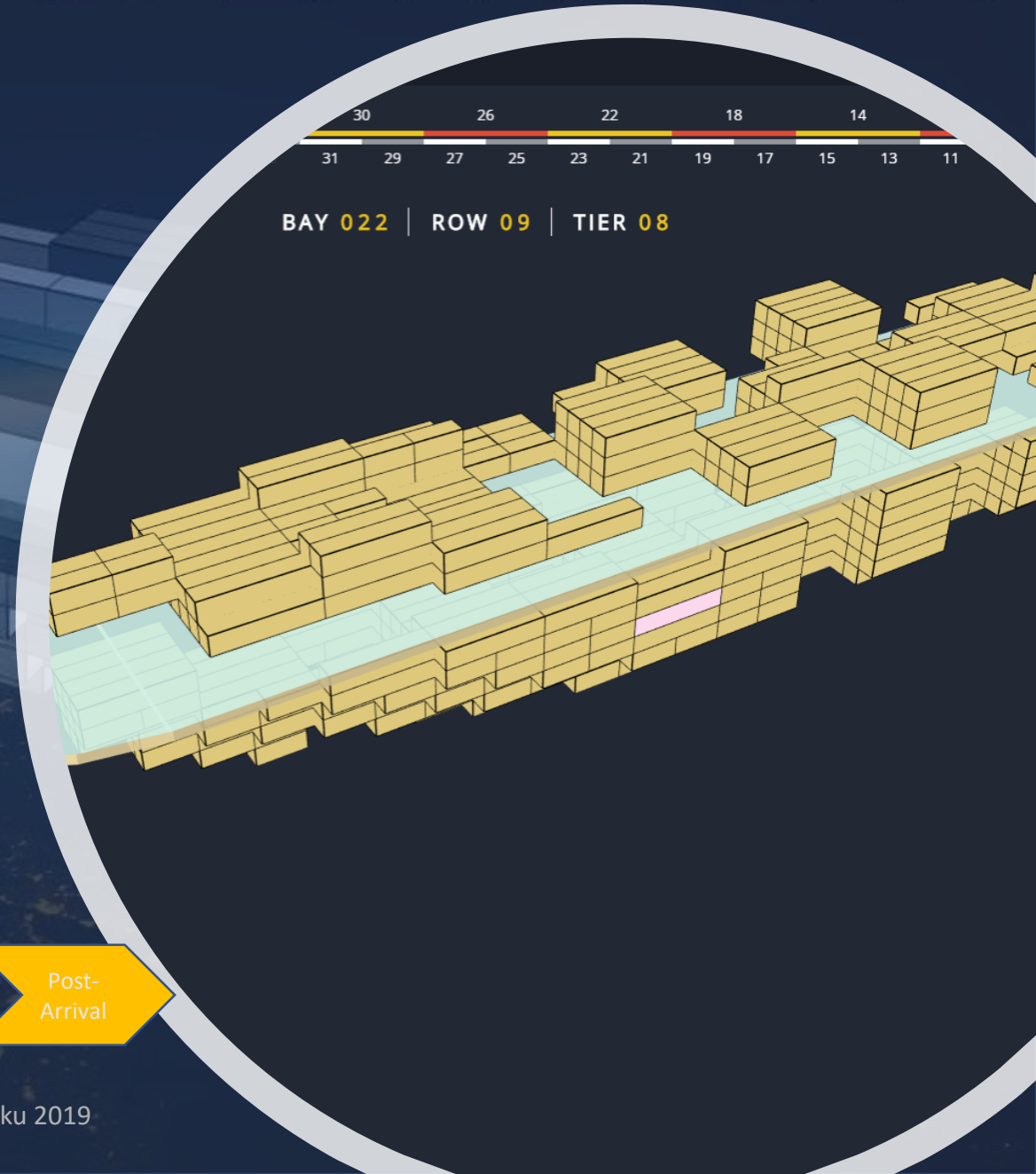
52,524	55,103	19,966	22,000
2018 imported manifests	2017 imported manifests	2018 exported manifests	2017 exported manifests

Manifests

Top 10 - Ship name occurence

Customs section

VERACRUZ, VER.

