



# Trade Compliance Secure

Dual-Use Goods Screening - Statistics and Examples







# Model and algorithm background

Connecting the world’s largest traded goods database with dual-use and military brands and products

Trade intelligence	Goods intelligence		
<div>Bill of Lading Data </div> <div>17</div> <div>Countries seaborne imports &amp; exports scanned</div> <div>2m+</div> <div>Goods descriptions uploaded per year</div>	<div>Aerospace, Defence, Nuclear &amp; Security </div> <div>190k+</div> <div>Defence items, brands, parts and components</div> <div>125k</div> <div>World armed forces inventories</div>	<div>Chemical &amp; Electronics </div> <div>400+</div> <div>Speciality chemical identification</div> <div>120k+</div> <div>Electronic and engineering components mapped for dual-use potential</div>	<div>Nuclear &amp; Explosives </div> <div>5k+</div> <div>UN classified dangerous explosives</div> <div>20k+</div> <div>Nuclear grade components and technologies recognised by the IAEA</div>

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Benchmarking\*

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- The Goods Intelligence datasets are applied to over 2 million real-life bills of lading in order to surface any possible military or dual-use items
- The results create a foundation from which all future model testing can be benchmarked for accuracy and precision
- A/B testing is a key component in the benchmark process providing instances where ‘false negatives’ change to ‘true negatives’ for example

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Back testing\*

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- To compile an accurate score of IHS Markit’s machine learning algorithm, back testing is used
- Scoring provides an indication on accuracy of the dual-use flag, probability of finding a non-dual-use item and the probability of finding a ‘real’ dual-use item

\* IHS Markit is the only dual-use goods provider to benchmark and back-test data in this way, offering a completely transparent overview of its model

## Metrics on data sample

IHS Markit provides frequent sampling of its dual-use goods (DUG) model, offering an insight into its accuracy and overall false positive rate. The latest benchmark results are presented here

PIERS 100k Sample File – June 2021	Number of goods desc analysed	100,000
	Total DUG=N	96,592
	Total DUG=N (false negatives)	0
	Total DUG=Y	3,408
	Total keywords DUG=Y	1,424
	Total DUG=Y (true positive)	594
	Total DUG=Y (false positive)	830
	Total machine learning DUG=Y	1,984
	Total ML DUG=Y (true positive)	548
	Total ML DUG=Y (false positive)	1,436
	Total true positives	1,142
	Total false positives	2,266
	Overall false positives (%)	2.3%

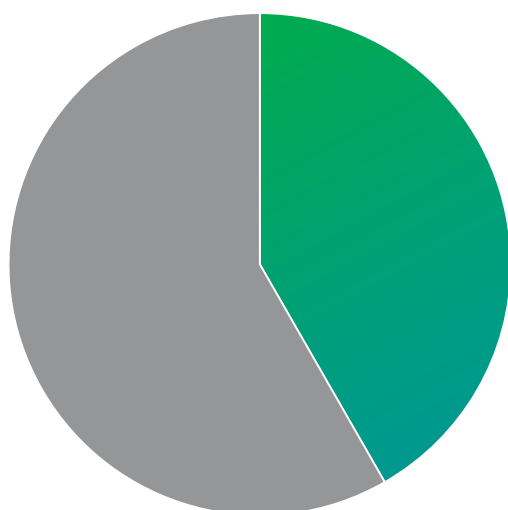
- This data sample consisted of 100,000 goods descriptions from real life Bill of Ladings.
- Overall, the Trade Compliance Secure product identified 3.4% of those trades as containing dual-use and military items, meaning the remaining 96.6% were identified as ‘clean goods’ and true negatives when screening for dual-use/military content.
- Of the 1,142 trades flagged as dual-use/military = true positive, there was an almost even split between ‘keyword’ and ‘machine learning’ matches (594 vs 548).
- Overall, the false positive rate was approximately 2.3%.



## Metrics on data sample – Matching on ‘keywords’

Total keywords DUG = Y	1,424
Total DUG=Y true positive	594
Total DUG=Y false positive	830

Dual-use/Military = Matching on ‘keywords’



■ True positive    ■ False positive

- The ‘keyword’ matching in Trade Compliance Secure related to specific words and/or phrases matched within the content database.
- IHS Markit has sourced thousands of phrases relating directly to dual-use regulations using cross-department product expertise and knowledge.
- IHS Markit uses Janes Military Intelligence data to provide military goods, brands and model numbers, sourcing over 100,000 descriptions of relatable content.

## True positive ‘keyword’ examples

1X40HQ 1 UNIT 1987 AM GENERAL M1038 HUMVEE HMMWV VIN 031248 CERTIFICATE  
SF97S16991L720810 HS CODE 8703230190

→ Matching on EU Military List – ML6 – Military ground vehicles

IGBT POWER SUPPLY V1MPU CARD HS CODE850490

→ Matching on EU Dual-Use Goods Regulation – 3A001 – Electronic items

20 PACKAGE = 20 BIG BAG ON 20 IPPCPALLETS GUANIDINE NITRATE 16098000 KGS +  
PALLETWEIGHT 700000 KGS UN 1467 CLASS 51 PG III

