TRANSFORMING ARMOUR FOR MULTI-DOMAIN WARFARE

Twickenham Stadium, London, United Kingdom
25-29 January 2021
KEYNOTE SPEAKER:

**General Tim Radford CB DSO OBE**, Deputy Supreme Allied Commander Europe, **NATO SHAPE**

Tim Radford commissioned into the Light Infantry in 1985. He has commanded extensively on operations in Northern Ireland, Sierra Leone, Iraq and Afghanistan.

As a Lieutenant Colonel, he developed the Army’s leadership doctrine at Royal Military Academy, Sandhurst, before forming and commanding the Special Reconnaissance Regiment. Promoted to Colonel in 2006, he became Assistant Director Special Forces in the MOD before assuming command of 19 Light Brigade in 2008, during which time he served in Afghanistan as Commander Task Force Helmand. He returned to the MOD in 2009 as Head of Overseas Operations, before promoting to Major General and returning to Afghanistan as the Chief of Staff of NATO’s ISAF Joint Command. In 2013 he assumed command of Force Troops Command (now 6 (UK) Div), as their first GOC, before serving briefly as Chief of Staff Land Forces. He then returned to Afghanistan as the Deputy Commander of NATO’s Op RESOLUTE SUPPORT after which he commanded the Allied Rapid Reaction Corps from July 2016 – July 2019. He assumed the role of DSACEUR in April 2020.

He is Regimental Colonel of the Special Reconnaissance Regiment, Chairman Army Cresta and President of Army Tennis.

OTHER EARLY-CONFIRMED SPEAKERS/PANEL MEMBERS INCLUDE:

- **Lieutenant General Shoichi Shibata**, Director General of Ground Systems at Acquisition, Technology and Logistics Agency (ATLA), **Japanese Ministry of Defence** (Or Officer Representing)
- **Lieutenant General Md Mahfuzur Rahman**, Principal Staff Officer, **Bangladesh Armed Forces**
- **Major General Pierre Gérard**, Land Component Commander, **Belgian Armed Forces**
- **Major General Attila Takács**, Commander, **Hungarian Land Forces**
- **Major General Jeremy Bennett**, Director Capability, **British Army**
- **Major General Erik Peterson**, Director, Force Development, Office of the Deputy Chief of Staff, G-8, **US Army**
- **Brigadier General Richard Coffman**, Director, Next Generation Combat Vehicle Cross-Functional Team, **US Army Futures Command**
- **Colonel Tom Laurent**, Project Officer, CaMo/Scorpion, **Belgian Land Component**
- **Colonel Antonio Llorens Perez**, Logistics Command (MALE)/Acquisitions Directorate (DIAD), **Spanish Armed Forces**
- **Colonel Syd Hills**, Director, **Stryker Warfighters’ Forum**
- **Colonel Valentin Skroza**, Chief, G-3 Armored Mechanized Brigade, **Croatian Army**
- **Colonel Klaus Nebe**, Deputy Chief of Staff Support, **NATO Joint Support and Enabling Command**
General Sir Adrian Bradshaw, KCB, OBE
Deputy Supreme Allied Commander Europe, NATO SHAPE (2014-2017)

General Sir Adrian Bradshaw joined the 14th/20th King’s Hussars in 1980. As a junior officer he served in Germany, N. Ireland, Africa, the Middle East, South East Asia and the Falkland Islands. 1994-1996, he commanded the King’s Royal Hussars (KRH), first providing the enemy force at the UK Armoured Training Area in Alberta, Canada, and then as Battlegroup Commander on operations in Bosnia.

After command, he went on to the UK Higher Command and Staff Course, and served in Military Operations in the MOD. On promotion to brigadier, he went to 3rd (US) Army in Kuwait, planning for Land operations in Iraq. He then became Deputy Commander of US Task Force West in the Iraq region before Commanding the UK 7th Armoured Brigade in Iraq.

