



# *Subtrack*

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Sonar Targets  
and  
Acoustic Calibration Systems



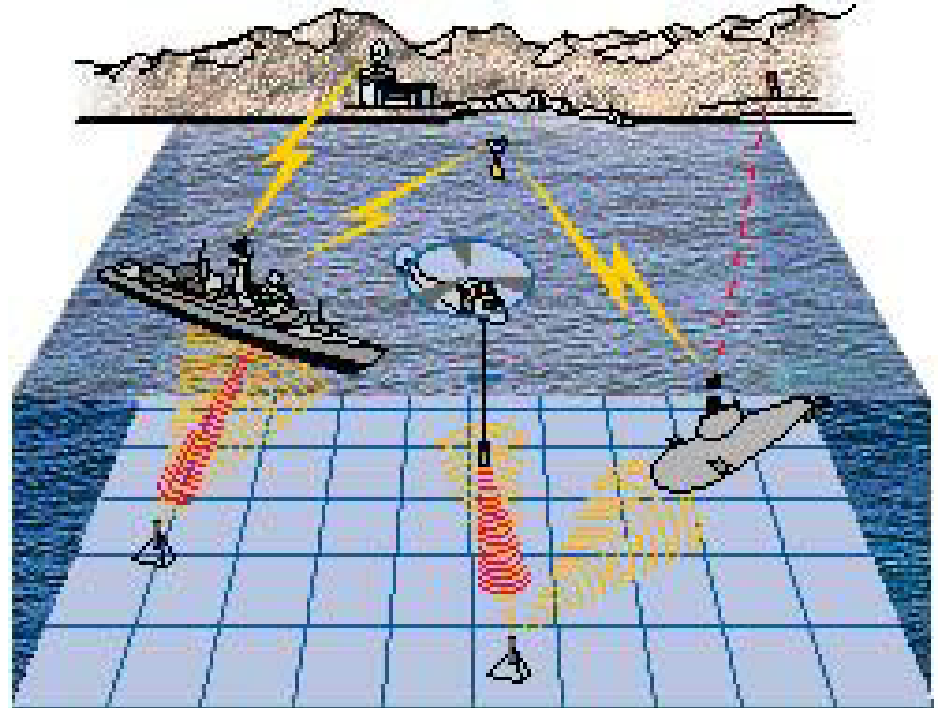
# *Subtrack* Acoustic Systems





# *Subtrack* Users

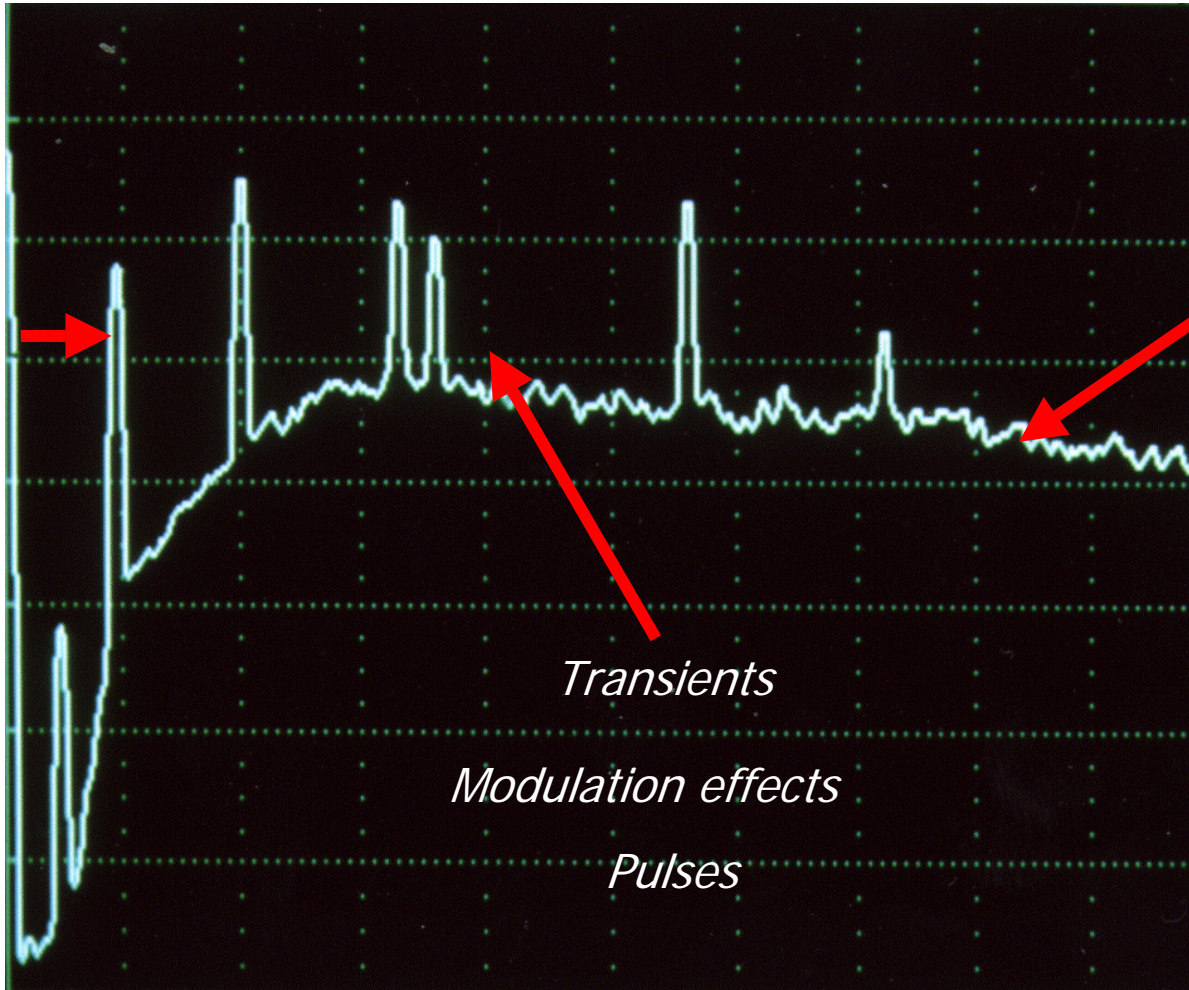
- United Kingdom
- Spain
- France
- Germany
- Japan
- South Korea
- Australia
- Turkey
- Netherlands
- Nato Foracs