→ Matched on EU Dual-Use Goods Regulation – 1C011 – Metal and compounds

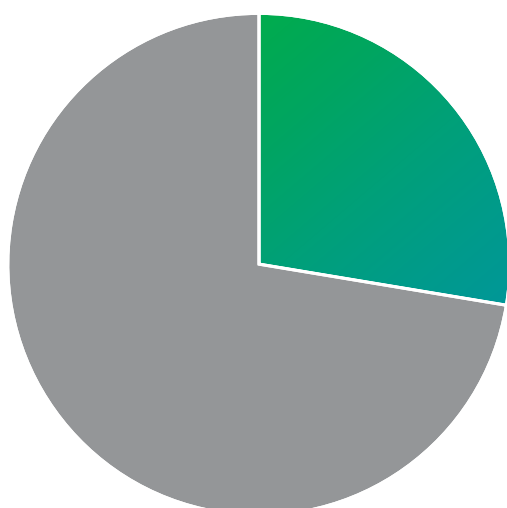
EXPRESS BILL OF LADING NO ORIGINAL BL ISSUED FREIGHT PREPAID N 720 BAGS ON 18  
PLTS BARIUM SULPHATE BLANC FIXE HD80 18MT SFPO4651392 APG PO 356 REL 2 GOODS ON  
WOOD PALLETS ISPM

→ Matched on China Export Control Law – 2-8-1 – Toxic chemicals used to make drugs

## Metrics on data sample – Matching on ‘machine learning’

Total machine learning DUG = Y	1,984
Total ML DUG=Y true positive	548
Total ML DUG=Y false positive	1,436

Dual-use/Military = Matching on ‘machine learning’



■ True positive    ■ False positive

- Trade Compliance Secure uses algorithms and machine learning technologies to return matches on dual-use/military items where possible.
- The machine learning model learns and improves when new descriptions are added into the model.
- The machine learning model also incorporates the use of negative words and negative weighting, in order to associate the correct dual-use/military phrase before returning a match.

## True positive ‘machine learning’ examples

1 X 40FT CONTR 9 CASES ARMOUR VEHICLE PARTS HS CODE 871000 INVOICE NOS A16663 A16664 A16677 1 X 45FT CONTR 4 CASES ARMOUR VEHICLE PARTS HS CODE 871000 INVOICE NOS A16663 A16677 FREIGHT COLLECT TEL 1 843 834 8197

→ Matching on EU Military List – ML6 – Military Ground vehicles

86 PKG 36 P\_KGS\_8PALLETS58CARTONS 9CASES19CARTONS\_GASTEC GAS DETECTION EQUIPMENT HS CODE\_382200 841420 491110

→ Matching on EU Dual-Use Goods Regulation – 2B350 – Chemical Manufacturing facilities

RF SIGNAL TRANSMISSION DEVICES FOR CABLE TV HS CODE853630

→ Matched on EU Military List – ML11 – Electronic equipment, spacecraft and components

SHIPPERS LOADCOUNT & WEIGHT CAIU9247056 ITN X20180515591885 4018832 1 X 40 HC CONTAINER 4018816 42 PKGS OF BLU109 JDAM GUIDANCE KITS FREIGHT COLLECT EXPRESS BILL OF LADING COPY NONNEGOTIABLE BL RELEASE PROCEDURES

→ Matched on EU Military List – ML11 – Electronic equipment, spacecraft and components

## False positive rate\*

- As mentioned, the false positive rate of the overall sample was approximately 2.3%.
- False positives are managed manually; Trade Compliance Secure will notify the user of a dual-use/military = YES match, the user then makes a decision as to its accuracy.
- The ways in which we have determined whether the matches in the sample are false positive are as follows:
  - ‘Relevancy’ – how relevant is the search term to the matched term.
  - Cross-referencing the regulation description to see if there is ‘relevancy’ to the matched item and the users goods description.
  - Looking for any words within the description consistent with the matched term – the words do not have to be exactly the same, but they have to be relevant.
  - Looking for any words within the search description which would negate the matched terms ‘relevancy’.

\* IHS Markit manages false positives through its machine learning algorithm, items which are identified as such are added to the model, so they are removed from future classification

## False positive examples

320 THREE HUNDRED TWENTY CTNS ONLY READYMA DE GARM ENTS MENS WOVEN 100%

→ Matching incorrectly on EU Military List – ML6 – ‘GARM’, a military vehicle; in this example, the keyword ‘garment’ is split in two

ON 4 PALLETS AIRGUNS WITHOUT AMMUNITION WITHOUT CO2 CARTRIDGES PLUS ACCESSORIES HS CODE 930400 930599

→ Matching incorrectly on EU Military List – ML3 – ‘cartridges’, a military item, in this example the item relates to air gun cartridges, not controlled in the EU Military List

6221 CASES FRESH BLUEBERRIES FREIGHT PREPAID REF M110 ++ ATMOSFERA CONTROLADA LIVENTUS CO2%12 O2% 8 ++ 081040 HS CODE081040

→ Matching incorrectly on EU Military List – ML1 – ‘M110’, a military weapon; in this example the item is a reference to fruit

CAR GPS MONITOR HS CODE852859 ++THIS SHIPMENT CONTAINS NO SOLID WOOD PACKING MATERIALS++

→ Matching incorrectly on EU Dual-Use Goods Regulation – 6A001 – ‘GPS monitor’, a navigation device; in this example the item relates to a generic car navigation device

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