SyntheSys

St. Hilda's Business Centre
The Ropery
Whitby
North Yorkshire
YO22 4ET

tel: +44 (0)1947 821464
fax: +44 (0)1947 603301
email: training@synthesys.co.uk
web: www.synthesys.co.uk

Patriot Tactical Communication Capability

Roland Kemp

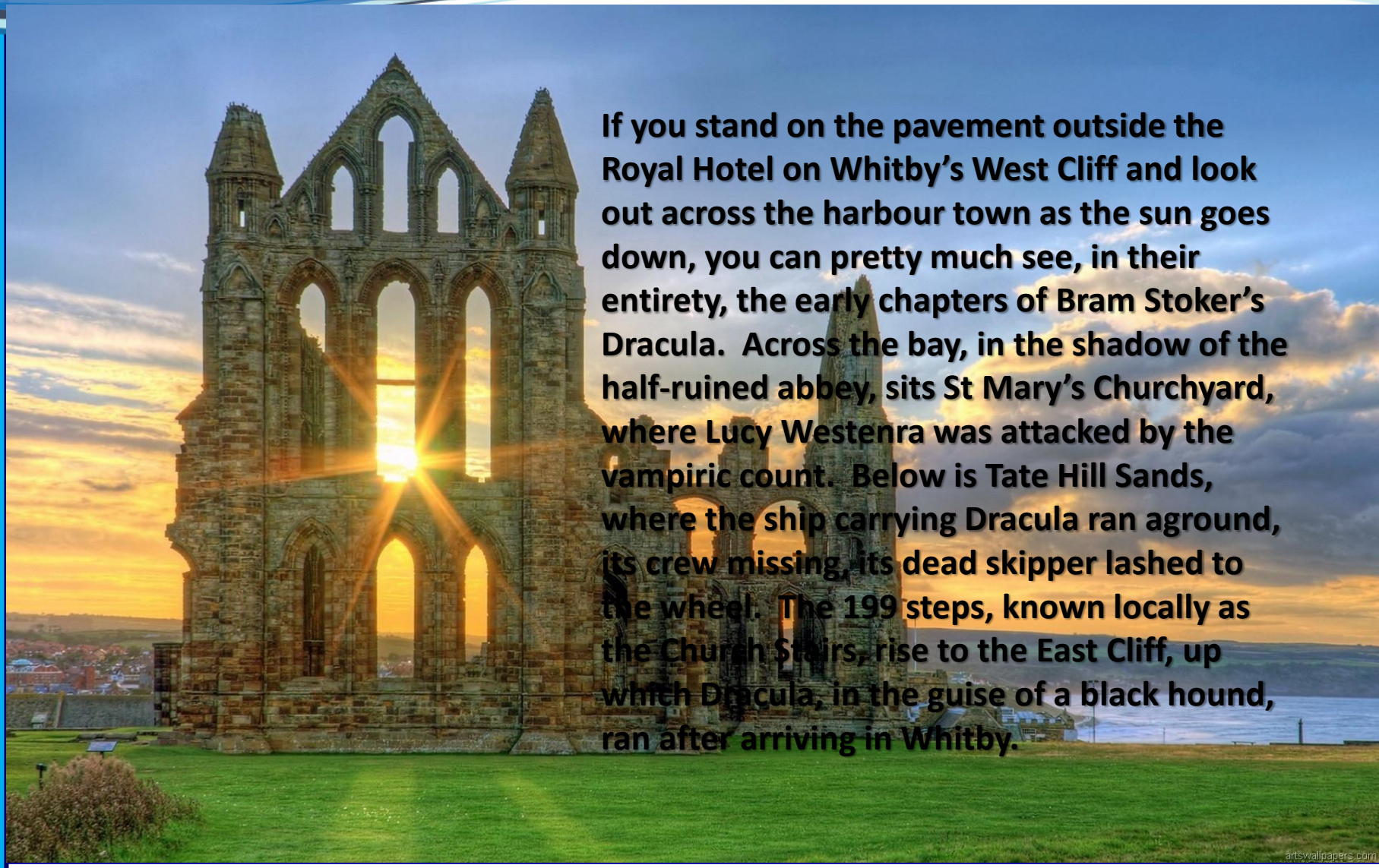
PATRIOT Tactical Communications Capability

- Training Consultant & Joint Interface Control Officer (JICO)
  - Retired Royal Netherlands Air Force 38 years
  - 1980 HAWK, PATRIOT
  - 1998 Training Branch, Centre of Extended Air Defence
  - 2000 JICO training during Joint Project Optic Windmill
  - 2006 National Data Link Management Cell
    - Senior Network Manager and Chief Network Design
  - 2011 Centre of Excellence (Air and Missile Defence)
  - 2015 Civilian ☺
  - 2016 SyntheSys

SyntheSys Systems Engineers Ltd

- Company based in Whitby
- 35-40 people
- Over 25 years
- Training is the smallest part!

