

MARITIME ACCIDENTS AND DISASTER MANAGEMENT



COMMODORE UDAI RAO (RETD)

FORMER PRINCIPAL DIRECTOR NAVAL INTELLIGENCE(PDNI)

FORMER DIRECTOR CABINET SECRETARIAT

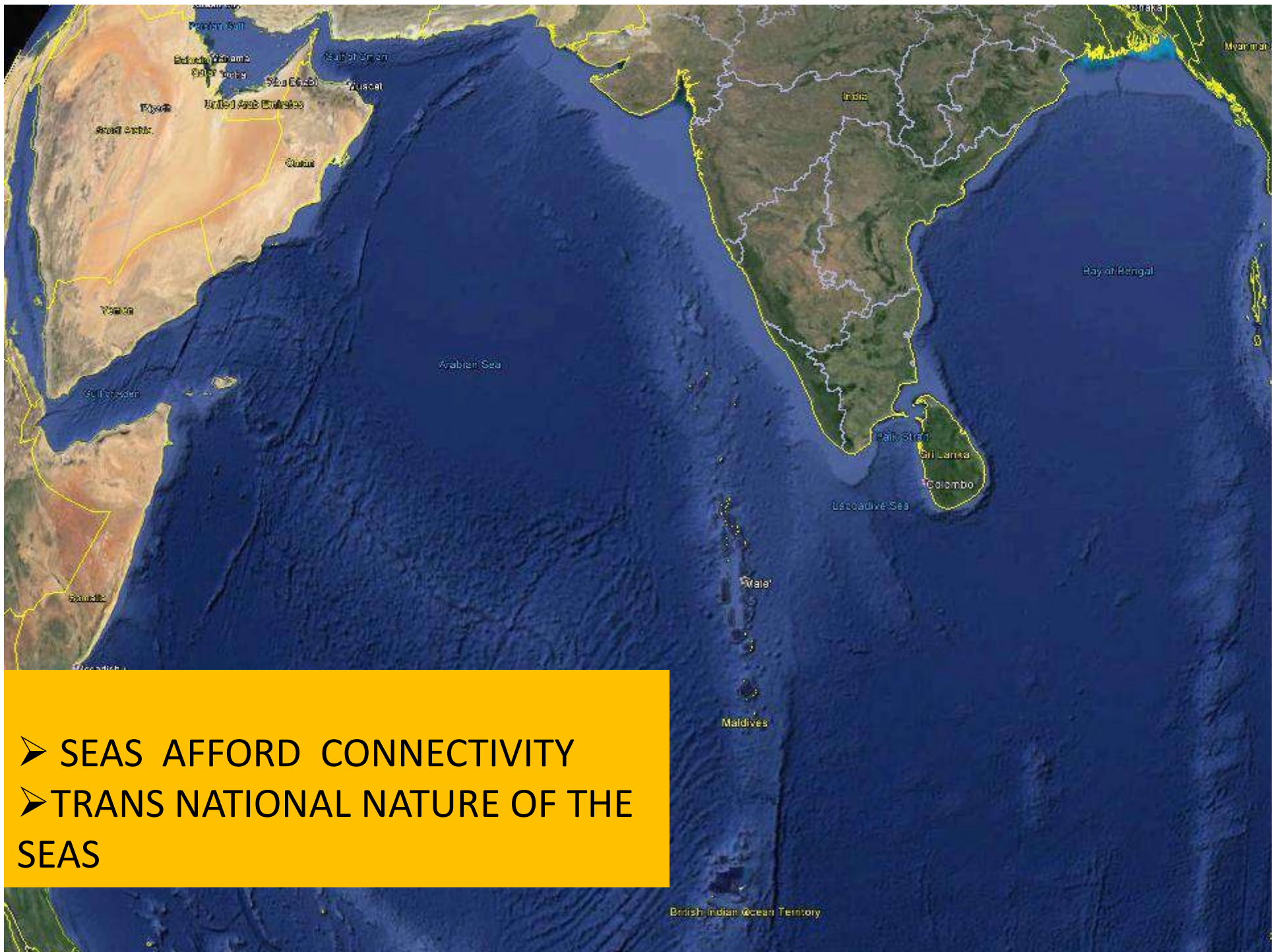
FORMER DIPLOMAT

PREVIEW

- MARITIME GEOGRAPHY & CHARACTERISTICS
- TYPES OF SHIPS
- TYPES OF ACCIDENTS & DISASTERS
- CAUSES
- IMPACT
- PREVENTION
- CONCLUSION

BLUE PLANET

- OCEANS COVER OVER 70% OF THE EARTH'S SURFACE
- DISTANT, REMOTE AND AMORPHOUS
- ASSETS FOR MARINE POLICING CAN NEVER BE ENOUGH
- LACK OF JURISDICTION / ACCOUNTABILITY ON THE HIGH SEAS
- TRADE AND COMMERCE - 95% BY VOLUME AND 72% BY VALUE GOES BY SEA
- SHIPS OF ALL SHAPES, SIZES AND TONNAGE SAIL THE SEAS



- SEAS AFFORD CONNECTIVITY
- TRANS NATIONAL NATURE OF THE SEAS



STRAIT OF HORMUZ

SUEZ
CANAL

MALACCA STRAIT

BAB-EL-MANDEB

SUNDA STRAIT

LOMBOK STRAIT

CAPE OF
GOOD
HOPE

CHOKES POINTS

SEA LINES OF COMMUNICATION (SLOCs)



- ✓ COAST LINE -7516 KM
- ✓ 9 MARITIME STATES/ 4 U/Ts
- ✓ 12 MAJOR AND 200 INTERMEDIATE & MINOR PORTS
- ✓ ISLAND TERRITORIES-1197
- ✓ EEZ-2.3 MILLION SQ KM

BLUE ASSETS



INDIAN EEZ



RECENT MARITIME INITIATIVES

- **SAGAR – SECURITY AND GROWTH FOR ALL IN THE REGION**
- **NEIGHBOURHOOD FIRST POLICY**
- **‘LOOK EAST’ TO ‘ACT EAST’ POLICY**
- **INDO- PACIFIC POLICY**
- **QUAD – INDIA ,US ,JAPAN , AUSTRALIA**

SHIP AND SHIPPING-CHARACTERISTICS

SHIPS- MULTI NATIONAL NATURE OF SHIPPING

- BUILT IN ONE COUNTRY
- NATIONALITY ANOTHER
- REGISTERED ELSEWHERE
- OWNER IS A
- MANAGED BY B
- CHARTERED BY - C
- CONSIGNOR -D
- CONSIGNEE- -E
- TRANS SHIPMENT ENROUTE
- STAFFED BY MULTINATIONAL CREW
- FLAGS OF CONVENIENCE (FOC)
- LANGUAGE PROBLEMS
- MARITIME LOGISTIC SUPPLY CHAIN -TENOUS



SHIP CHARACTERISTICS

- SHIP HAS NO BRAKES
- REVERSE ENGINES
- MOMENTUM
- STOPPING DISTANCE
- SHIP STABILITY –IMPORTANT FACTOR

TYPES OF SHIPS

- **TANKERS**
- **CONTAINER SHIPS**
- **LNG /LPG SHIPS**
- **CRUISE SHIPS**
- **BULK CARGO**
- **OIL RIGS**

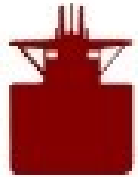
VLCC

ULCC

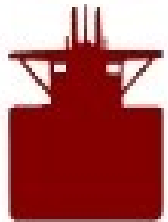
CRUDE, PRODUCT,
CHEMICAL

STOPPING DISTANCE

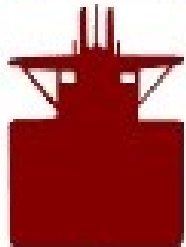




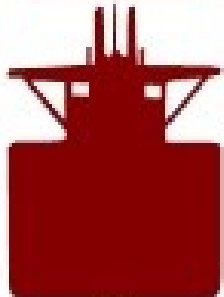
Coastal Tanker (205 m)