# *Subtrack* Sonar Targets

*Narrow  
band lines*



*Broadband  
noise*

*Transients*

*Modulation effects*

*Pulses*



# *Subtrack* Purpose

- Training sonar operators
- Command team training
- Proving weapon systems
- Proving sonar systems







# *Subtrack* Capabilities

- Towed systems
- Submarine based systems
- Statically deployed systems
- Sea-bed systems
- Narrow band lines
- Broadband noise
- AM and FM effects
- Pulses
- Transients
- Transponder
- Echo repeating





# *Subtrack* Training



- Passive sonar operators need frequent training
- Real submarine targets are expensive for training exercises
- Friendly submarines provide target signatures that are too familiar



# *Subtrack* Training

- Typical training exercise:
  - Start with Subtrack shallow and high level
  - Gradually reduce levels
  - Increase depth
  - Increase manoeuvres
  - Switch off occasionally
  - Change signature
  - After several days add a real submarine if possible (complicates TMA)







# *Subtrack* Towed Systems

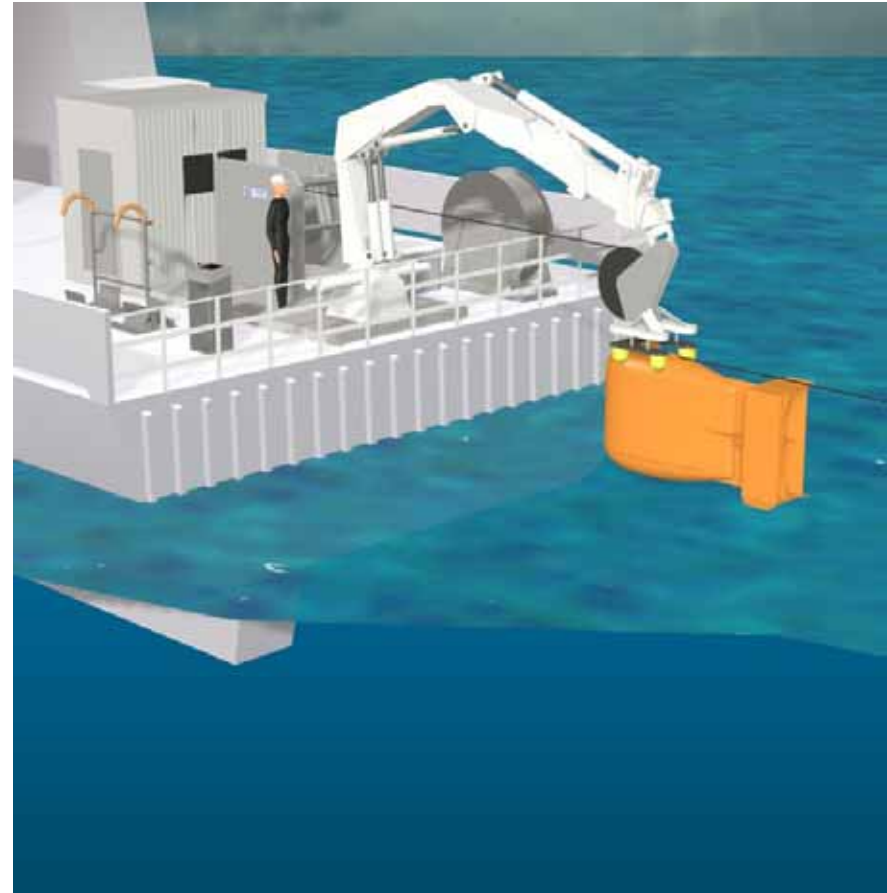
- High power systems or general targets
- Deployed from craft of opportunity
- Sonar system proving
- General research