In Mar 09, he took command of 1st (UK) Armoured Division based in Germany, training brigades for operations in Afghanistan. He has since attended the US Army Strategic Leadership Programme (Advanced) and the US Joint Pinnacle Course. He became Deputy Commander of ISAF in Afghanistan in late 2011 and Commander UK Land Forces in Jan 2013. General Bradshaw served in the capacity of DSACEUR from Mar 2014 to Mar 2017.

2021 AGENDA AT A GLANCE

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2021 CONCEPT: TRANSFORMING ARMOUR FOR MULTI-DOMAIN WARFARE

The prospect of multi-domain warfare against a peer adversary is driving transformation right across the land force. Operational concepts, training, doctrine and capability are adapting to enable forces to deploy – even at scale – in the distributed formations demanded by urban operations and proliferating A2/AD technologies. Like the rest of the land force, armoured platforms must be equipped to achieve and to sustain force manoeuvre under such circumstances. They must be able to deploy decisive firepower at low densities whilst retaining the ability to concentrate and to generate mass where necessary. Just as important, vehicles must be able to integrate multiple domains, whether that be to call in fires or to link up with UAVs to enhance their situational awareness. In other words, lethality and survivability must, more than ever, not come at the expense of mobility, agility or – in an era of multi-domain operations - connectivity.

International Armoured Vehicles remains the world’s premier meeting ground for the community. The largest dedicated conference of its type, it annually brings together more than 700 defence and industry leaders, with a military cohort comprising force and operational commanders, acquisition officials, requirement-setters, capability development experts and S&T architects. For the first time in 2021, the conference will expand to span five days. That expansion recognises, above all, the increasingly multi-domain and networked nature of the battlespace – current and future. The conference will open with a Focus Day on Amphibious Vehicle capability, acknowledging efforts ongoing in the UK, US and elsewhere around the world to rethink the role of armour in supporting marine and joint operations – particularly in the littoral. The development of these highly agile marine forces has much to teach us about mobility in the future joint space.

The middle day of the conference, meanwhile, will add C4i to the established streams of Firepower, Survivability and Mobility, expanding them to deliver an entire day of content. As NATO’s most capable land forces prepare to integrate next-generation armoured platforms, it is vital not only that those platforms are lethal, agile and well protected, but that they can plug into advanced networks and multiple domains to deliver situational awareness and decision-making authority right down to the tactical edge.

Alongside these new subject areas, the conference retains its focus on those major vehicle programmes that will deliver armour out to and beyond 2050. Robotics and autonomy will be an important part of the future capability mix, and so the conference will once again conclude with an Unmanned Ground Vehicles component. It will build on last year’s success to look not only at autonomy in a warfighting context, but at the role of unmanned platforms in a variety of combat support roles – from logistics, to casualty evacuation to reconnaissance.
**SPOTLIGHT TOPICS FOR 2021**

- C4i – Improving armoured vehicle situational awareness; transitioning command and control from the mounted to the dismounted soldier
- The digital vehicle – supporting digital integration; embedding future tactical networks; reducing cyber vulnerabilities; enabling open architecture
- Amphibious vehicle capability – supporting naval and marine operations from the littoral to the shore
- Major programme updates and global armoured vehicle acquisition priorities
- Future force structure – rethinking operational concepts, doctrine and TTPs to support distributed operations at tempo and scale; vehicles within the future land and joint force; armoured vehicles in support versus warfighting roles
- Future force development – system of systems versus single platform concepts; supporting the defence industrial base; enabling non-traditional defence partnerships; transforming requirements design
- Next-generation force protection and active protection systems
- Delivering mass and precision lethality for fighting vehicles at range in a contested and congested operating environment
- Unmanned ground vehicles – robotic and autonomous systems development; autonomous resupply; digital twinning
- Next-generation power solutions – electric drive and hybrid-electric drive
FOCUS DAY: AMPHIBIOUS VEHICLE CAPABILITY – 25 JANUARY 2021

FOCUS DAY TOPIC OVERVIEW
In his Commandant’s Planning Guidance, the 38th Commandant of the US Marine Corps identified “Force Design” as his number one priority. That designation speaks to the challenges for marine forces everywhere as they seek to field highly agile forces that can mitigate the effects of the A2/AD environment – particularly long-range precision fires - by deploying smaller combat teams in distributed formations. His focus on a changing demand for marine forces mirrors the efforts of the UK Royal Marines to field their own Future Commando Force in the early 2020s.

