

# DATA TO DECISION

DELIVERING EXPLOITABLE CAPABILITY FROM  
ADVANCED PROCESSING IN COMPLEX SONAR  
SYSTEMS

**ANDY MARLOR, HEAD OF GENERAL  
SONAR STUDIES (GSS), THALES UK**

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**NO MATHS, NO ALGORITHMS**  
(May be a mistake at a UDRC  
"Signal Processing in the information Age"  
Meeting)

**SION**  
FROM  
EX SONAR

...OR, HEAD OF GENERAL  
SONAR STUDIES (GSS), THALES UK



# THE CONTEXT

## GSS IS ABOUT LAYING THE FOUNDATIONS FOR FUTURE MARITIME CAPABILITY

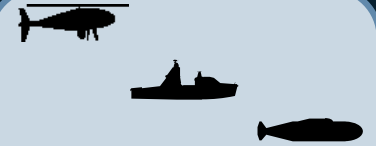
- Group of ~40 Mathematicians, Physicists, Engineers working collaboratively
- Across the TRL Stages
- Across technical/engineering functions
- Across academia, SMEs and larger industry
- Close links with Customers in MOD
  
- What?, So What? And So?

"Research and development programs will not deter and defeat aggression. Fielded combat capabilities do."

*Someone on LinkedIn.....*



Research and Development



Future Maritime Capabilities on Operations

**IMPACT, BENEFITS and OUTCOMES**

# DATA.....

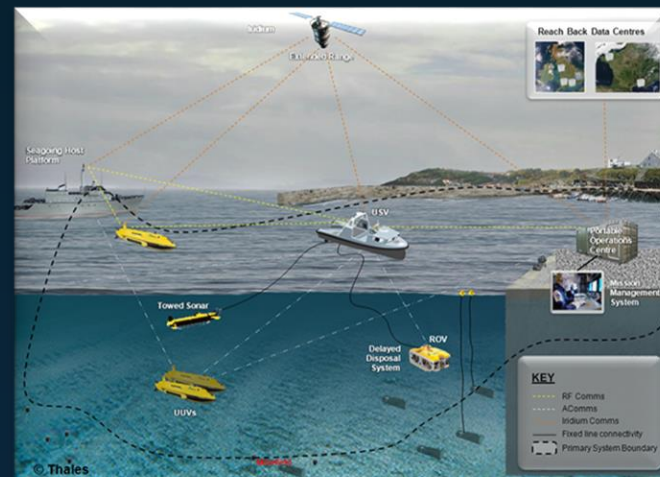
## THE DATA REVOLUTION IS HERE.....

- Increased Availability of Data
- Increased Ability to store, process & **EXPLOIT** it
- New Development Tools and Algorithmic techniques to extract value from data
- New communications opportunities to move data
- New Innovation and Development/Deployment Processes
- Increased Speed.....

**“The nature of war remains constant: it is visceral and violent... and it is always about politics. What is changing is the character of warfare, which is evolving significantly due to the pervasiveness of information and the pace of technological change.”**

General Sir Nick Carter GCB CBE DSO ADC Gen, Chief of the Defence Staff

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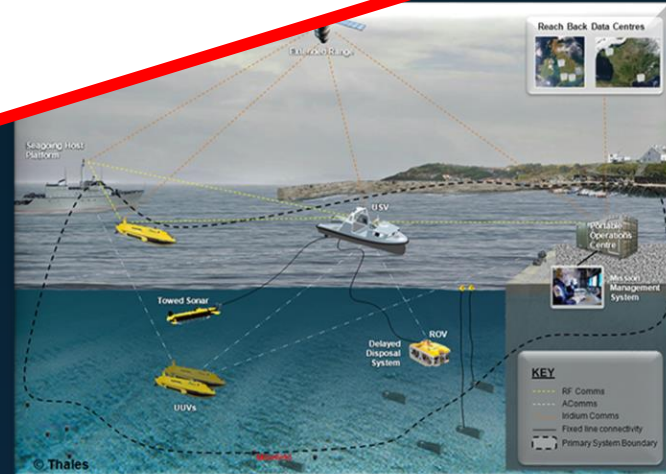
# DATA.....

## THE DATA REVOLUTION

- Increased Data Volume
- Increased Data Velocity
- New Development Processes to extract value from data
- New communication and data processing architectures
- New Innovation and Deployment Processes
- Increased Speed.....

"The nature of war remains constant: it is visceral and violent... and it is always about politics. What is changing is the character of warfare, which is increasingly about the control of information."