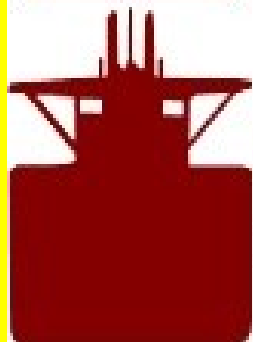
Aframax (245 m)



Suez-Max (285 m)



VLCC (330 m)



ULCC (415 m)



CAN CARRY OVER 23,000 + CONTAINERS



LNG/LPG --HIGHLY INFLAMMABLE



CRUISE VESSEL

- LARGE NO OF PASSENGERS/CREW
- TOP HEAVY -UNSTABLE
- VERY LARGE COMPARTMENTS
- AFFECTS DAMAGE CONTROL

Ferry



CARGO VESSEL



OIL RIGS---IN EEZ

- INCREASED EXPLORATION & PRODUCTIVITY ACTIVITY IN RECENT YEARS
- SHIPPING LANES PASS CLOSE TO OFFSHORE DEVELOPMENT AREA





FISHING VESSELS

- OVER 3 LAKHS REGISTERED VESSELS
- TRADITIONAL, MOTORIZED ,MECHANISED BOATS
- DUE WOODEN HULL, VESSELS MAY NOT PAINT ON RADAR TILL VERY LATE
- MAY NOT SHOW LIGHTS
- VESSELS SWITCHING OFF AUTOMATIC IDENTIFICATION SYSTEM(AIS)- GO DARK TO AVOID DETECTION –ILLEGAL FISHING

DHOWS



DHOWS

- TRADITIONAL CRAFT
- BUILT ALONG WEST COAST –MANDVI,RATNAGIRI,BEYPORE
- UP TO 2000 TONs
- CARRY ONION, POTATOES ,LIVE STOCK TO WEST ASIA & NORTH AFRICA
- BUILDING MATERIAL AND FOOD TO LAKSHWADEEP ISLANDS

TYPES OF ACCIDENTS

- FIRE
- COLLISION
- GROUNDING
- FLOODING
- SHIFTING CARGO
- OIL SPILL

FIRE



COLLISION



GROUNDING



COSTA CONCORDIA-2012



SHIFTING CARGO-
INSTABILITY
-CONTAINERS-DANGER
TO NAVIGATION



SOME IMPORTANT ACCIDENTS / INCIDENTS



EXXON VALDEZ 1989
ALASKA

DEEP WATER HORIZON -2010 GULF OF MEXICO



Asia Devastated By Quake, Tsunami



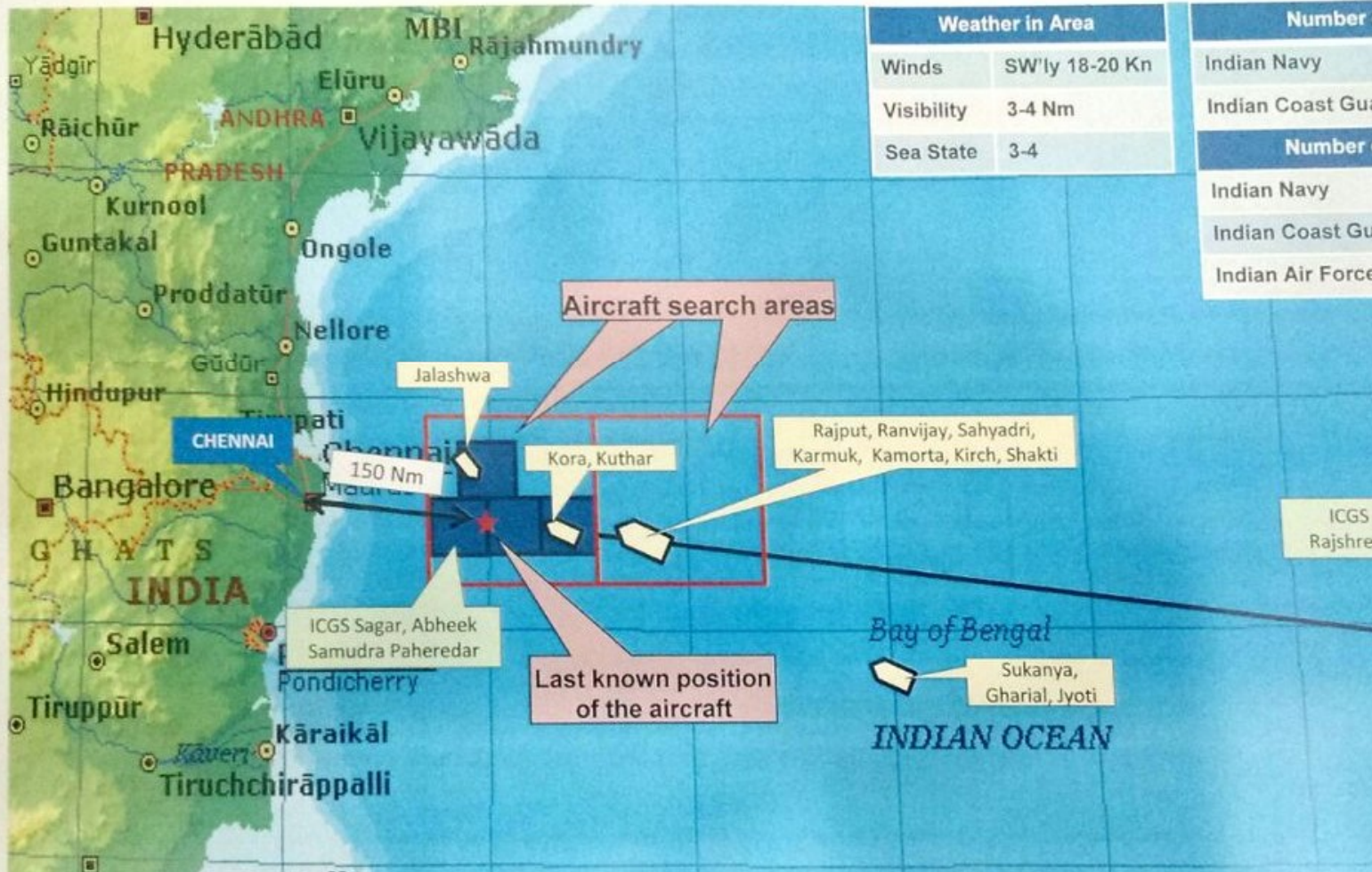
MH370's flight path before it vanished



2014

2016

SEARCH FOR IAF AN-32



CAUSES OF ACCIDENTS

WEATHER

- LOW VISIBILITY
- MONSOON- SHIPS GOING AGROUND, SINKING
- MIST/FOG
- CYCLONES
- TSUNAMI

NAVIGATIONAL

- NOT KEEPING A SHARP LOOK OUT
- NOT FOLLOWING **ROR**
- HIGH SPEED
- SHALLOW WATERS
- NARROW SEA LANES & HIGH TRAFFIC DENSITY- NEAR PORTS & CHOKES POINTS
- UNDER INFLUENCE OF ALCOHOL & DRUGS

HUMAN RELATED

- SKELETON CREW -COST CUTTING
- LONG HOURS
- FATIGUE /BOREDOM ON LONG VOYAGES
- LACK OF SLEEP
- INEXPERIENCE
- NEGLIGENCE
- ERROR OF JUDGEMENT
- POOR DECISION MAKING
- POOR TRAINING – TOO MANY SUBSTANDARD MARITIME TRAINING INSTITUTES

