

THE DARWIN FUZE

An Evolution in Fuze Improvements



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THALES MUNITRONICS B.V.
THE NETHERLANDS

THALES



 Operational Need

 Design Specification & Constraints

 Choice of Technology




 Simulation & Artificial Target

 Qualification & Acceptance results

 Conclusion

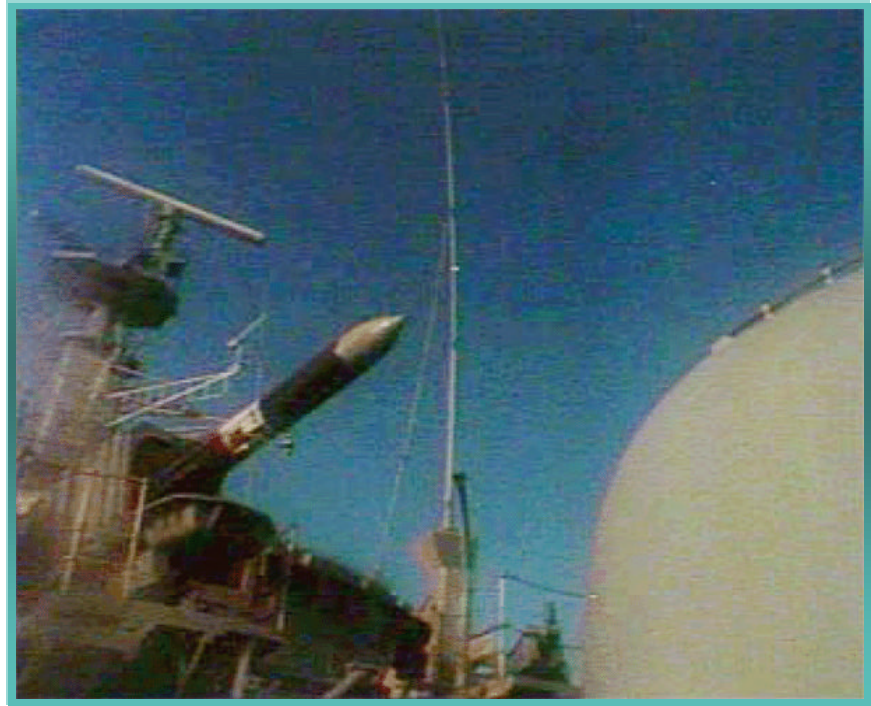
Operational Need of Naval Gun systems



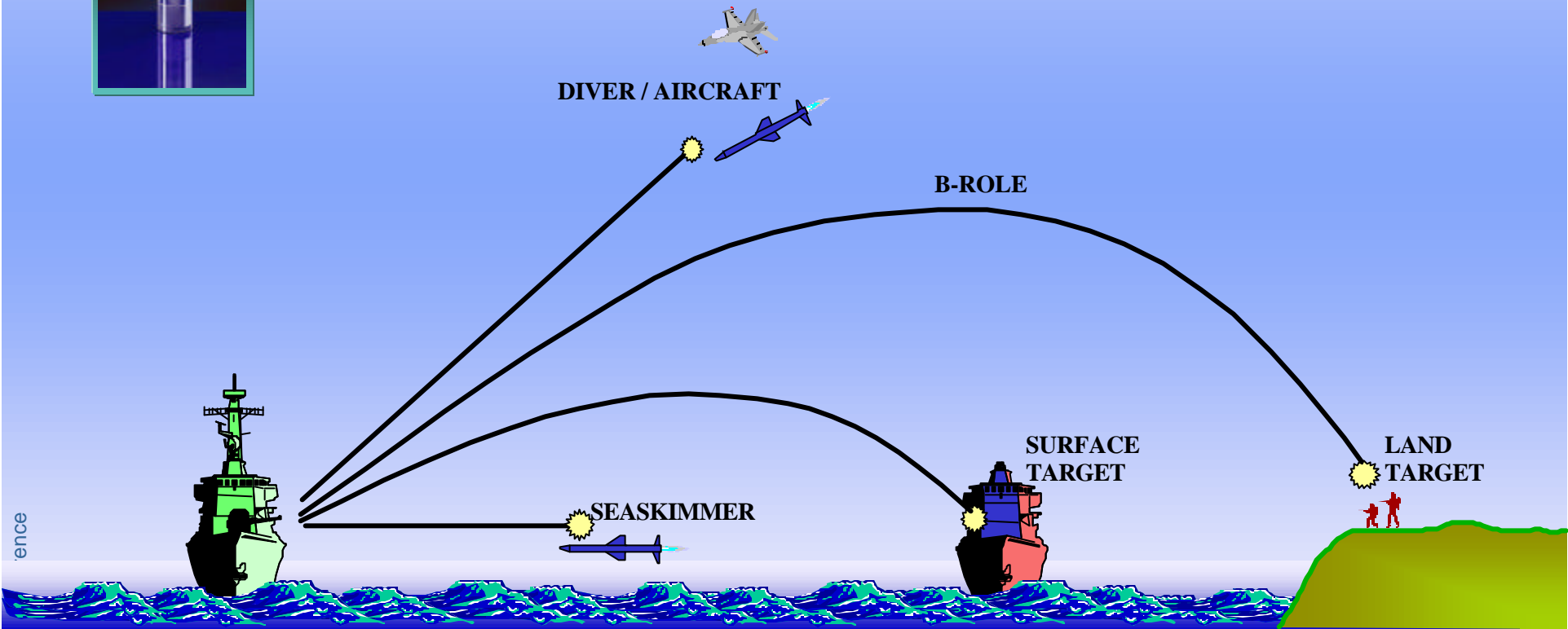
-  Air Defence (AAW)
-  Surface Warfare (ASuW)
-  Naval Surface support (NSFS)