Regime

Import

Pre-...status

Passed

From

MM/DD/Y...

...o

...Y/YYYY

Q SEARCH

MONTE CERVANTES | MONTE OLIVIA | MONTE VERDE | MONTE PASCAL | MONTE SARMIENTO | CHACABUCO | ALLEGORIA | E.R. BERLIN | MSC LUDOVICA | E.R. SEOUL

					Section code	Manifest number	Company agent	Trade type	Voyage number	Arrival date	Reciept date	Validation date
					430	11239718008979	N/A	IMPORTACION	1849N	01/02/2019	28/12/2018	29/12/2018
					430	11291818006180	N/A	IMPORTACION	0GB2HS1MA	01/02/2019	26/12/2018	26/12/2018
						...0623...	N/A	IMPORTACION	0GB2HS1MA	01/02/2019	28/12/2018	28/12/2018
						...233	N/A	IMPORTACION	0GB2HS1MA	01/02/2019	28/12/2018	28/12/2018
					430	11291818006218	N/A	IMPORTACION	0GB2HS1MA	01/02/2019	28/12/2018	28/12/2018
					430	11257318505897	N/A	IMPORTACION	CG850A	30/01/2019	12/12/2018	12/12/2018

"Proprietary and Confidential"

Origin > Pre-Load > 96hrs > 48hrs > 24hrs > Arrival > Post-Arrival

142 b $

/alue

84 b $

2017 Export Value

164 b $

2018 Import Value

101 b $

2018 Export Value
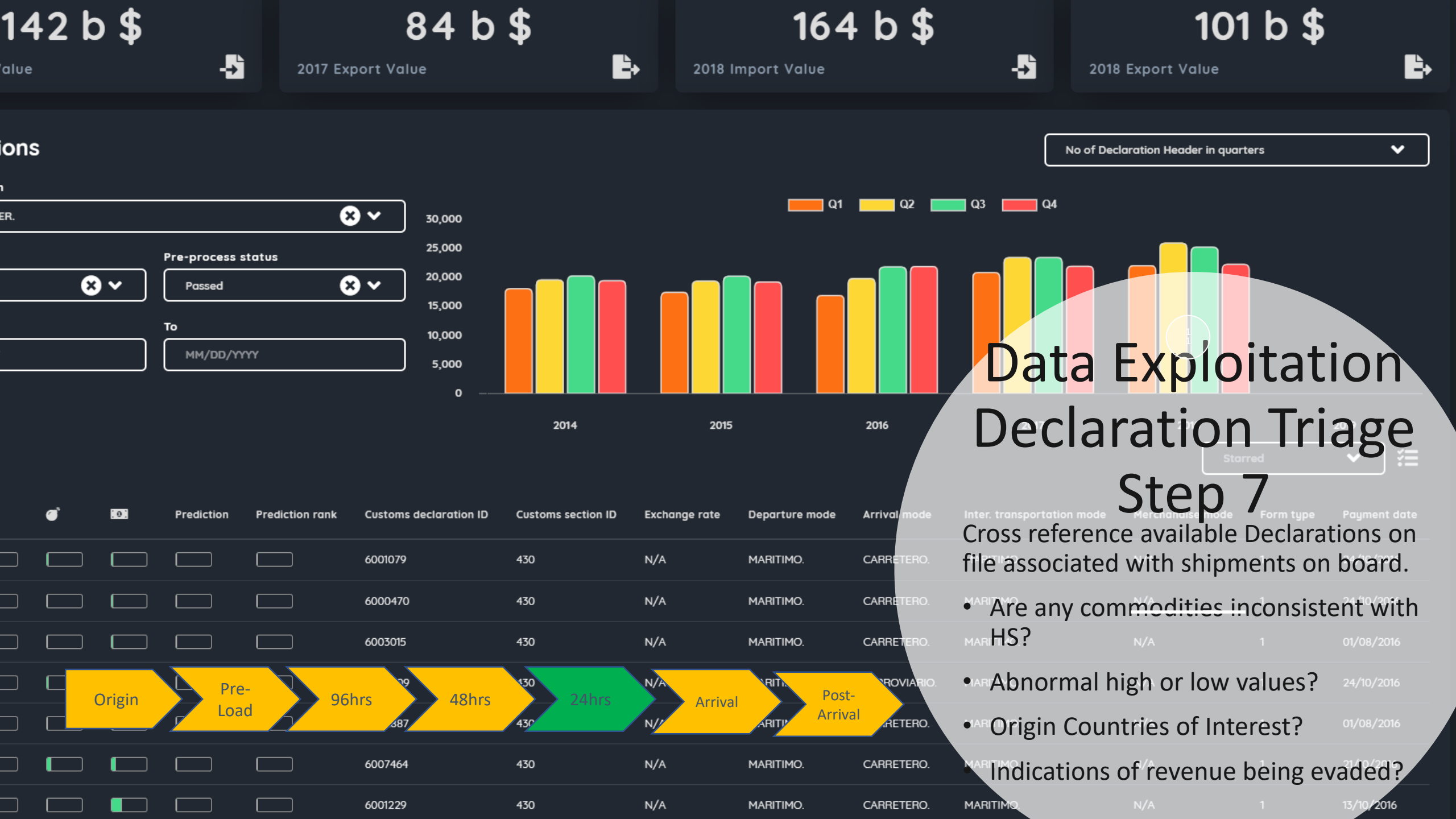
ions

No of Declaration Header in quarters

ER.

Pre-process status

Passed

To

MM/DD/YYYY

Q1 Q2 Q3 Q4

30,000
25,000
20,000
15,000
10,000
5,000
0

2014   2015   2016

Starred

		Prediction	Prediction rank	Customs declaration ID	Customs section ID	Exchange rate	Departure mode	Arrival mode	Inter. transportation mode	Merchandise mode	Form type	Payment date
				6001079	430	N/A	MARITIMO.	CARRETERO.				
				6000470	430	N/A	MARITIMO.	CARRETERO.		N/A		24/10/201
