

NDIA ExWAR MIW Panel



Mine Warfare Branch

OPNAV N952



Mr. Steve Olson (Acting)

U.S. NAVY Mine Warfare Programs

PEO USC, PMS 495



DISTRIBUTION STATEMENT A:

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CAPTAIN Danielle George
Major Program Manager

16 October 2018

PMS 495 Program Portfolio

ALMDS

COBRA

MK-103

MK-104

MK-105

AQS-24B

AQS-24C

AAG/IAAG

AN/SPU-1/W MOP

SQQ-32V(4) HFWB

AN/SLQ-37 (V)4 Sweep

AN/SLQ-38

AN/ASQ-235 Archerfish

Barracuda

AN/ASQ-232A SeaFox

AN/SLQ-48

OPMA

MOC

PINS

Hammerhead

CDM

Quickstrike Extended Range

AN/SLQ-60 SeaFox

JABS

NSAM

MEDAL EA

NAVITTAR

Quickstrike (JDAM)

Quickstrike Mod 3

SLMM

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Legacy Systems Highlights

- **AQS-24B High Speed Synthetic Aperture Sonar**
 - Laser upgrade and test to complete this summer
Kit procurement planned for FY19
 - RIMPAC: HM 14 successfully completed 35 missions 62 tow hours, 29 June –02 August 2018
- **AQS-24C Volume Search Sonar**
 - System Verification Review (SVR) conducted 21 June 2018. Government accepted as-built.
 - First delivery expected 1QFY20
- **SSQ-94 Trainer (Mine Countermeasures Trainer)**
 - 2.0 Install completed in FY18
 - 2QFY18 first installs of 3.0 completed
 - 12 3.0 software installs planned in FY19
 - Version 3.1 under development
- **SQQ-32(V)4 Sonar**
 - Completed multiple installations of the AN/SQQ-32 (V)4 Through-The-Sensor (TTS) software and 10 gigabit switch upgrades (Mar 2018)





Legacy Systems Highlights



- **SLQ-37/38 Minesweep Systems**

- Overhauled all Advanced Acoustic Generators (AAGs) and Infrasonic Advanced Acoustic Generators (IAAGs) (Apr 2018)
- FMS Interest



AN/SLQ-37/38

- **SLQ-48 Mine Neutralization Vehicle**

- Exceeded threshold A_o through-out FY17. On time delivery of 2 MNS overhauled vehicles.



AN/SLQ-48 (MNV)

- **SLQ-60 SeaFox Mine Neutralization System**

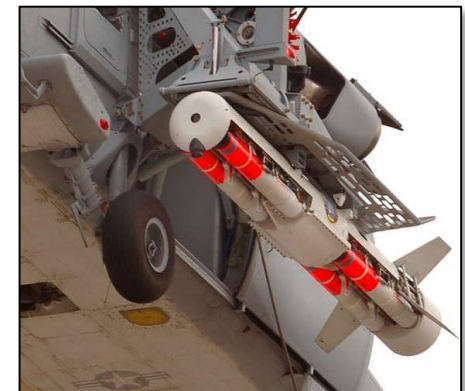
- Delivered MK62 MOD2 Combat Rounds. (Mar 2018)
- Ordered additional MK62 Combat Rounds in FY19 to meet inventory objective



**AN/SLQ-60 SeaFox
Neutralizer**

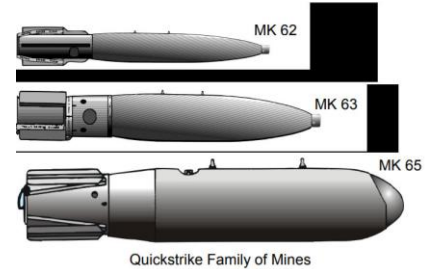
MCM Recently IOC'd Systems

- **Coastal Battlefield Reconnaissance and Analysis (COBRA) (AN-DVS-1) Block I**
 - IOC, July 2017
 - Completed Initial Operational Test and Evaluation in 2018. Commander, Operational Test and Evaluation Force reported COBRA Block I was operationally effective, operationally suitable, and cyber survivable operating within its intended system of systems.
- **Airborne Laser Mine Detection System (ALMDS) (AN/AES-1)**
 - IOC, Oct 2016
 - RIMPAC: HSC 21 successfully participated in SOCAL exercise, July 2018
- **Airborne Mine Neutralization System – Archerfish (AMNS) (AN/ASQ-235)**
 - IOC, Nov 2016
 - RIMPAC: HSC 21 conducted 13 destructor launches over 7 flights July 2018