# *Subtrack* Handling Systems

- Tow cables
- Winches
- Cranes
- A-frames
- Auto recovery gear





# *Subtrack* Submarine Systems



- Augments submarine acoustic signature
- Permits the submarine to change signature and become a different type
- Provides a better target in noisy waters
- Helps operators to familiarise with submarine manoeuvres
- Weapon system proving



*Subtrack*

# Static & Sea-bed Systems

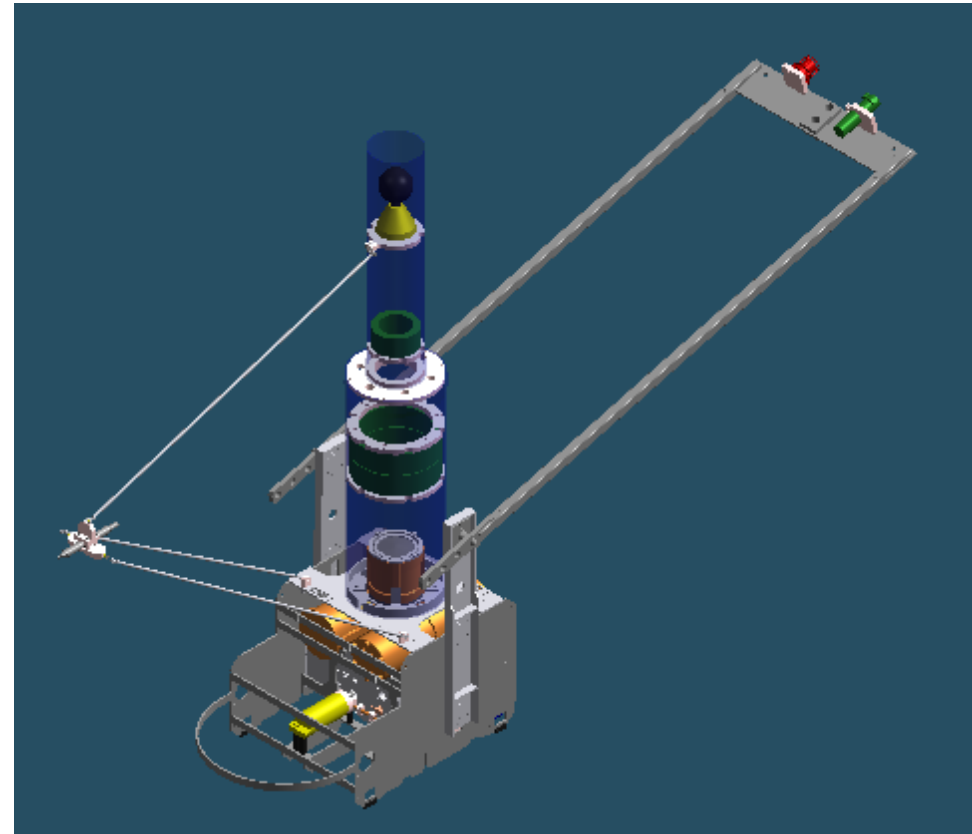
- Deployed from a buoy or moored on the sea bed
- Range calibration
- Pre-deployment check and calibration





# *Subtrack* Calibration Systems

- Operation from 20Hz to 80kHz
- Excellent beam patterns ( $\pm 1.5\text{dB}$ )
- High source levels
- Highly stable ( $\pm 10^\circ$ )
- Environmental sensors