				6003015	430	N/A	MARITIMO.	CARRETERO.	MARI	N/A	1	01/08/2016
				387	430	N/A	MARI		ROVIARIO.			24/10/2016
					430	N/A						01/08/2016
				6007464	430	N/A	MARITIMO.	CARRETERO.	MARI			21/10/201
				6001229	430	N/A	MARITIMO.	CARRETERO.	MARITIMO.	N/A	1	13/10/2016

Origin → Pre-Load → 96hrs → 48hrs → 24hrs → Arrival → Post-Arrival

Data Exploitation Declaration Triage Step 7

Cross reference available Declarations on file associated with shipments on board.

- Are any commodities inconsistent with HS?
- Abnormal high or low values?
- Origin Countries of Interest?
- Indications of revenue being evaded?

Data Exploitation Declaration Triage Step 8

Now review Deductive /Inductive Findings based on risk indicator rules, risk scoring, profiles, and other qualitative findings.

- Did a watchlist hit?

- What rules or indicators have been identified?

- Is the overall score red, yellow, green?

- How many rules fired?

INDUCTIVE

Score	Rule ID	Category	Threat rule set	Risk indicator	Rationale
⚠ 6					
	653	transparency	security	Port of Receipt is Missing	When a Cargo Declaration o...
	654	transparency	security	Port of Loading is Missing	When a Cargo Declaration o...

Declaration items

🛡	🍁	⚥	☠	🚜	🏃	🧠	💵	🐾	💗	Prediction	Prediction rank	HS code	Item number	Cust...		
												84181001	1	N/A	51	26425

Origin → Pre-Load → 96hrs → 48hrs → **24hrs** → Arrival → Post-Arrival

Score	Rule ID	Category	Threat rule set	Risk indicator	Rationale
	130	country	security	Country is known for Political Corruption Activities	These countries ar...