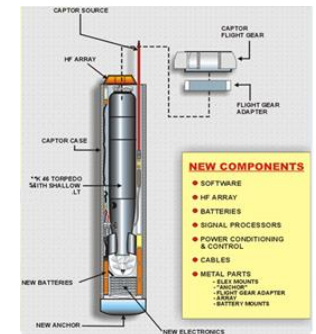


Mines Portfolio

- **QUICKSTRIKE MK 62/MK63/MK65**
 - Target Detection Device and Adapters contract competitively awarded to SECHAN 4QFY18
- **QUICKSTRIKE Joint Direct Attack Munition (JDAM)/QUICKSTRIKE Extended Range (ER)**
 - Conducted QS-J Water Impact Testing on 25 Apr 2018
 - Operation Demo Valiant Shield 18
 - Conducted QS-ER software and wing kit functionality test on 10 Apr 2018
 - Aerial Delivery Improvement: increased standoff, precision, safety
- **Clandestine Delivered Mine (CDM)- Phase I**
 - In prototype testing
 - End-to-end testing 2QFY19
 - Phase I delivery FY20
- **HAMMERHEAD**
 - New Program-started in 2018
 - Prepositioned, encapsulated torpedo
 - CAPTOR replacement
 - Modular architecture approach to allow for future technology insertions
 - Classified RFI release expected FY19



Clandestine Delivered Mine (CDM)



HAMMERHEAD (Encapsulated Effector)



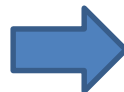
Mine Countermeasures Strategic Vision



Enabling Technologies

- **Automated Target Recognition**

- Multi-Modal
- Multi-Sensor Fusion



Enabling Capabilities

- **Artificial Intelligence/Machine Learning**
(Planning, Detection, Classification & Decision Aids)

- **System Autonomy**

- Mission Evaluation & Re-planning

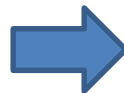


- **Remote Vehicles/Devices**
(Autonomous/Semi-Autonomous)

- **Over-the-Horizon Capability**

- MCM Data Link
- MCM C2 Link

- **Standardized Common Interfaces**



- **Vessels and Aircraft of Opportunity**

Opportunities for Industry to invest in developing needed critical enabling technologies to Mine Warfare



QUESTIONS?

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Unmanned Maritime Systems - PMS 406