Modern Navy's threat in single ship operations

- ➔ Anti-ship missiles
- ➔ Fighter Aircraft
- ➔ Small attack crafts
- ➔ Shore to ship attack
- ➔ Mines
- ➔ Torpedo's



76 mm DARWIN operational readiness



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Sea Clutter

- Characteristic in anti sea skimmer roles, depending on theatre of operations
 - Solution : Advanced Filtering techniques

EMI in-flight

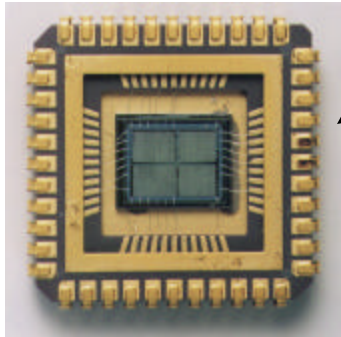
- Universal problem with increase in Electro magnetic equipment
 - Solution : New Front-end

Strength of Design against impact

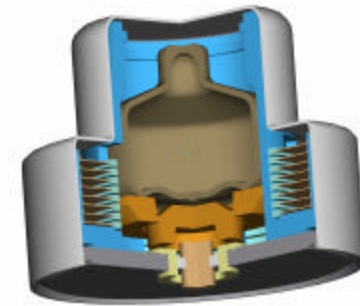
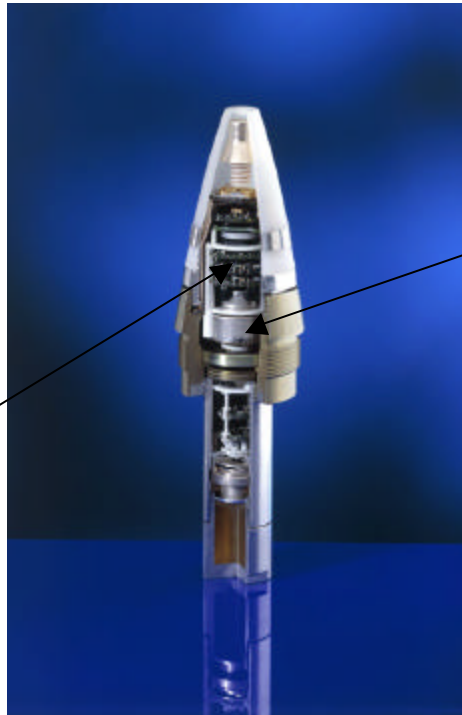
- multi-role fuzes have limit penetration capability depending on shell
 - solution : accept limitation

ASIC: digital signal processor and controller

- Signal processing
- Autonomous mode selector
- Clutter detection
- Burstpoint controller
- Time sequence controller