Threat rule set

|		
		❗ 54
Security		🟥
Illegal migration		⬜
IPR		✅ 21
Revenue		🟩
Cites		⬜
Health		⬜

Data Exploitation
Declaration Triage Step 9

Review Predictive Findings based on sound Machine learning and Artificial Intelligence.

- What new indicators are present based on mathematical relationships?

- What additional relationships exist that are not immediately evident on a declaration?

- Do any additional indicators exist to suggest attempts to undervalue, misclassify, or misdeclare country of origin, or abuse exemptions?

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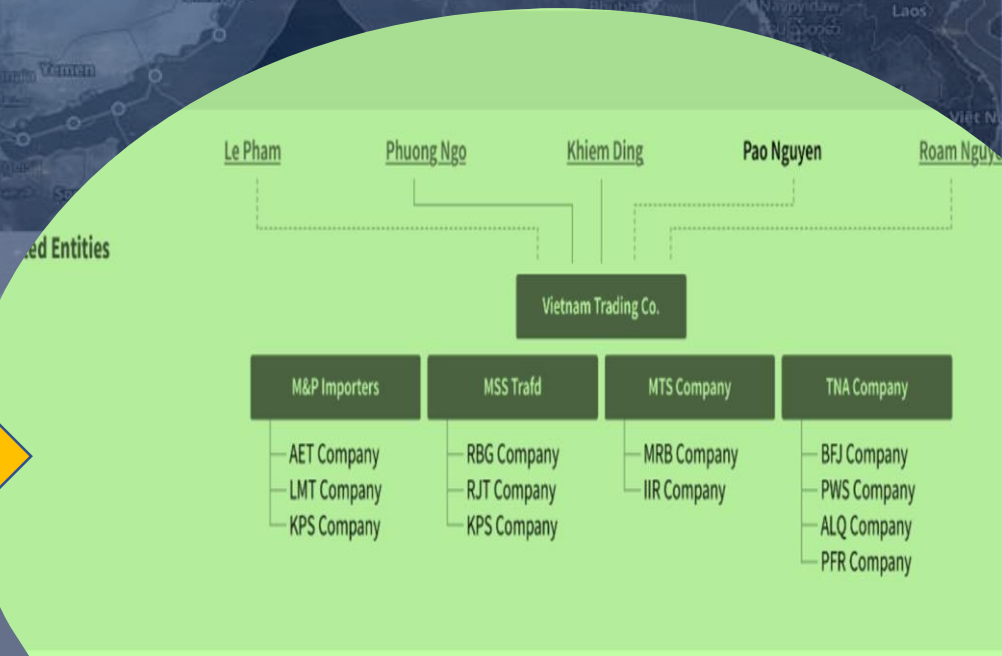
Data Exploitation
Triage Selectivity Referral
Step 10

Refer High RIsk Shipments for closer scrutiny or inspection

- Non Intrusive Inspection (Scanner, Rad portal, K-9)

- Partially Intrusive Inspection (Tail-end, Tunnel, Partial de-stuff)

- Fully Intrusive Inspection (Full-offload)

- OGAs (Agriculture, Plant and Animal Health, Food Inspection, CITES, etc.)

Origin → Pre-Load → 96hrs → 48hrs → 24hrs → Arrival → Post-Arrival

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Data Exploitation Triage – Field Reporting - Step 11

Record Results:
- Non-Resultant Inspection?
- Resultant Inspection?