Clearly, delivering an adaptable and agile marine force will have substantial implications for the armoured vehicle platforms currently fielded by marines in amphibious assault roles. If they are to remain relevant, marine vehicles must not only demonstrate exceptional mobility, but the means to deploy self-sustainably, and to integrate with a broader force that includes next-generation tactical networks and unmanned systems.

The opening Focus Day of IAVs 2021 will provide an opportunity to look specifically at the requirements for armour on future marine operations. Core themes will include naval-marine force integration, survivability for highly-mobile armoured platforms and delivering an effective communications architecture for vehicles deploying at tempo from the sea to the shore. Conversations on this day will provide a solid foundation from which to discuss agility and manoeuvre for armour throughout the following days.

MORNING SESSION

THE FUTURE MARINE FORCE AND THE ROLE OF ARMOUR

Key Themes
- Fielding a lean and agile marine force for next-generation combat
- The US integrated naval force concept and its implication for marine fighting vehicles
- Operating smaller, agile forces within a distributed force structure
- Achieving high mobility without vulnerability. Lethality for ACVs

SENIOR LEADERS PANEL: INTEGRATING ARMOUR WITHIN A HIGHLY AGILE MARINE FORCE
- What does the changing character of the threat in the littoral mean for marine-naval integration, and in what roles will marines and their fighting vehicles deploy in the future?
- What does an emphasis on distributed operations mean for the structure of the future marine force, and how might changes to that structure impact the role of armour?
- Is there only a place for light and highly agile armour within the marine force of the future? Can amphibious vehicles extend beyond supporting force manoeuvre and reconnaissance to deliver effective firepower?

AFTERNOON SESSION

MULTI-DOMAIN CAPABILITIES FOR MULTI-DOMAIN OPERATIONS

Amphibious Vehicle Programme Updates to be Invited From:
UK Royal Marines
US Marine Corps
Swedish Marine Corps
Brazilian Marine Corps

Key Themes:
- Maneouvring from ship to shore in the highly contested operating environment – challenges for light armour
- Defending points of entry with light armour
- Air-vehicle integration and the role of UAS
- Sustaining C2 for the mounted soldier moving from ship to shore

A BLUEPRINT FOR THE FUTURE AMPHIBIOUS VEHICLE
- How do we conceptualise the amphibious assault role and what are the implications for armour?
- What should the survivability baseline be for the marine vehicle as the force executes the “first-in” role? How light can marine armour afford to be?
- Does a requirement for mobility rank above all other considerations for the amphibious vehicle?
- How do we strike a balance between high-end platforms and mass in the context of distributed marine operations? What is the threshold for risk?

CLOSE OF AMPHIBIOUS VEHICLE FOCUS DAY
MORNING SESSION

ARMOUR & THE PEER FIGHT

Key Themes:
- The future of combined arms warfare and the changing role of the vehicle
- The evolving battlespace and principal threats to armour
- Rethinking operational concepts and doctrine for a peer warfighting scenario
- Attaining and sustaining force manoeuvre in a contested battlespace
- Integrating armoured capability within a distributed force structure. Firepower at low densities, concentrating to generate mass where necessary

Session Contributors Include:
- Major General Pierre Gérard, Land Component Commander, Belgian Armed Forces
- Major General Attila Takács, Commander, Hungarian Land Forces

SENIOR LEADERS PANEL DISCUSSION: EQUIPPING ARMOUR FOR THE MULTI-DOMAIN FIGHT

- What are the priorities for the land force as NATO seeks readiness for peer-level warfare?
- How must the role of armour change as we advance thinking on smaller combat teams and distributed force structures?
- How can armour meet the challenge of deploying significant firepower at low densities whilst retaining the ability to concentrate forces and generate mass? What does this reality mean for the way we design the vehicle and deploy the force?
- What are the most significant threats to the vehicle in an era of contested and multi-domain operations? How is the land force adjusting to the threat from UAS and long-range precision fires?
- How can the vehicle integrate effectively with a multi-domain task force? What barriers are there to closer integration?