Bram Stoker's Dracula



If you stand on the pavement outside the Royal Hotel on Whitby's West Cliff and look out across the harbour town as the sun goes down, you can pretty much see, in their entirety, the early chapters of Bram Stoker's Dracula. Across the bay, in the shadow of the half-ruined abbey, sits St Mary's Churchyard, where Lucy Westenra was attacked by the vampiric count. Below is Tate Hill Sands, where the ship carrying Dracula ran aground, its crew missing, its dead skipper lashed to the wheel. The 199 steps, known locally as the Church Stairs, rise to the East Cliff, up which Dracula, in the guise of a black hound, ran after arriving in Whitby.

Aim

- This presentation will give you some information on the Tactical Communications Capabilities and inside information about the Patriot Air Defence System

Agenda

- History
- Missile Types
- System Overview
- Tactical Communications
- Remote Launch
- Engagement Coordination
- Future

History

- Initial Project SAM-D
- 1987 in the Royal Netherlands Air Force (RNLAF)
- Out of Area Deployments and Exercises
- Interoperability is key

History

- August 1966
  - The Army selected Raytheon as one of three companies to compete for the SAM-D contract
- May 1976
  - The SAM-D Missile System was renamed the PATRIOT Air Defense Missile System
- February 77
  - The PATRIOT program was accelerated by moving the full-production decision from March 83 to April 80. The overall success of the first 23 firings and the need for the system in the field led to this decision.

History

- June 1977
  - A combined PATRIOT/Improved HAWK flight test was successfully conducted at White Sands Missile Range
- May 1982
  - The Army's first PATRIOT missile battalion was activated
- December 1985
  - The first European PATRIOT battalion passed NATO Tactical Evaluation and became fully operational
- June 1990
  - Raytheon shipped the 100th PATRIOT radar and 4000th missile

History

- January 1991 Operation Desert Storm
  - Dutch PATRIOT was deployed to Turkey and Israel
- November 1998 Link 16 operational in Dutch PATRIOT
- 2003
  - US PATRIOT was deployed to Iraq (NL PATRIOT to Turkey)
- 2013
  - US, GE and NL PATRIOT was deployed to Turkey

Missile Types

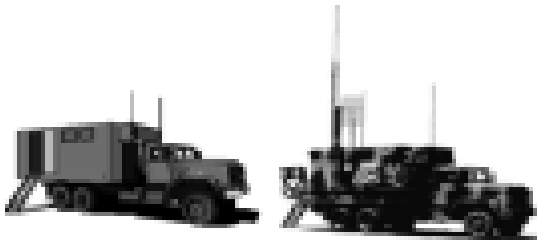
- Standard
- SJOC (Stand Off Jammer Counter)
- PAC-2 (Patriot ATM Capability)
- GEM (Guided Enhanced Missile)
- GEM-C (Cruise Missiles) Upgraded GEM
- GEM-T (Tactical) Upgraded PAC-2 missile
- PAC-3 (PATRIOT Advanced Capability)
  - Hit To Kill
- PAC-3 MSE (Missile Segment Enhancement)

System Overview

System Overview

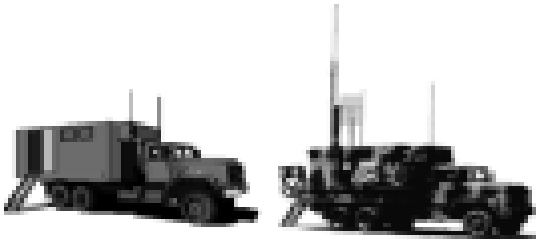
- Information and Coordination Central – ICC
- Tactical Command System - TCS
- Engagement Control Station – ECS
- Battery Command Post - BCP
- Radar Set – RS (Phased Array)
- Launching Station - LS
  - Standard Max. 4 Missiles (NO PAC-3)
  - Modified Max. 16 Missiles (PAC-3)
- Electric Power Plant or Unit – EPP EPU
- COMPATRIOT