Actions:
- Photos?
- Samples?
- Resultant Inspection?
- Seizure?
- Monetary Penalty?
- Warning?
- Refer to Intel or OGA?

| Origin | Pre-Load | 96hrs | 48hrs | 24hrs | Arrival | Post-Arrival |
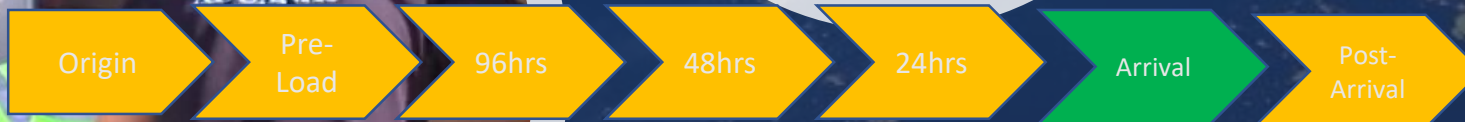
Data Exploitation Triage - Adapt - Step 12

Immediately use results to tune inductive rules sets and risk scoring,

Data used to strengthen predictive modelling, machine learning, and Ai.

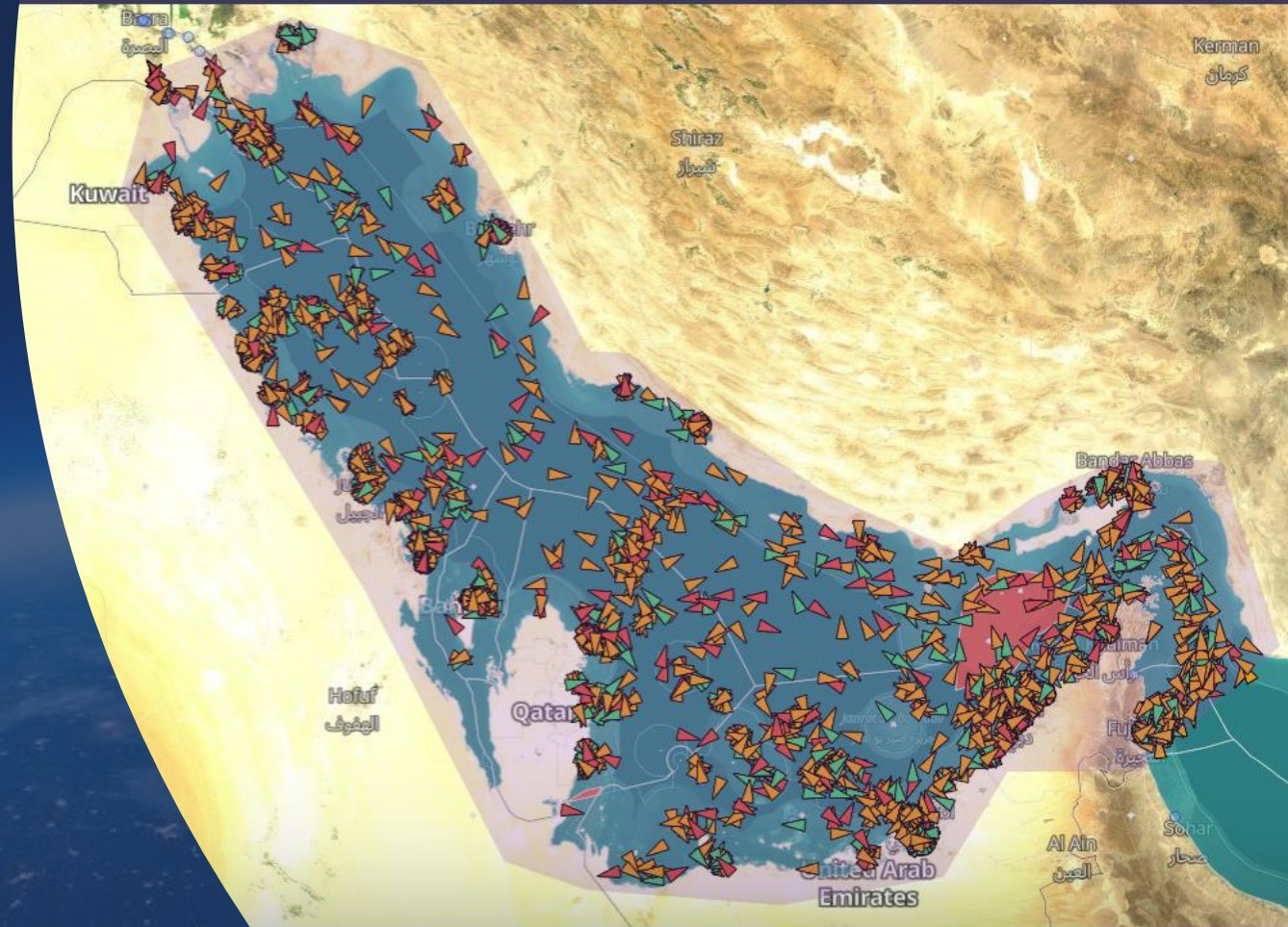| Origin | Pre-Load | 96hrs | 48hrs | 24hrs | Arrival | Post-Arrival |
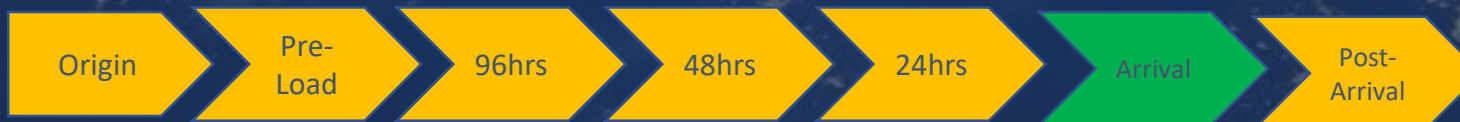
Data Exploitation Return to Step 1!