SHIP RELATED

- SHIPS NEED TO BE SEA WORTHY- FLOAT & MOVE
- OLD SHIPS
- POOR MAINTENANCE –COST INTENSIVE
- SEA IS CORROSIVE
- ACCESSIBILITY TO SMALL COMPARTMENTS
- CUTTING & WELDING
- SHIP IN **DOCKS** – NOT EARNING

TECHNICAL

STEERING GEAR FAILURE

ENGINE BREAK DOWN

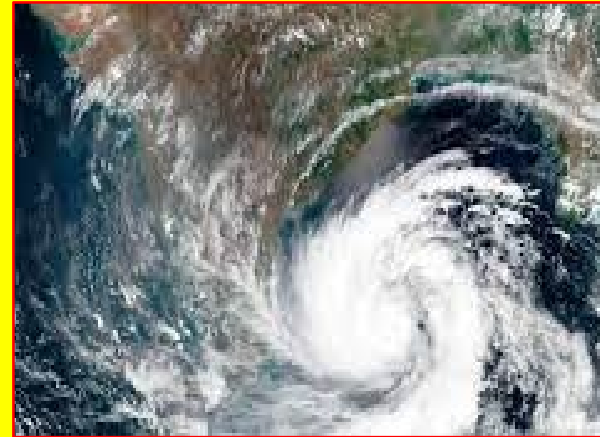
CYBER ATTACK

GPS SPOOFING

INSURANCE FRAUDS

CYCLONES

- AMPHAN
- VAYU
- OCKHI
- NISARGA









IN ROUGH WEATHER





OIL SPILL & POLLUTION

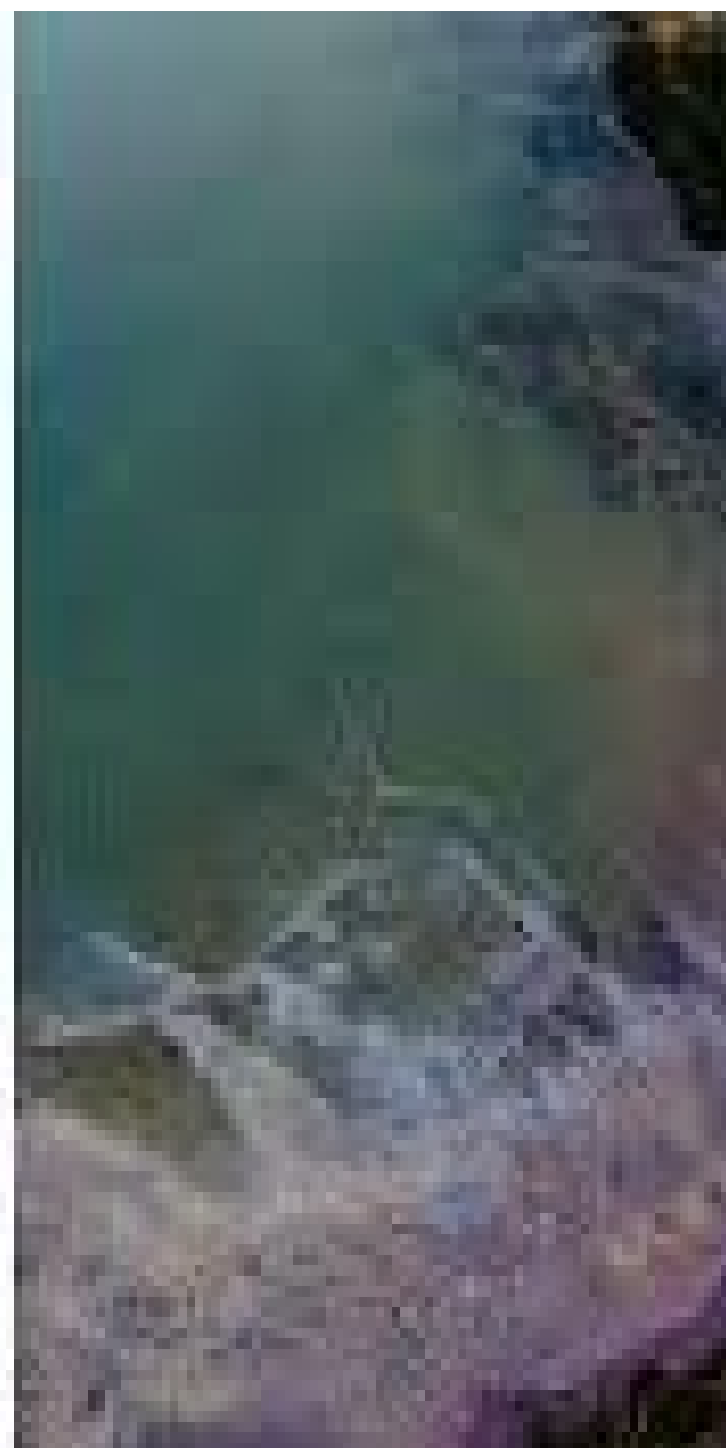


INDIA DESPATCHES –
EQUIPMENT AND
COAST GUARD TEAM

JAPANESE TANKER
MV WAKASHIO

G





MT SEA DIAMOND- EXPLOSION AND FIRE –OFF SRI LANKA





OIL SPILL OFF CHENNAI-2017



Kamarajar Port ●
Ennore

MT BW MAPLE



CHENNAI

MT D
KANCHIPL

EFFECTS OF OIL SPILL

- ENVIRONMENTAL
- ECONOMIC
- FIRE HAZARD
- LOSS OF LIFE
- LOSS OF PROPERTY
- LOSS OF LIVELIHOOD
- CLOSURE OF PORTS
- BLUE ECONOMY AFFECTED – FISHERIES, TOURISM, TRANSPORTATION, IMPORT /EXPORT