**So its about data and algorithms then?**



# WHAT DOES GOOD LOOK LIKE?

## JUST BECAUSE WE CAN – SHOULD WE?

- Everything has changed but nothing has changed
- The aim is to combine technology and people
- The limitation hasn't been the data and technology for a LONG time – the limitation is the people and the decisions they make
- The fundamental problem does not change:

*How do I enable people to make better decisions in ever more complex scenarios?*



Thales UK Transition Ship (TX) Ship Concept

# WHAT DOES GOOD LOOK LIKE?

## JUST BECAUSE

- Everything
- The aim is
- The limitations of technology, people and
- The fundamental challenge:

*How do I encourage people to make better decisions in ever more complex scenarios?*

**How do I use Signal Processing and Algorithms to bring simplicity NOT more Complexity?**



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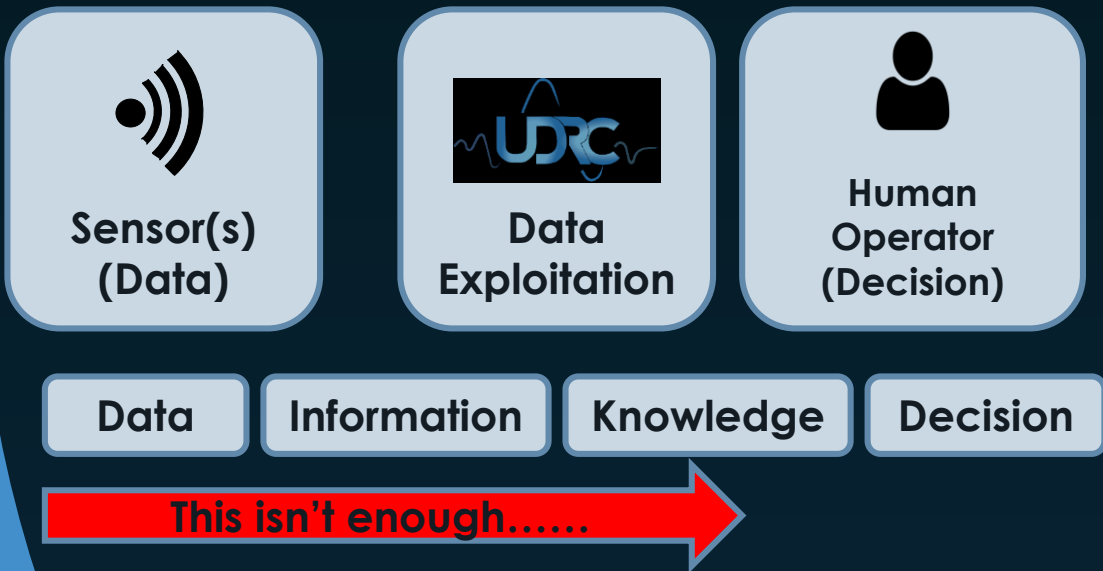


Thales UK Transition Ship (TX) Ship Concept

# DECISIONS

## ITS ALL ABOUT DECISIONS

- A 'better' algorithm may not mean a 'better' decision in the intended Use Case
- As signal processors, algorithm engineers and data exploitation experts we cannot work alone
- What is the context for our work and where does it fit in a solution?
- We already know that the context of the data is everything E.g. for sensor data you need to understand the environment and the signature you are sensing
- BUT we need to look Data to Decision
- We need to enable Decisions.....





# CAPABILITY

## PRE-MISSION, ON MISSION, POST MISSION

- Thales Group is investing significant R&D Effort in Human Performance, Operability and User Experience – Better Decisions
- Autonomy makes this more not less important – it changes though
- Socio-Technical Research – individuals, sub-teams and teams – assessing roles and activities
- Understanding, assessing and exploiting the potential of people in scenarios – multi-generational
- Understanding how they interact with Data, Information and Knowledge to make assured decisions – e.g. Trusted, Assured and Explainable AI



University of  
South Australia

UNIVERSITY OF  
Southampton

ev-i-den-tial



# CONCLUSION

## WHAT DOES GOOD LOOK LIKE?

- What I *could* do with the data is **VITAL** to drive innovation (**PUSH**)
- **BUT** Understanding the Decision to be made is **CRITICAL** (**PULL**)
- In developing any new Data to Decision capability then consider the decision space – how hard is it to exploit the 'better'?
- To create capacity in Socio-technical systems we need to understand, evolve and optimize the role of people:
- Focus them on Decisions **NOT** Data
- Get people to the 'Knowledge' Layer
- Does it survive contact with the 'enemy'?
- Real data, with real systems, with real people who are multi-tasking?



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