Virtualize cross-border traffic

Using AIS, SAIS, LRIT, HFSWR, Sat Radar, and other data available.

E.g. View of Persian Gulf, Physical borders and Exclusive Economic Zones

Conveyances automatically risk assessed.

| Origin | Pre-Load | 96hrs | 48hrs | 24hrs | Arrival | Post-Arrival |

VESSEL TYPE	MMSI	GROSS TONNAGE	DEADWEIGHT TON
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	422012400	448	650

CASE Study #1
## Small / Medium GDP Nation in South East Asia

- Analytics and RiskLab BI tracked revenue leakage to excessive use of VAT exemptions.

- All VAT- 480 exemptions occurring at specific Customs checkpoint.

- 20% of exemptions linked to a single consignee.

- Guided by this information, a combination of outreach, change to business process and workforce reassignments eliminated the leak. Revenue collected increased by **USD $80M** in the 4 months following the change.
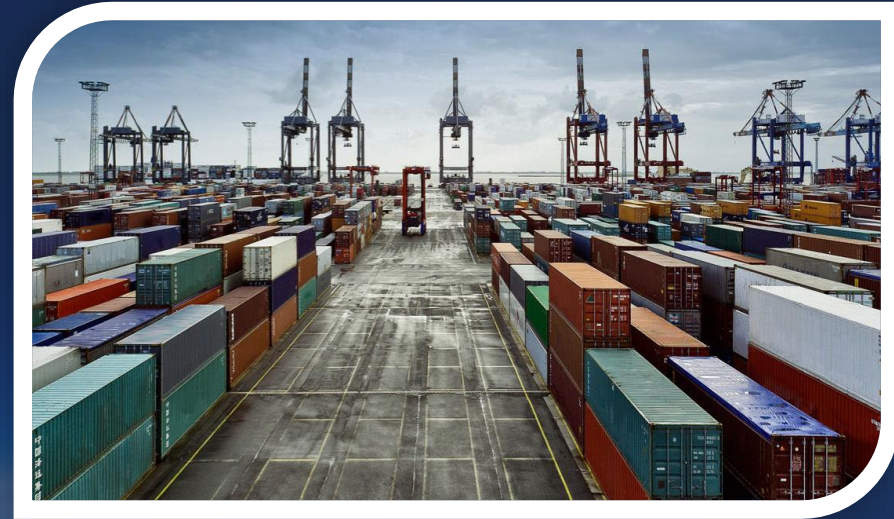
Case Study #2
## Medium GDP Nation in Africa

- Deployment of RiskLab BI and a team of Customs Revenue Leakage experts mobilised to work with Customs data from an African country for a <u>3-week period.</u>

- Scope of the project focussed on only 5 high priority commodities.