INDIAN COAST GUARD

NATIONAL MARITIME OIL SPILL COORDINATING AUTHORITY

MARITIME SEARCH AND RESCUE AUTHORITY









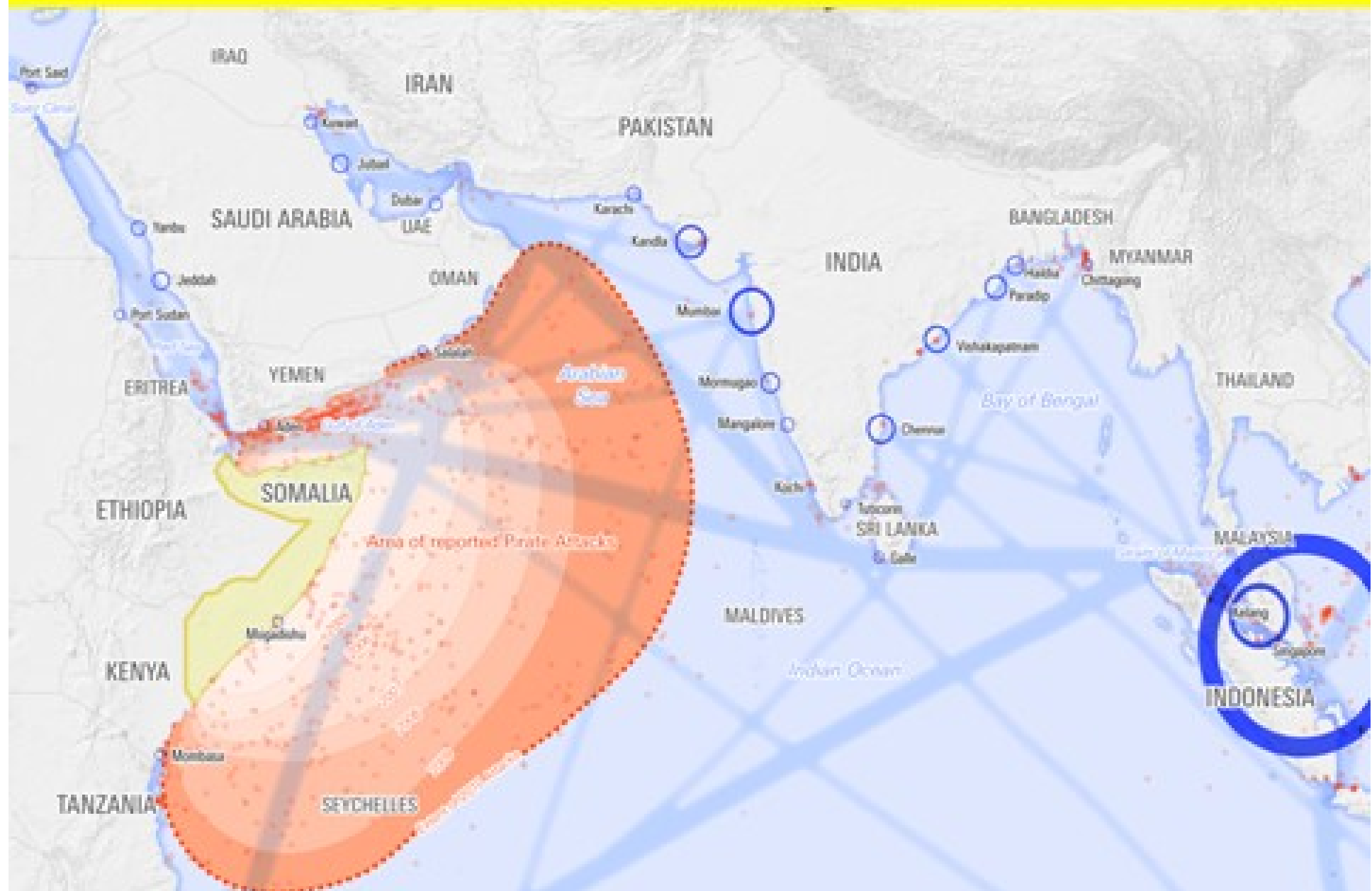
THREATS

PIRACY AT SEA



JOLLY ROGERS STILL FLIES

PIRACY OFF SOMALIA



MARITIME TERRORISM

MARITIME TERRORISM

WE LIVE IN A TROUBLED NEIGHBOURHOOD

❖ PAK SPONSORED TERRORISM

❖ MALDIVES

❖ SRI LANKA

❖ BANGLADESH

TERRORIST GROUPS IN WEST ASIA & SOMALIA

- **AL QAEEDA**

- **TALIBAN**

- **LASHKAR**

- **JEI**

- **AL SHABAB TERRORISTS – AFRICAN CONTINENT**

INCLUDING SOMALIA

- **HOUTHİ REBELS –YEMEN**

TERRORIST GROUPS IN SOUTH EAST ASIA

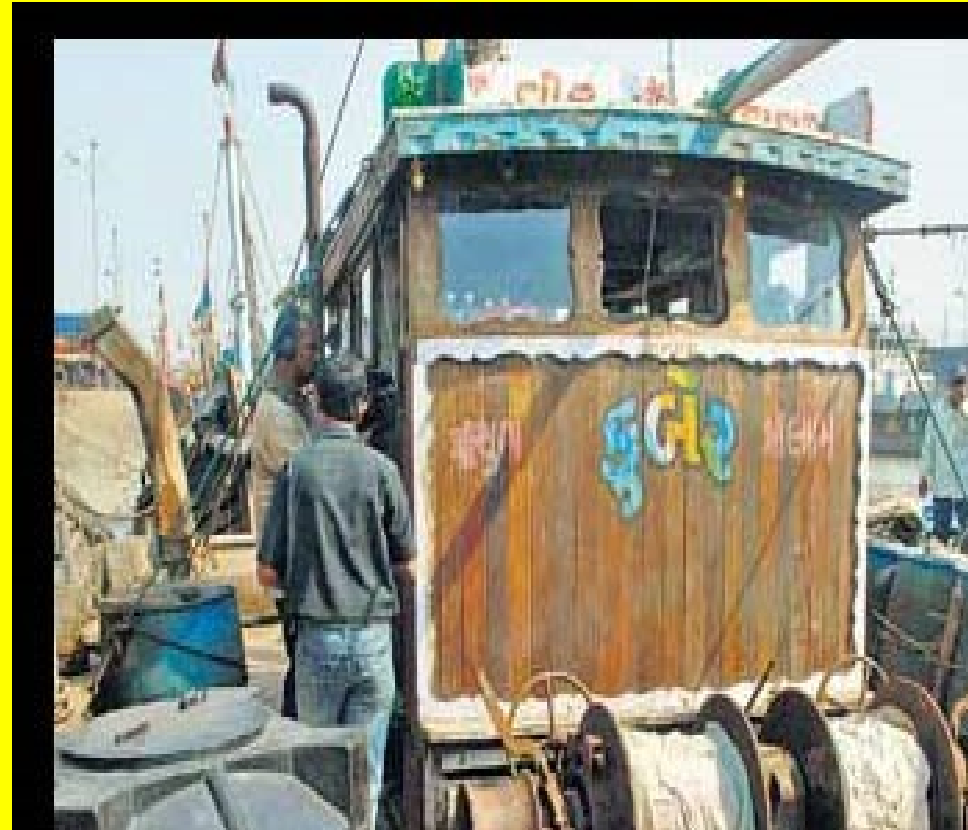
➤ **ABBU SAYAFF GANG (ASG)**

E

➤ **MORO ISLAMIC LIBERATION FRONT (MILF)**

➤ **JEMIAH ISLAMIAH (JI)**

MARITIME TERRORISM



- 1993 MUMBAI BLASTS
- 26/11 ATTACKS

INSTANCES OF TERRORIST ATTACK AT SEA



UAE SHIP HIT BY HOUTHİ MISSİLE
ATTACK -2017



SAUDI SHIP HIT BY HOUTHİ
EXPLOSİVE LADEN BOAT -2017

OIL & GAS –STRATEGIC CARGO

- FLOATING BOMBS
- CAN BE EXPLODED OR SUNK IN THE MOUTH OF NARROW HARBOURS LIKE KOCHI ,MANGALORE ETC TO CLOSE PORTS
- CAN THEMSELVES BE USED AS A WEAPON TO RAM INFRASTRUCTURE – a la 9/11
- CARGO CAN CAUSE ECONOMIC & ENVIRONMENTAL DISASTER

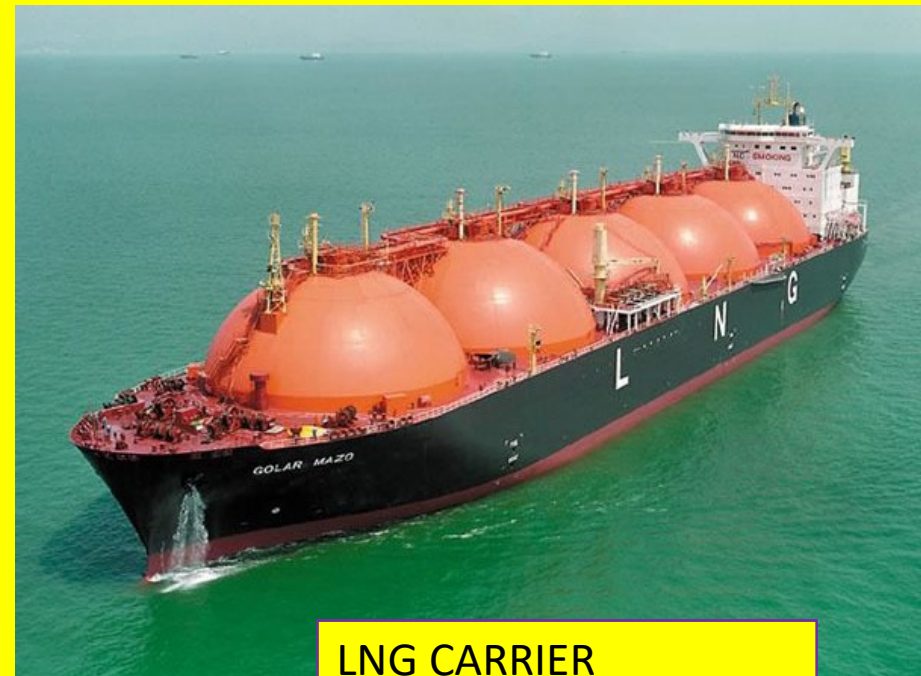


TANKER ALONGSIDE

FLOATING BOMBS



TANKER AT SINGLE POINT MOORING (SPM)