Floating point processor



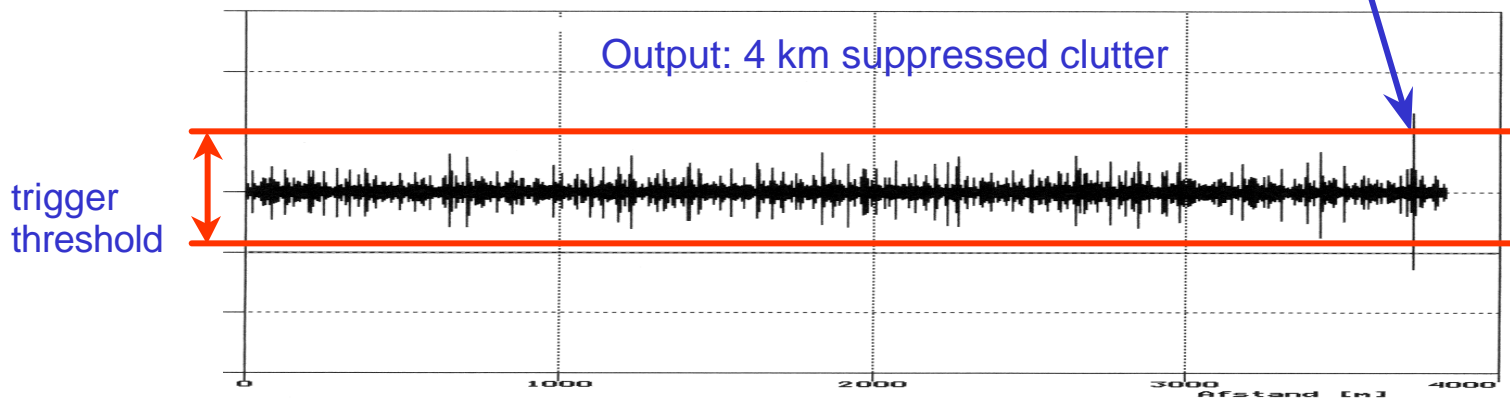
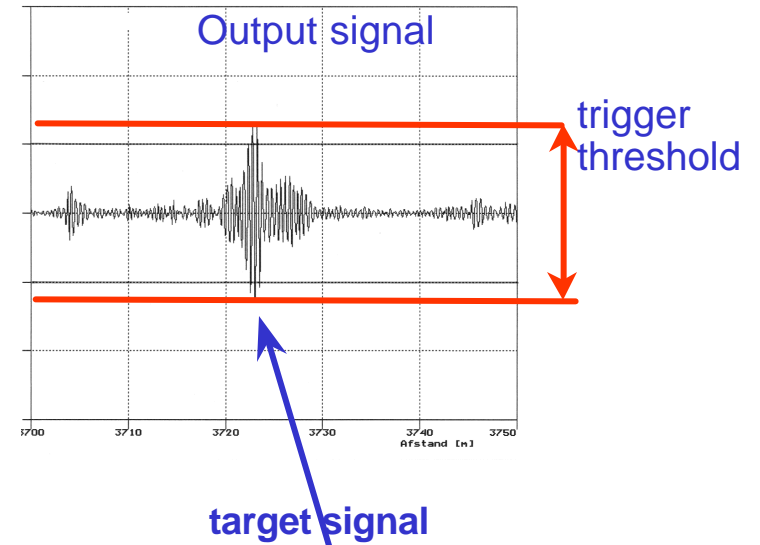
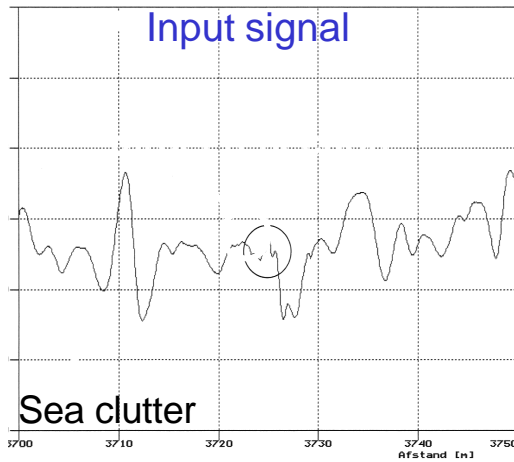
- THALES Lithium reserve technology
- High reliability
- High Energy Density
- Variable Voltage
- Long storage life
- Excellent temperature range

Design Criteria

- Highly resistance to EMI
 - Shielding of fuze electronics
- Narrow band width
- Small and robust
- Low power output
- Easy and cheap to reproduce