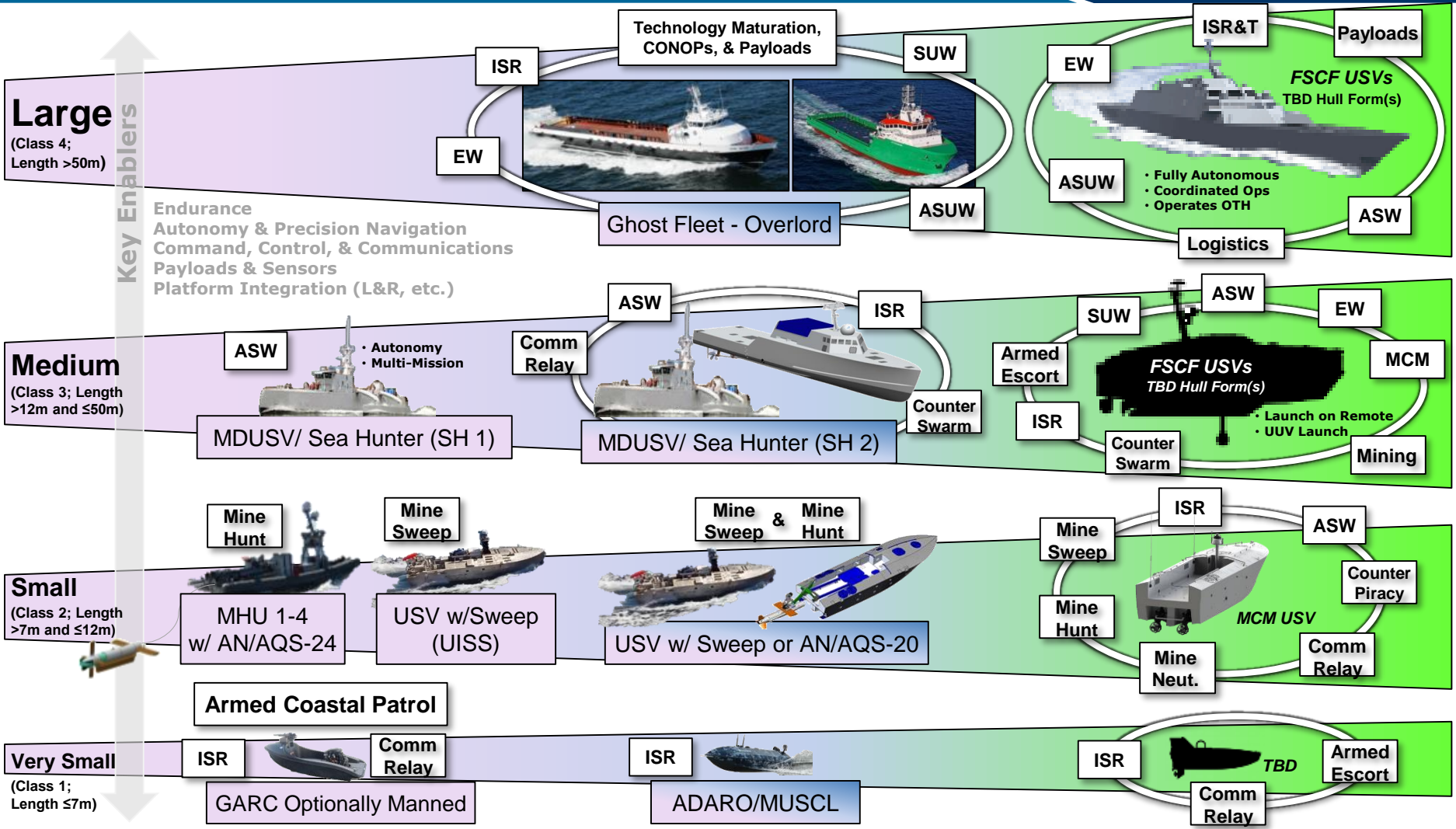
CAPT Pete Small
Major Program Manager



USV Systems Vision

Enhanced, Efficient Capabilities

	Current
	Near/Mid
	Mid/Far



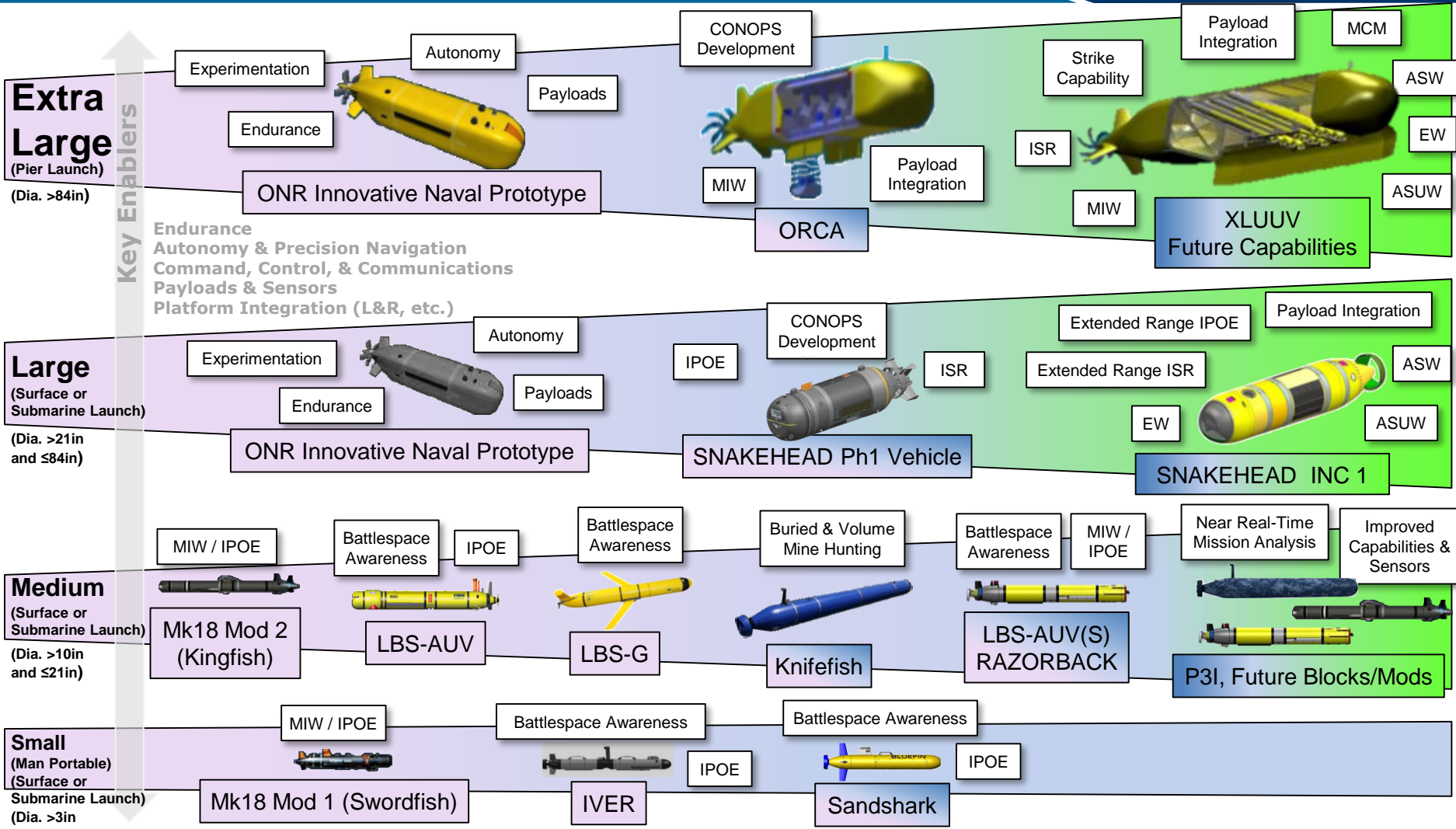
Efficient, Executable Progression of Capabilities onto Common USV Hull Forms



UUV Systems Vision

Enhanced, Efficient Capabilities

Current
Near/Mid
Mid/Far



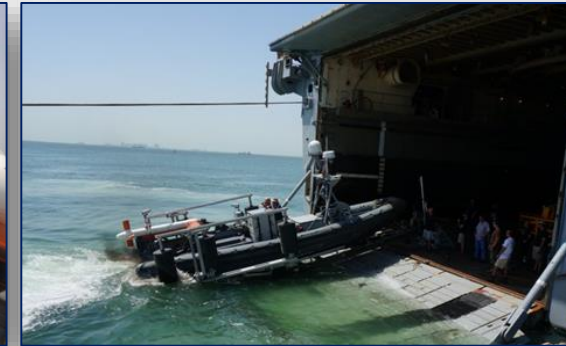
Efficient, Executable Progression of Capabilities through Various UUV Systems



Recent Accomplishments

- **Minehunting USVs (MHUs) continue to support Fifth Fleet training and operations**
 - AN/AQS-24B upgrade integrated with MHU
- **Unmanned Influence Sweep System (UISS) continues Development Testing**
 - Completed over 800 hours of in-water testing to date
 - DT/OA planned through Nov 2018; Milestone C in FY19
- **MCM USV + Minehunting continues development**
 - 1st craft delivered July 2018; 2nd craft delivers Oct 2018
 - Payload Integration & Testing in FY19
- **AQS-20C production units delivering**
 - Delivery of 10 units planned through 1QFY19
 - Navy DT through 1QFY19