System Overview Battalion Level



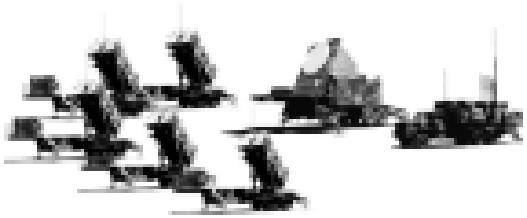
- Tactical Command System - TCS
  - Planning Airspace Control Order (ACO)
  - Radar Coverage (DTED)
  - Select optimal positions for Battery based upon To Be Defended Assets (TBDA)
  - Compute ideal Primary Target Line (PTL) for RS and LS's
  - Calculate Radar Load based upon Search Modes combination.
  - Upload all initialisation data to ICC

System Lay-out Battalion Level



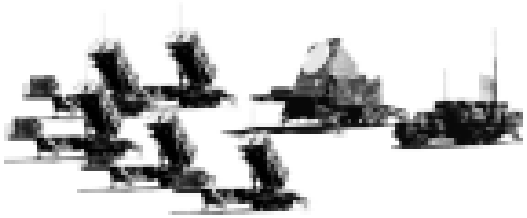
- Information & Control Central - ICC
  - Receive Radar Data from all Battery Radars (Correlation)
  - Receive status from Battery
  - ID authority (Tactical Director)
  - Select optimal Battery for engagement and initiation
  - Max. 6 PATRIOT Batteries and 6 HAWK Batteries
  - Automatic or Semi-Automatic Engagement
  - Upload initialisation data to Engagement Control Station (ECS)

System Overview Battery Level



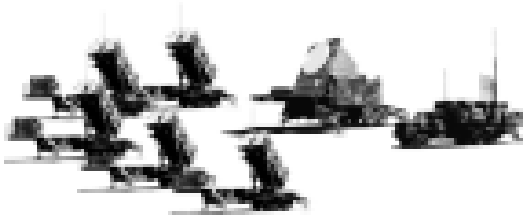
- Engagement Control Station - ECS
  - Control of Radar
  - Control of Launching Stations
  - Engagement Decision (Tactical Control Officer)
  - Engagement Initiation (Tactical Control Assistant)
  - Auto select optimal Launching Station and Missile Type for engagement
  - 8 LS's and 16 LS's optional
  - Upload initialisation data to ECS

System Overview Battery Level



- RS - Radar Set
  - 3 Dimensional Phased Array Radar
  - Automatic Emplacement
  - 120 degrees track sector and 120 degrees search sector
  - Search Modes: Air Breathing Threat, Tactical Ballistic Missile and High Altitude Cruise Missile
  - Identification Friend or Foe (IFF) embedded
  - Digital Signal Processors (Target identification and classification)
  - Track Via Missile

System Overview Battery Level



- Launching Station - LS
  - Automatic Emplacement
  - 4 Msl's on standard LS (Missile Mix)
  - 16 Msl's on enhanced LS (PAC-3 only)
  - 8 up to 16 Launching Stations per Battery
  - Emplaced in PTL or Secondary Target Line (STL)
  - Fiber Optic / VHF (Sincgars radio) or Coaxial cable

Tactical Communications

- Link 11 and Link 11B
- Link 16
- ATDL-1
- PADIL
- JREAP
- COMPATRIOT

Tactical Communications

- Link 11 and Link 11B
  - Link 11 UHF only - installed in the TCS
  - Link 11B in the ICC via modem for connection to Higher Echelon (e.g. CRC)

Tactical Communications

- Link 16
  - LVT-2 in the ICC
  - LVT-2 in the Battery Command Post (XMT Precise Participant Location and Identification (PPLI) only)

Tactical Communications

- ATDL-1
  - Via MODEM in the ICC to connect to HAWK Batteries / HAWK Fire Platoons

Tactical Communications

- PADIL
  - PATRIOT unique Tactical Data Link
    - G-Series messages – 32 kb
    - Radio Logic Routing Interface Unit – RLRIU
      - Translates B, M and J series messages into G-series messages and vice versa
    - Intra Battalion Communications from ICC to ECS's (Multi Routing)
    - External Communication to other PATRIOT Battalions
    - Connection over UHF to PAC-3 Launcher Farms (Remote Launch)