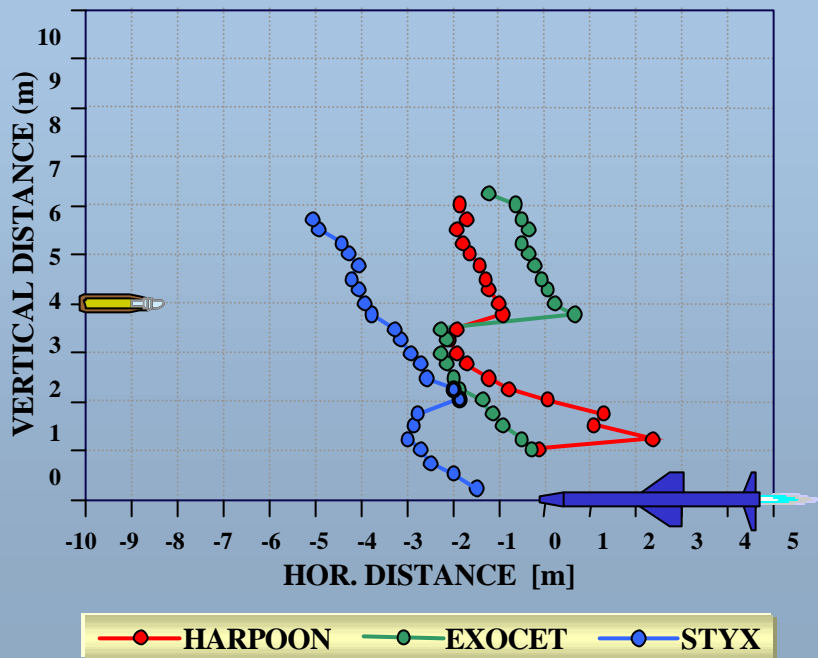


Skimmer channel performance



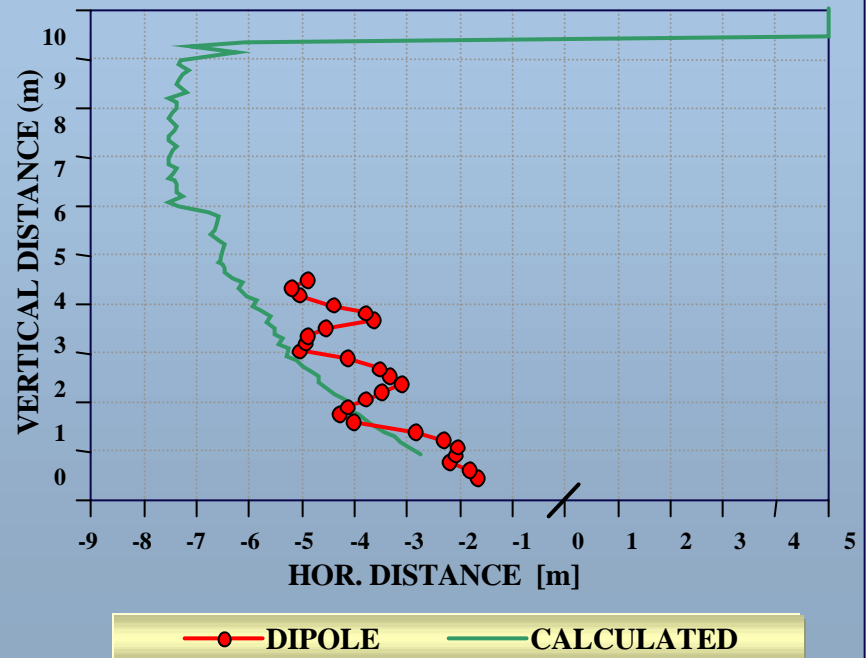
Missiles

MONA BURST CONTOURS SEASKIMMING MISSILES

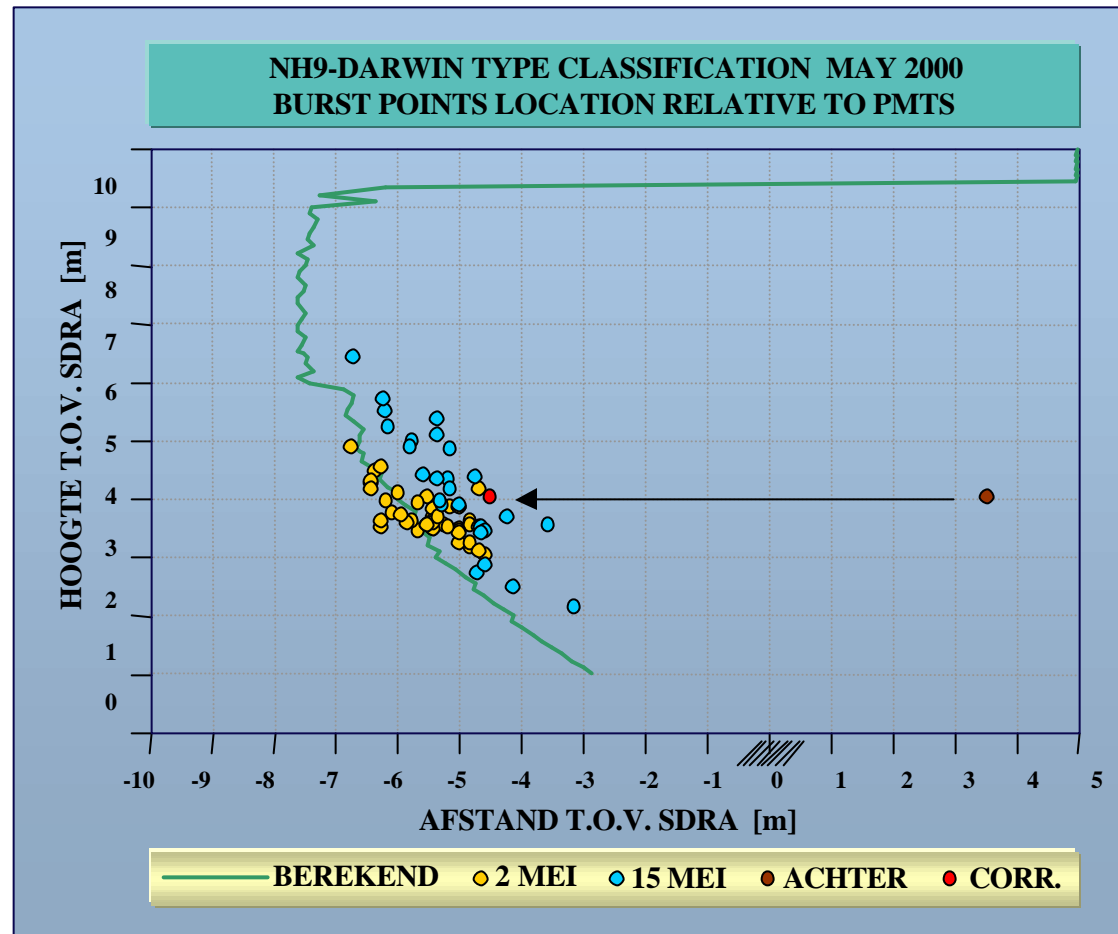


PMTS

MONA BURST CONTOURS MOVING DIPOLE



Results skimmertest Type Classification



Date, reference

Passive Moving Target Simulator



Date, reference



UA 3330/01

NSN 1390-17-1111-6268

Multi Role Fuze

- Air defense
 - Miss distance 6 mtr
- Surface fire
 - PID 6 mm steel