- Over **USD $100M** in potential revenue loss was identified through Undervaluation of imported goods.
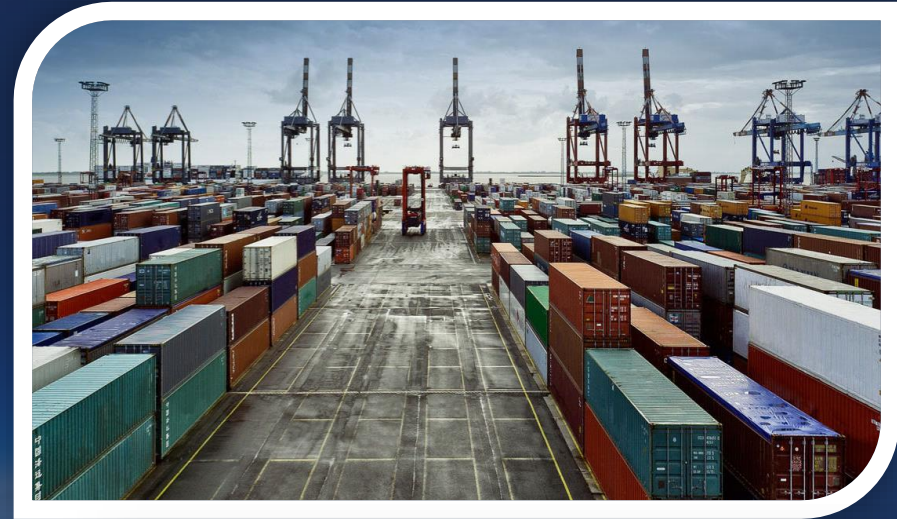
Case Study #3
Medium / Large GDP Nation in the Middle East North Africa Region

- Using RiskLab BI, data scientists and on-site experts, TTEK conducted a <u>3-month analysis</u> of 5 years of historical Customs import and export data.

- Over **USD $300M** in potential annual lost revenue was identified.

- Critical findings included:
  - ✓ Non-compliance with exemption rules,
  - ✓ Indications of significant levels of undervaluation from specific companies,
  - ✓ Undervaluation in the tobacco and vehicle importation sectors,
  - ✓ Significant levels of misclassification in the food and drink sector.
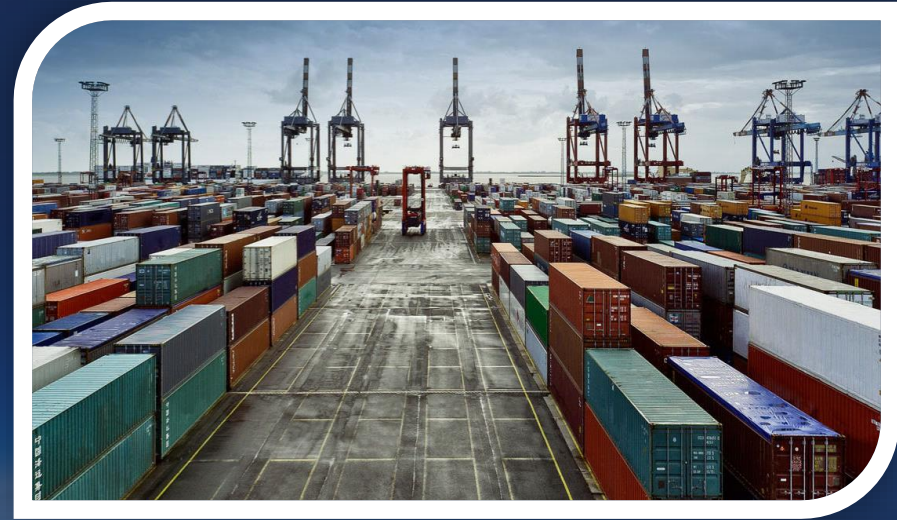
Questions?

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  - Email: Mike.Squirrell@ttekglobal.com