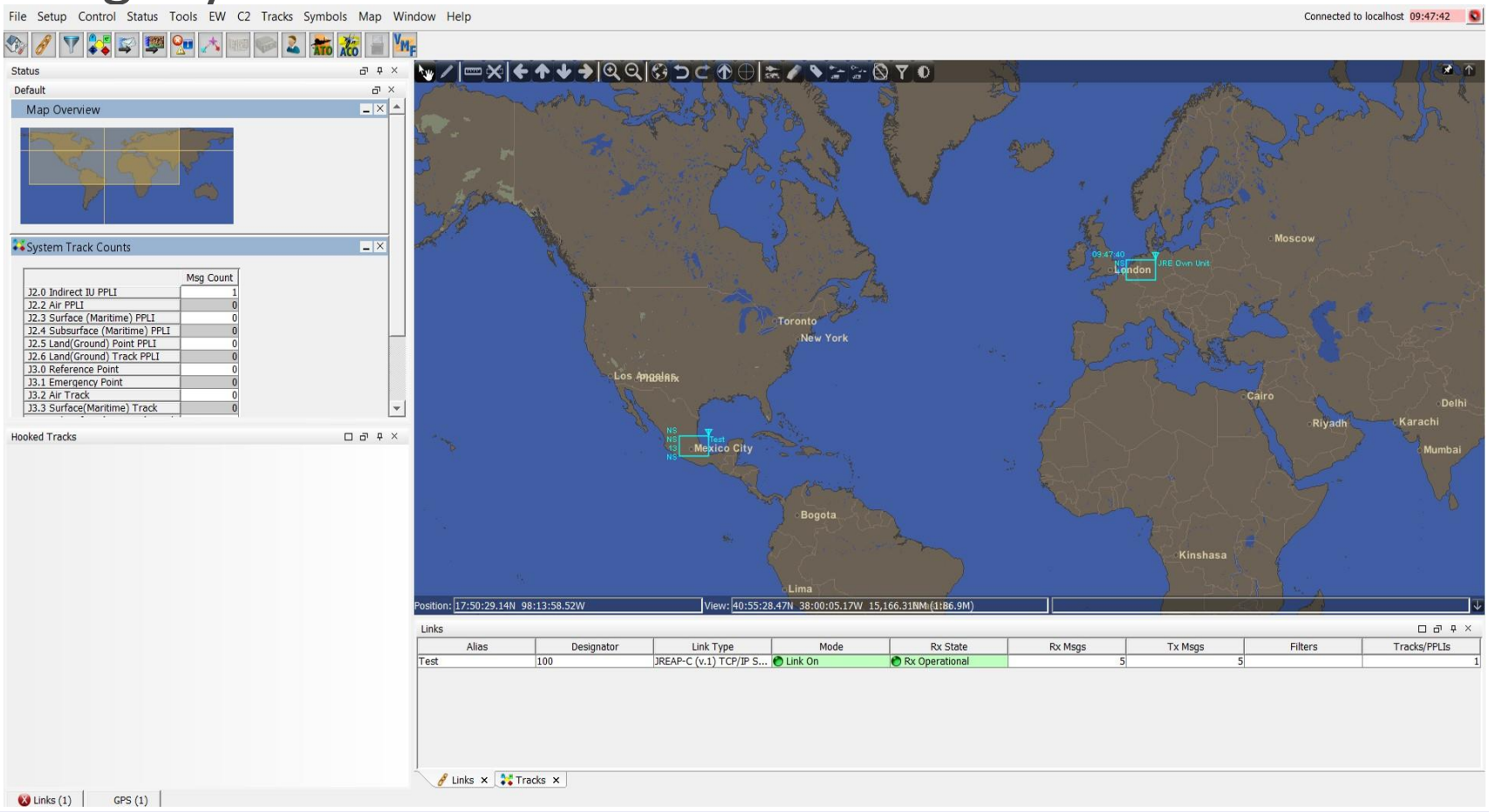
Tactical Communications

- JREAP
  - Common Data Link Interface Module – CDLIM
  - Current (Dutch) solution use of Engility JRE with additional LVT-1 or 2 forwarding the RF Link 16 data to JREAP A, B or C