LNG CARRIER



OMAN

--- Shipping lanes
— Maritime borders

IRAN

IRAN

Disputed

Strait of Hormuz

OMAN

OMAN

IRAN

Gulf of Oman

Fujairah

**FUJAIRAH- MAY
2019**

50 miles

OMAN

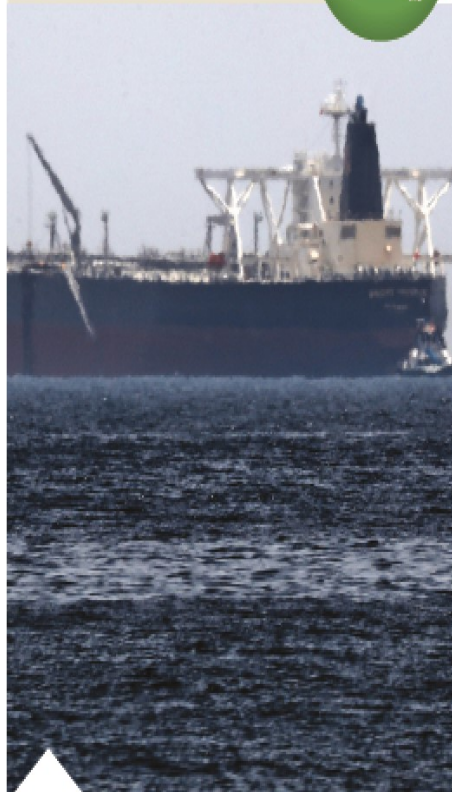
Google

BBC

A. Michel
UAE



Amjad
Saudi Arabia



Al Marzoqah
Saudi Arabia



Andrea Victory
Norway



CHOPPY WATERS: A collection of funded photographs provided by the UAE and sent to the United Nations show underwater

FUJAIRAH ANCHORAGE - HORMUZ - MAY 2019







GULF OF OMAN

JUNE 2019





OPERATION SANKALP



THREATS TO OFF SHORE STRUCTURES

- EXPLOSIVES /LIMPET MINES ATTACHED TO LEGS OF RIGS
- SMALL BOATS LOADED WITH EXPLOSIVES TO RAM THE RIGS
- ENVIRONMENTAL DISASTER
- ECONOMIC DISASTER
- MSV SAGAR SURAKSHA COLLIDED IN MONSOONS -BHN PLATFORM -2005



ALANG SHIP BRREAKING YARD



PROTECTIVE MEASURES AGAINST THREATS

INTERNATIONAL SHIP AND PORT SECURITY CODE (ISPS)- POST 9/11

**PORTS ARE THE INTERFACE BETWEEN SHIPS,CARGO & CREW AND
FOREIGN SHORES**

INTERNATIONAL SHIP AND PORT SECURITY CODE(ISPS) – POST 9/11

- DESPITE CLAIMS, NO INDIAN PORT IS REALLY ISPS COMPLIANT
- PORTS LIKE MUMBAI CAN EASILY BE PENETRATED EVEN TODAY – 12 YEARS AFTER 26/11
- WATER FRONT SECURITY IS WEAK SPOT .
- ACUTE LACK OF OVERSIGHT IN MINOR PORTS
- INTELLIGENCE BUREAU (IB) REPORTS HAVE APPEARED IN THE MEDIA IN THIS REGARD

CONTAINER SECURITY

CONTAINER SECURITY



POST 9/11 -CONTAINER SECURITY INITIATIVE

- **CONTAINERS(20 FT, 40 FT) -TROJAN HORSES
(TERRORISTS, WEAPONS & EXPLOSIVES ETC)**
- **PAUCITY OF ADEQUATE X-RAY MACHINES**
- **100% SCREENING IMPOSSIBLE**
- **TEECHINT & HUMINT AT CONTAINER STUFFING/ DE-STUFFING CENTRES IS THE KEY.**
- **CUSTOMS PERSONNEL PLAY AN IMPORTANT ROLE .**

EXPLOSIVE SCRAP IMPORTED IN CONTAINERS

EXPLOSIVE SCRAP



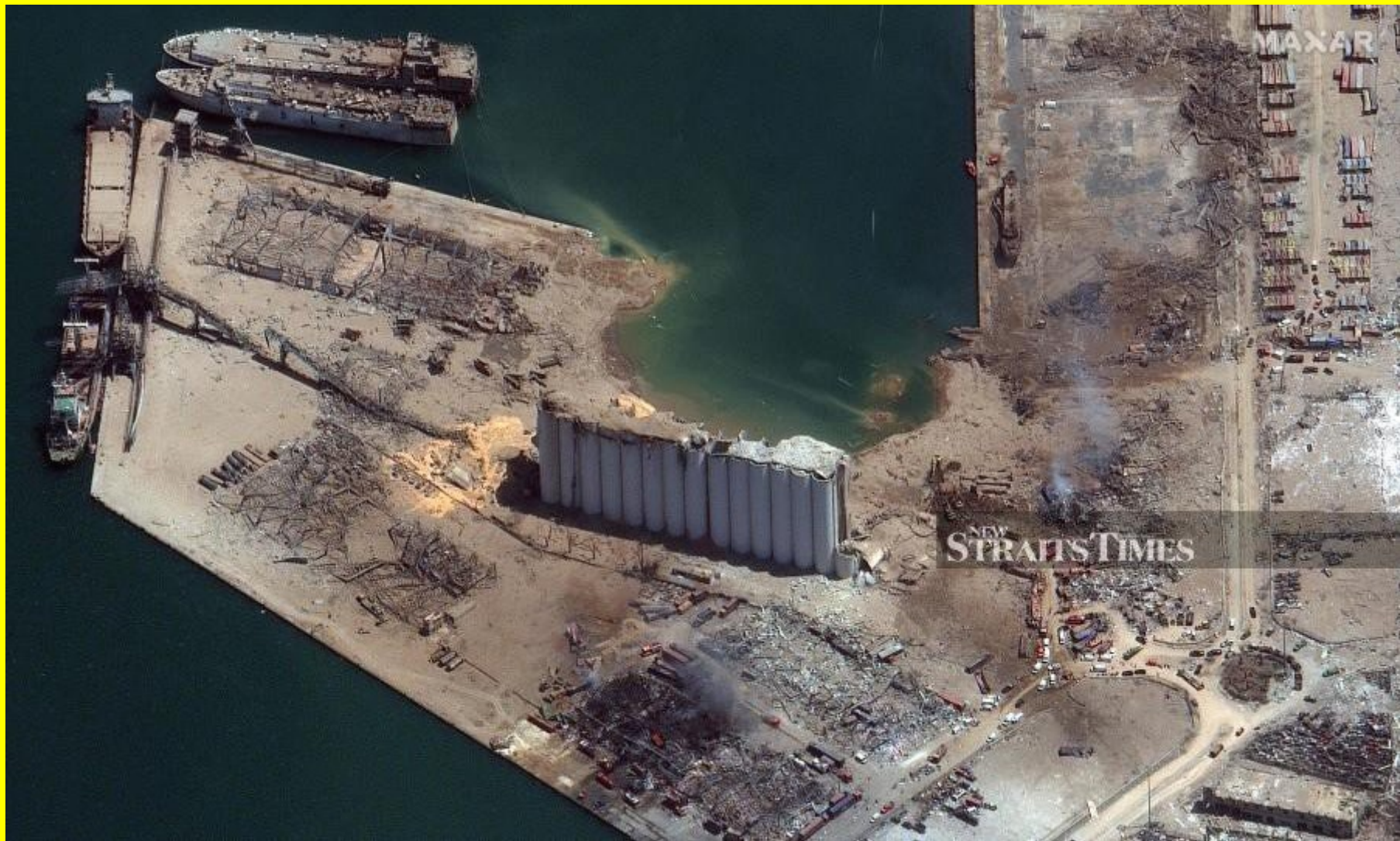
- FROM IRAQ,IRAN ,AFGHANISTAN FOR SMELTING IN DELHI. HARYANA,RAJASTHAN
- THERE HAVE BEEN EXPLOSIONS IN NORTH INDIA FROM LIVE AMMUNITION