- Naval Gunfire Support
 - HOB 6 - 8 mtr

76/62 mm Caliber

Standard Cavity HE-PFF

Independent of Sea State

EMI/EMP safe



DARWIN Caliber Conversions & Conclusion

127/54 mm

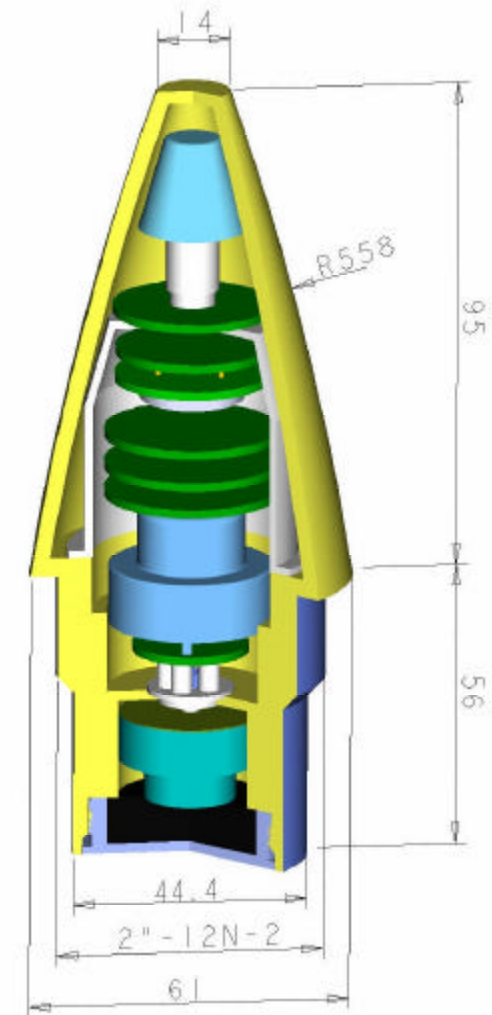
4.5 Inch

100 mm

76.2 mm (EC)

Similar electronics required

Part	No change	Mechanical change	Electronics change	Software change
Booster	X			
S&A Device	X			
Igniter	X			
Battery	X			
Fuze contour		X		
Front - End			X	
Processing				X
Self destruct			X	



Date, reference