Tactical Communications

PATRIOT Tactical Communications Capability

Engility JRE



Tactical Communications

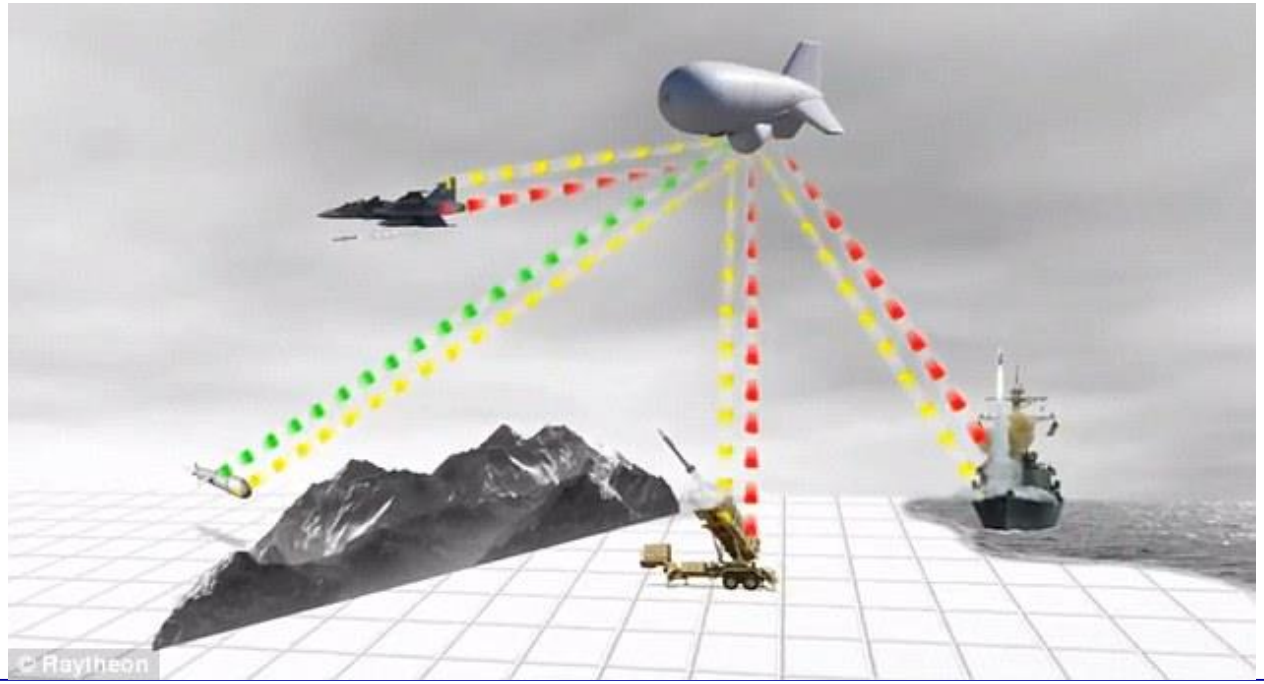
- COMPATRIOT
  - Battalion Internal and External Secure Voice / Data Comms
  - Different International PATRIOT users, different systems
  - Dutch Army replacing system due to limited band width and age

Remote Launch

- Deploy Launching Stations and Comms Van >30 km from Battery versus up to 10 km from Local Launching Stations
- PAC-3 only
- Gain more battle space by early engagement
- Improves Survivability
- Neighbouring Battery can take over Launching Stations (Reconstitution)
- Battalion Ripple Fire, firing missiles from different Batteries on one track.

Remote Launch

- PATRIOT Launch on Remote
  - Neighbouring Battalion
  - Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System - JLENS



Engagement Coordination

- Terminal High Area Air Defence (THAAD) and PATRIOT
- AEGIS Ballistic Missile Defence ship and PATRIOT
- Radar executes tailored search to track Ballistic Missile
- Gain more battle space by early engagement
- Improves Survivability

Future

- Radar upgrade to cover 360 degrees
- 3 D Display
- Smaller Operator Vans
- New Missile Type SkyCeptor (450K vs 3M)
- Dutch Inventory till 2040

PATRIOT

- PATRIOT is already 50 years in use.
- In use by more than 13 countries world wide

US	Netherlands
Germany	Romania *
Greece	Saudi Arabia
Israel	Spain
Japan	Sweden *
Jordan	Qatar
Korea	Taiwan
Kuwait	United Arab Emirates
Poland *	

Any Questions?

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