**IMPORT OF HAZARDOUS
TRASH**

AMMONIUM NITRATE INCIDENT – BEIRUT



**AMMONIUM NITRATE STORED IN CHENNAI BY CUSTOMS
HAS BEEN MOVED TO HYDERABAD**

FACT FILE



➤ Ammonium nitrate is used in fertilisers and explosives

➤ In India, its import is controlled by the Ammonium Nitrate Act, 2012

➤ It explodes when heated. It is used as an explosive with a mixture of fuel oil

➤ Ammonium nitrate is a white crystalline solid

MARITIME STAKE HOLDERS& GOVERNANCE

- MINISTRY OF DEFENCE(MOD)
- MINISTRY OF EXTERNAL AFFAIRS(MEA)
- MINISTRY OF SHIPPING (MOS)
- MINISTRY OF EARTH SCIENCES(MOES)
- MINISTRY OF HOME AFFAIRS(MHA)
- MINISTRY OF PETROLEUM & NATURAL GAS(MOP&NG)
- MINISTRY OF AGRICULTURE (FISHERIES)
- MINISTRY OF LAW
- INDIAN NAVY
- COAST GUARD
- MAJOR PORTS- 12
- NATIONAL HYDROGRAPHIC OFFICE
- DG SHIPPING
- DG HYDROCARBONS
- DGLL
- SHIP BUILDING YARDS
- CISF
- BSF
- INDIAN CUSTOMS
- R&AW, IB , INTELLIGENCE AGENCIES
- ONGC
- ISRO
- 9 MARITIME STATES& 4 U/Ts
- STATE MARINE POLICE
- INTERMEDIATE & MINOR PORTS
- STATE MARITIME BOARDS
- FISHERIES

MARITIME GOVERNANCE

- **LARGE NO OF STAKE HOLDERS IN THE COUNTRY**
- **LACK OF SYNERGY**
- **WANT AUTHORITY BUT NO RESPONSIBILITY**
- **CIVIL SERVANTS LACK MARITIME DOMAIN KNOWLEDGE**
- **LAND FOCUS**
- **FEDERAL STRUCTURE CREATES PROBLEMS OF ITS OWN**
- **SOME STATES YET TO SET UP MARITIME BOARDS**

NAVY & CG -TO THE RESCUE

AERIAL SURVEY

SHIPS ON THE SCENE OF ACTION

HELP –FISHERMEN ,SHIPPING

WATER, FOOD ,MEDICINE

EVACUATION OF PEOPLE

HA/DR KITS

DEFENCE FORCES-USP

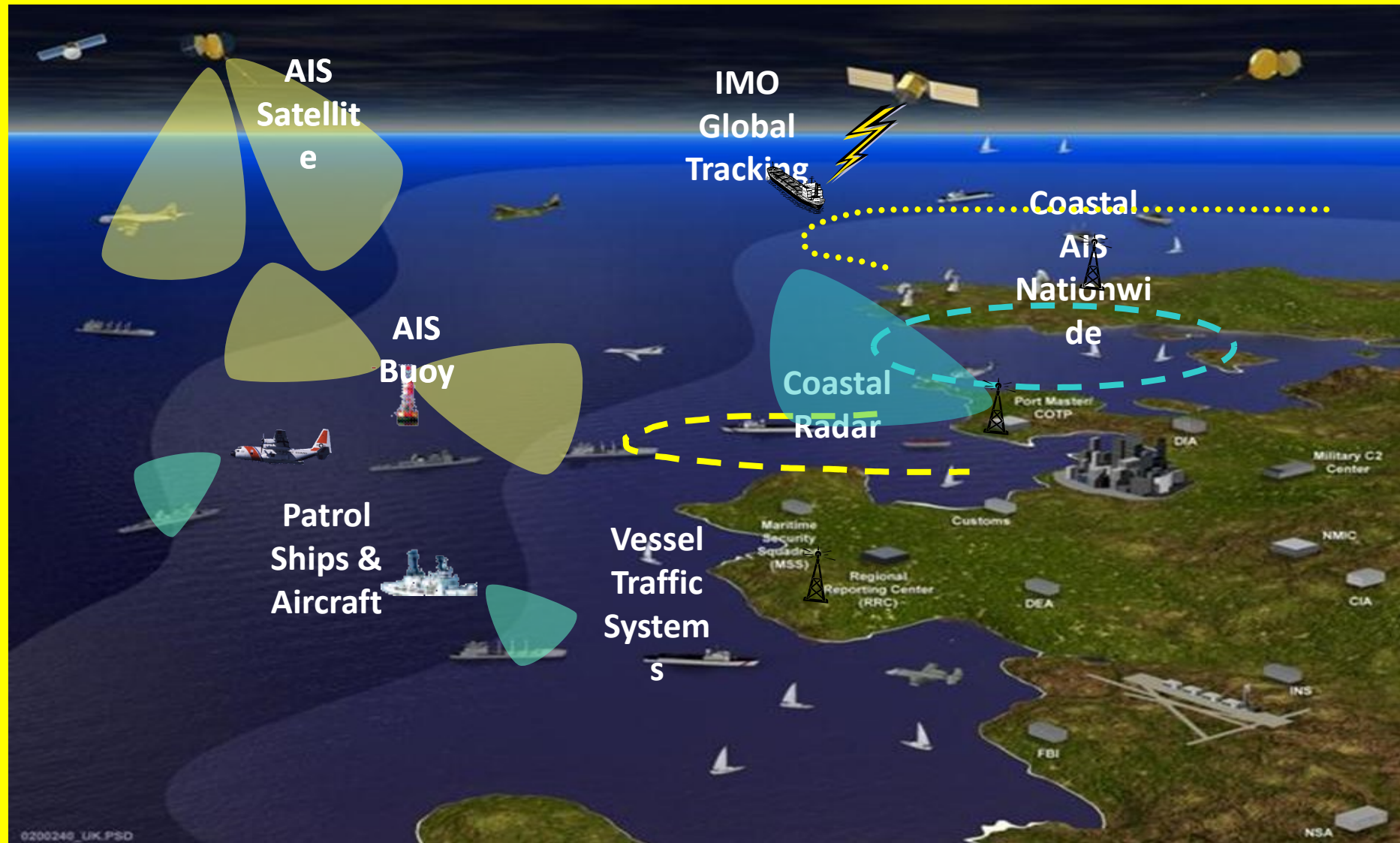
INDIAN NAVY & COAST GUARD

- TRAINED
- DISCIPLINED
- COMMAND & CONTROL
- COMMUNICATIONS
- MAN POWER
- RESOURCES
- ✓ SHIPS
- ✓ AIRCRAFT
- ✓ HELICOPTERS