Moderator: General Sir Adrian Bradshaw, KCB, OBE, Deputy Supreme Allied Commander Europe (2014-2017)

AFTERNOON SESSION

FIELDING THE NEXT-GENERATION OF FIGHTING VEHICLES

Key Programmes: Capability and Force Development

Key Themes:
- Key programme updates
- Designing and fielding the future armoured vehicle
- Critical capabilities/technologies for next-generation armour
- Aligning capability with threat – mitigating C-UAS and other non-conventional threats to next-generation armour
- Heavy and survivable versus light and mobile; the future capability balance

Session Contributors Include:
- Lieutenant General Shoichi Shibata, Director General of Ground Systems at Acquisition, Technology and Logistics Agency (ATLA), Japanese Ministry of Defence (Or Officer Representing)
- Major General Jeremy Bennett, Director Capability, British Army
- Major General Erik Peterson, Director, Force Development, Office of the Deputy Chief of Staff, G-8, US Army
- Brigadier General Richard Coffman, Director, Next Generation Combat Vehicle Cross-Functional Team, US Army Futures Command

INDUSTRY LEADERS PANEL

Intended Discussion Topics:
- Rethinking major vehicle acquisitions. Single platform or system of systems?
- Adapting to the "fail fast" mindset of rapid acquisition culture
- Partnering with the non-traditional defence company
- Coping with non-conventional threats to the platform; baking in cyber resilience, C-UAS capability
- Coping with cyber vulnerabilities across the vehicle supply chain

CLOSE OF CONFERENCE DAY ONE
### MID-MORNING SESSION

**UPGRADING FIREPOWER TO ENGAGE NEXT-GEN HEAVY ARMOUR**
- Engaging heavy armour at tempo and range
- Anti-armour upgrades for legacy fleets
- ATGW
- Developing deep-strike capability

**ACTIVE PROTECTION SYSTEMS**
- Update on the UK’s APS programme
- Soft active protection systems: disrupting, degrading and denying
- Hard-kill APS
- Integrating APS on platforms mid-life
- Overcoming compatibility issues with existing vehicle architectures
- APS as more than a survivability system – integrating with the vehicles’ C2ISR infrastructure

**GETTING TO THE FIGHT**
- Assuring mobility for land forces
- Delivering the force to theatre
- Overcoming engineering and logistics challenges

**ENHANCING MOUNTED SITUATIONAL AWARENESS**
- Vehicle situational awareness in the urban conflict environment
- Trading weight of armour for improved situational awareness
- Situational awareness from the mounted to the dismounted soldier
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<td>• Building a C4I infrastructure for UGVs</td>
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### LATE-AFTERNOON SESSION

#### CLOSING PANELS

**WHAT DOES NATO WANT FROM ITS LETHALITY SYSTEMS?**
- What outcomes are we expecting from our lethality systems as we prepare for the A2/AD theatre of operations?
- Can the vehicle community agree on shared standards for our munitions?
- How should the changing nature of the threat change the way we think about platform lethality, and how will combined arms force multiply the firepower of the platform in the future?

**VEHICLE PROTECTION WITHIN A WHOLE FORCE APPROACH TO SURVIVABILITY**
- How do the signatures of digital, C4I-heavy vehicles affect our approaches to enhancing survivability?
- Can we trade off armour and weight in favour of mobility and enhanced situational awareness?
- How can advanced and active protection be leveraged as more than a vehicle protection solution to enable overall C4I for the land unit?
- How might broader approaches to force protection impact survivability considerations for individual vehicles?