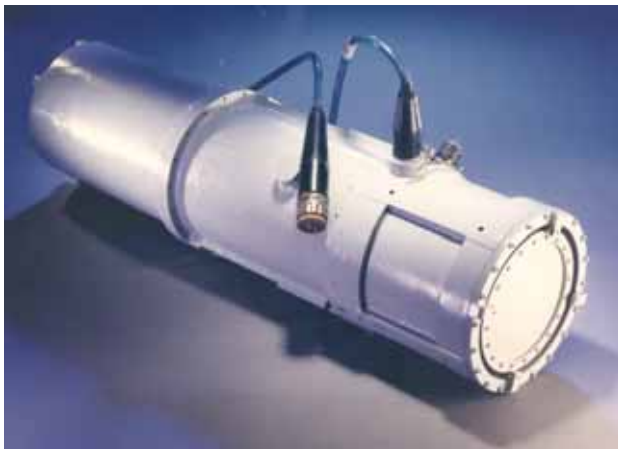




# *Subtrack* Transducers



*Segmented  
Rings*



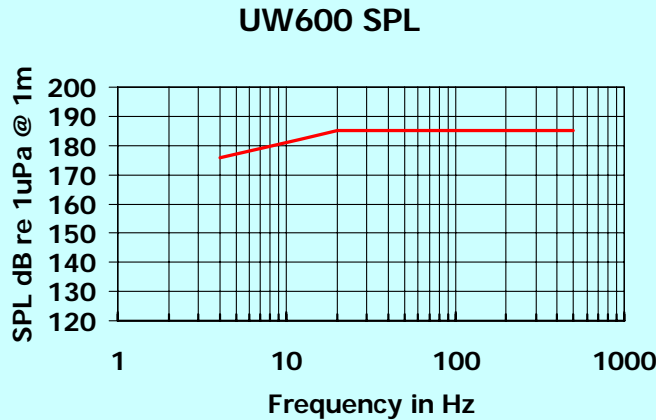
*Low  
frequency  
moving coil*



*Spherical  
transducers*



# *Subtrack* Influence Minesweeping



- Very low frequency (4Hz) capability
- High power – up to 185dB re 1μPa @ 1m
- Very low stray field
- Family of transducers to increase bandwidth



# *Subtrack* System Calibration

- Calibration in large reservoir
- UK MoD facility
- Beam patterns and SPL
- Able to test echo repeat and DME systems





# Intercept Sonar

- Detects threat active sonars
- Detects weapon active sonars
- Performance up to 135kHz





# Intercept Array

- 3 frequency bands or 5 frequency bands
- Carbon fibre dome for low flow noise
- Titanium support structure
- Complies with military environmental specifications





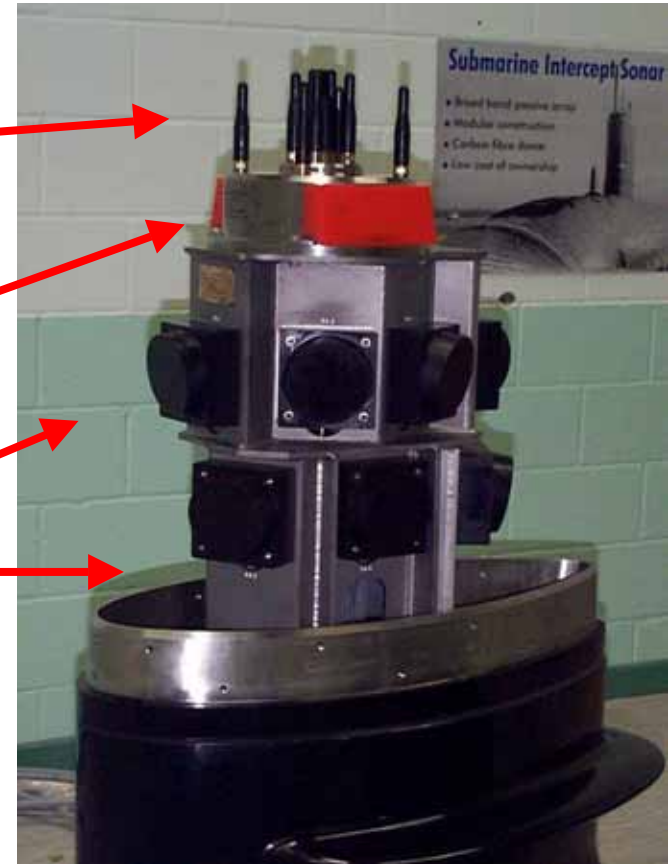


# Intercept Transducers

*Omni-directional ball  
hydrophones for low and mid  
frequency bands*

*Electronics pod for pre-  
amplifiers*

*Directional high frequency  
hydrophones. Constant angle,  
low side lobes*





# Intercept Array

- Advanced polyurethanes for match to sea water
- Structure filled with gas free oil
- Easy servicing
- Explosive tested





# Intercept Array

- Height 880mm
- Length 900mm
- Width 400mm
- Beamwidth – customer specified
- Sensitivity
  - $>27\text{kHz}$   $-160\text{dB}$  ref  $\text{V}/\mu\text{Pa}$
  - $<27\text{kHz}$   $-170\text{dB}$  ref  $\text{V}/\mu\text{Pa}$