HUMANITARIAN ASSISTANCE AND DISASTER RELIEF(HADR)

- 2004 - TSUNAMI
- SEARCH FOR MH 370
- DRINKING WATER CRISIS IN MALE
- OP RAHAT – 960 FOREIGNERS FROM 41 COUNTRIES

MARITIME DOMAIN AWARENESS





➤ **NATIONAL COMMAND , CONTROL,
COMMUNICATION & INTELLIGENCE(NC3 I)
FACILITY – GURGAON**

RUKMINI - INDIAN NAVY 'EYE IN THE SKY'



NATIONAL COMMAND CONTROL COMMUNICATION INTELLIGENCE NETWORK









LANDING PLATFORM DOCK

6 HELICOPTERS

LANDING CRAFT AUXILIARY (LCA)

CAN OPERATE WHERE NO PORT EXISTS







MARITIME -NEIGHBOURS

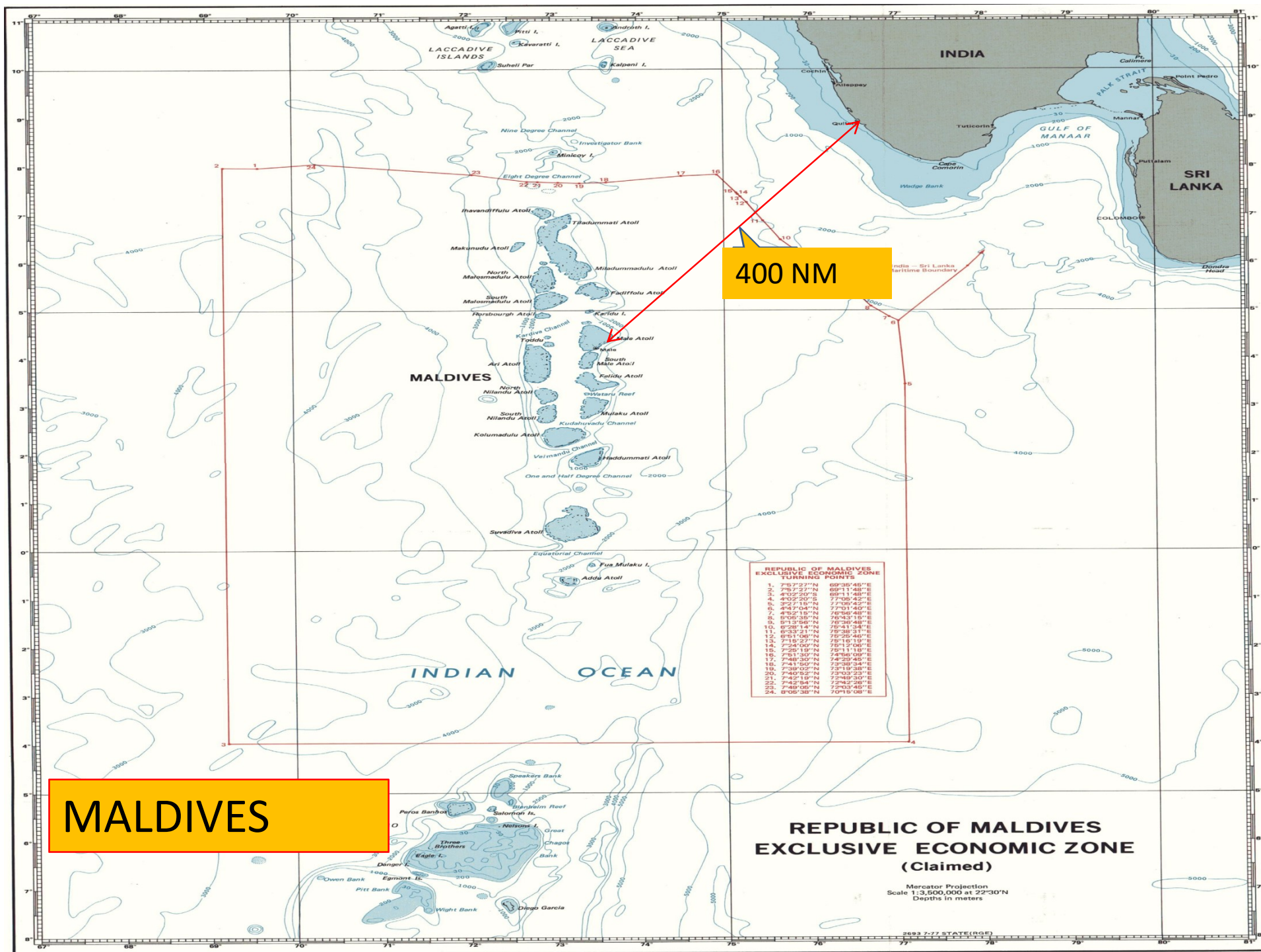
- **SAGAR – SECURITY AND GROWTH FOR ALL IN THE REGION**
- **NEIGHBOURHOOD FIRST POLICY**
- **‘LOOK EAST’ TO ‘ACT EAST’ POLICY**

MARITIME NEIGHBOURHOOD

- PAKISTAN ,
- SRI LANKA,
- MALDIVES,
- BANGLADESH
- MYANMAR,
- THAILAND,
- INDONESIA

➤ INDIAN OCEAN -SIDS

➤ OUR MARITIME NEIGHBOURS LACK CAPACITY AND
CAPABILITY



MALDIVES

400 NM

REPUBLIC OF MALDIVES
EXCLUSIVE ECONOMIC ZONE
(Claimed)

Mercator Projection
Scale 1:3,500,000 at 22°30'N
Depths in meters

SRI LANKA



INDIAN OCEAN ISLAND STATES





MARITIME COOPERATION- WHY

- **SHEER SIZE AND EXPANSE OF THE SEA**
- **COST INTENSIVE**
- **TECHNOLOGY INTENSIVE**
- **NO NATION OR NAVY CAN GO IT ALONE**
- **BILATERAL –MULTI LATERAL APPROACH**

MARITIME COOPERATION

- OVER SEAS DEPLOYMENT (OSD)
- PORT VISITS
- JOINT EXERCISES
- EEZ PATROL
- ANTI PIRACY PATROL
- COUNTER TERRORISM EXERCISES /PATROL
- SAFETY OF SLOCs

➤ CAPACITY BUILDING

- PATROL CRAFT , HELOs, FIXED WING AIRCRAFT
- SRI LANKA ,MALDIVES, SEYCHELLES , MAURITIUS , VIETNAM

➤ COOPERATION BETWEEN COAST GUARDS

➤ ENHANCING MARITIME DOMAIN AWARENES (MDA)

➤ SHARING OF INFORMATION ON WHITE SHIPPING

JOINT EXERCISES

- SIMBEX – SINGAPORE
- KONKAN - UK
- INDRA - RUSSIA
- VARUNA - FRANCE
- SLINEX- SRI LANKA
- AUSINDIA – AUSTRALIA
- JIMEX - JAPAN
- NASEEM AL BAHAR – OMAN
- MALABAR - INDIA US JAPAN
- SAMUDRA SHAKTI -INDONESIA

•HA/DR IMPORTANT COMPONENT OF MOST EXERCISES

- COORDINATED PATROL(CORPAT)
- THAILAND
- MYANMAR
- INDONESIA
- BANGLADESH

PURPOSE OF JOINT EXERCISES

1. INDICATE INTENT AND CAPABILITY TO DETER
2. TO HONE PROFESSIONAL SKILLS
3. IMBIBE BEST PRACTICES
4. ENABLE INTER-OPERABILITY
5. ENHANCE SECURE COMMUNICATION BETWEEN FORCES
6. SHARING OF TECHNOLOGY IS A PRELUDE
7. ENHANCE MARITIME SECURITY
8. CONFIDENCE BUILDING MEASURES
9. SAR , HADR , ANTI PIRACY