MHU Operations



Unmanned Influence Sweep System (UISS)



AQS-20C Testing and Delivery





Recent Accomplishments



Knifefish Testing



➤ **Knifefish UUV will provide LCS and Vessels of Opportunity volume, bottom, and buried minehunting capability**

- Contractor Trials and Sea Acceptance Testing completed
- DT-1 complete in Boston and South Florida
- DT-2/OA planned for Nov 2018 – Feb 2019
- Milestone C planned in 2QFY19



UxV Technology Enablers

➤ Endurance

- Improved reliability and safety
- Increased endurance and range
- Support additional and more capable sensors

➤ Autonomy & Precision Navigation

- Increased levels of autonomy and decision making
- Increased accuracy and reliability

➤ Command, Control, and Communications (C3)

- Safely, autonomously and reliably launch and recover
- Improved Command, Control, and Communications

➤ Payloads and Sensors (ISR, Comms, etc.)

- Increased capacity for sensors, payloads and systems
- Increased capability, both individual and with other platforms

➤ Platform Integration (L&R, etc.)

- Increased capability to L&R
- Increased coordination with host platforms

Battery Shock Testing



Command and Control



Knifefish Integration Testing w/LCS





Future of Mine Warfare

16 October 2018

Dr. Sam Taylor
PEO Unmanned & Small Combatants



Transition

- **Legacy**

- Operator intensive
- Well-understood capabilities/CONOPS
- High sustainment costs
- Platform dependence

- **Future Force**

- Robust, autonomous, offboard unmanned systems
- Artificial Intelligence
- New CONOPS
- Platform agnostic

- **Modular Mission Force**

- Heavy use of offboard, unmanned systems
- CONOPS still developing
- Replacing capabilities, not systems
- Platform agnostic



MIW Singularity





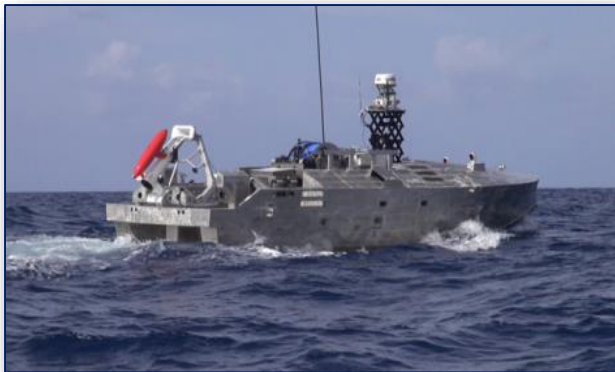
MIW is a Team Sport

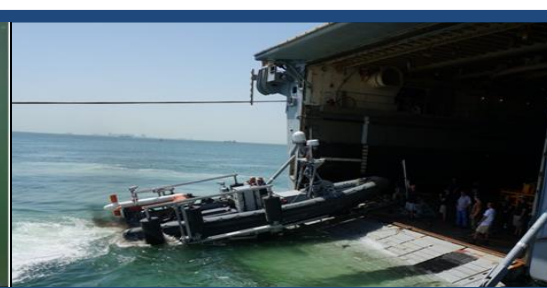
- **Collaboration across the Navy and with International partners**
- **Partnership with industry to develop, deliver, field, and sustain enduring MIW systems**
- **Reliance on industry, academia, and S&T community for innovative technologies, ideas and tactics**
- **Key MIW enablers:**
 - Interoperability
 - Real time data links
 - Automatic Target Recognition
 - Reliability of Unmanned Systems
 - Cybersecurity and Information Assurance



Summary

- We need to think differently about mine warfare
- Unmanned systems unleash great potential
- **MIW Singularity**
 - AI – Machine-to-Machine learning
 - Data analytics
- **Team Sport – we're in it to win**





Accelerate



Innovate



Deliver