MISSION SAGAR

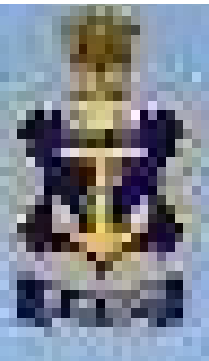


1. ASSISTANCE TO FIGHT COVID -19
2. 540 TONS OF MEDICINES AND FOOD MATERIAL- 5 ISLAND NATIONS
3. MEDICAL TEAMS

Source: National Maritime Foundation

MISSION SAGAR II- INS AIRAVAT
SUDAN ,SOUTH SUDAN, DJBOUTI ,ERITREA





INS KILTAN



MISSION SAGAR III -VIETNAM
,CAMBODIA



OPERATION VANILLA-JAN 2020

DISASTER MANAGEMENT

SOLAS 1974-1980

MARPOL-1978

GPS

GLOBAL MARITIME DISTRESS SAFETY SYSTEM (GMDSS -1988- 1999)

EMERGENCY POSITION INDICATING RADIO BEACON (EPIRB)

IMO

NDMA

DM 2005- LAND ORIENTED

MINISTRY OF PORTS, SHIPPING & INLAND WATERWAYS

DG SHIPPING- ADVISORIES

**INDIAN COAST GUARD – NATIONAL MARITIME SEARCH & RESCUE COORDINATING
AUTHORITY**

NATIONAL OIL SPILL DISATER CONTINGENCY PLAN

- MERCHANT SHIPPING ACT -2016
- INTERNATIONAL CONVENTION ON MARITIME SEARCH
RESCUE 1979
- CG ACT 1978

CONCLUSIONS-WAY AHEAD

- WITH INCREASING GLOBALISATION , NUMBER OF PORTS AND SHIPS WILL ONLY INCREASE
- EXTENSION OF EEZ (200NM -350NM)
- SAGARMALA & BLUE ECONOMY
- STATES ,PORTS & OIL HANDLING COMPANIES MUST UP THEIR TIER I OIL SPILL RESPONSE CAPABILITY
- A DEDICATED MARITIME ACCIDENT INVESTIGATION TEAM NEEDS TO BE SET UP IN THE COUNTRY
- MARITIME DISASTER RESPONSE SHOULD FORM IMPORTANT PART OF NDMA

- GREATER FUNDING FOR MARITIME RISK MITIGATION AND DISASTER RESONSE
- ACQUISITION OF ADEQUATE AND MORE MODERN EQUIPMENT
- VALIDATION & AUDIT OF MARITIME RISK MITIGATION AND REDUCTION CAPABILITY REQUIRED
- NEED FOR AN AMBULANCE SHIP
- BETTER TRAFFIC MGT BY PORTS
- **GREATER ATTENTION TO MARITIME LAW . LAW UNIVERSITIES DO NOT GIVE ADEQUATE IMPORTANCE TO MARITIME LAW**
- **.MARITIME COURTS NEEDED**

CONCLUSION –WAY AHEAD

- NODAL AGENCY REQUIRED
- BJP GOVT ANNOUNCED IN 2014 SETTING UP OF A ‘NATIONAL MARITIME AUTHORITY’ -(NMA) .
SEVEN YEARS LATER , NO PROGRESS . NEEDS TO BE IMPLEMENTED EARLY

WISHING YOU FAIR WINDS AND CALM SEAS

MAY LORD VARUNA , THE LORD OF THE SEAS ,ALWAYS BE WITH YOU .



THANK YOU

3 TIER COASTAL SECURITY FRAME WORK

MARINE POLICE 0-12 NM
(CURRENTLY TILL 5 NM)

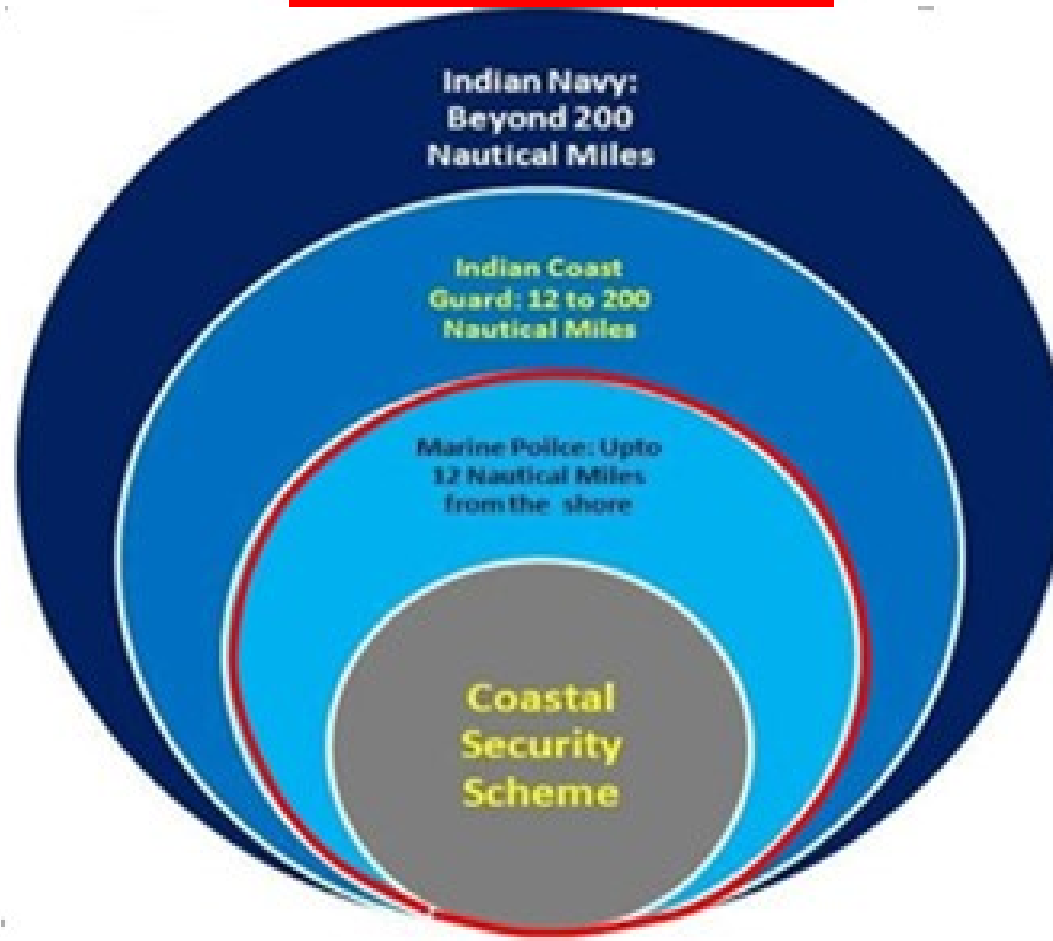
COAST GUARD 12-200 NM

NAVY > 200 NM

HIGH SEAS

INDIAN OCEAN REGION

JURISDICTION AT SEA



MARINE POLICE –LAST LINE OF DEFENCE



INDIAN CUSTOMS







INS SINDHURATNA



ILLEGAL MIGRATION

➤ PEOPLE MOVING FROM **WEST ASIA AND NORTH AFRICA**
TO SOUTH EAST ASIA & AUSTRALIA

➤ MAY PASS THROUGH OUR WATERS



ROHINGYAS

ROHINGYA CRISIS

- **ROHINGYA BOAT REFUGEES HEADING TO SOUTH EAST ASIA STRANDED OFF A&N ISLANDS**
- **ROHINGYAS IMPETUS - ARMS , DRUGS AND HUMAN SMUGGLING IN NORTH BAY OF BENGAL AND ANDAMAN SEA**



ROHINGYA CRISIS



ROHINGYA MIGRATION