**EXPLOITING VEHICLE MOBILITY TO ENABLE MANOEUVRE FOR FUTURE LAND FORCES**
- What should the role of mobile light armour be within the contested battlespace of the future?
- Is the far-reaching electrification of ground combat systems achievable, and how would electrically-powered vehicles be sustained on operations?

**INTEGRATING THE DIGITAL VEHICLE FROM THE THEATRE-LEVEL TO THE TACTICAL LEVEL**
- What roles will next-generation vehicles play as information enablers for the land and joint force, and what demands would this place on their communications and systems architectures?
- Is the development of open architectures the only barrier to enhanced digital integration for the ground combat system?
- How will the vehicle integrate with the multi-domain task force?
## CONFERENCE DAY THREE – 28 JANUARY 2021

### MORNING SESSION

#### INTEGRATION AND DIGITISATION: ARMOUR WITHIN THE FUTURE JOINT FORCE

**CONFERENCE KEYNOTE FROM DSACEUR**  
General Tim Radford CB DSO OBE, Deputy Supreme Allied Commander Europe, NATO SHAPE

**Key Themes:**
- Integrating new armoured platforms within the joint component
- Leveraging joint effects to enhance lethality and survivability for armour
- The digital force and its implications for armoured capability
- Networking armour with ISR, unmanned systems and long-range fires
- Training the mounted soldier for multi-domain operations

### MID-MORNING SESSION

#### ENABLING ARMOUR

**THEME 1: “GETTING TO” THE FIGHT**
- Sustaining the force at readiness
- Overcoming mobility challenges for armour on operation
- Combat engineering and logistics – enabling small combat teams and distributed armour
- Minimising the logistics footprint and enabling rapid deployments

**THEME 2: IN-SERVICE SUPPORT FOR CURRENT AND NEXT-GENERATION ARMOUR**
- Bridging the capability gap – keeping existing platforms online
- Maximising availability
- Predictive approaches to maintenance and logistics
- Supporting the vehicle in a support versus a combat role

### AFTERNOON SESSION

#### THE FUTURE VEHICLE SUPPLY CHAIN AND THE DEFENCE INDUSTRIAL BASE

**Key Themes**
- Defence industrial strategy
- Rethinking the defence industrial base to support the development of unmanned ground vehicles
- Agile acquisition and DevOps
- Rethinking requirements design for the ground combat platform
- 'System of systems' as a useful concept for armoured acquisition
- Developing non-traditional defence partnerships

**ENABLING INNOVATION: BROADENING THE DEFENCE INDUSTRIAL BASE TO ACCELERATE THE APPLICATION OF AUTONOMY**
- What are the advanced technologies that will define the next-generation of armoured vehicles, and how does our view of the vehicles as a capability need to adapt as we seek to integrate them?
- Is it helpful to start with a concept for the future vehicle at all, or should we begin with the technologies? What might a future ground combat capability look like if we did that?
- What does our industrial base need to look like to enable the adoption of new technologies, and how do we build that industrial base?
- How will we ultimately through-life sustain those technologies once they are integrated onto next-generation platforms?

### CLOSE OF CONFERENCE DAY THREE
# UNMANNED GROUND VEHICLES CONFERENCE – 29 JANUARY 2021

## MORNING SESSION

### SETTING THE PARAMETERS FOR AUTONOMY

**KEYNOTE BRIEFINGS**

**THEME: SETTING EXPECTATIONS FOR THE ROLE OF AUTONOMY ON THE FUTURE BATTLEFIELD**

Session Contributors Include:

- **Ted Maciuba**, Deputy Director, Robotics Requirements, Maneuver Capabilities Development Integration Directorate, Futures and Concepts Center, US Army Futures Command
- **Lieutenant Colonel Armin Dirks**, Planning II - Land Systems Roadmap Group, Officer for Main Ground Combat System, German Federal Ministry of Defence

### ALTERING ATTITUDES AND CHANGING THE WAY WE FIGHT

- One year on from the first iteration of the UGV conference, are we further along when it comes to setting shared expectations for the role of autonomy and robotics?
- How does the panel assess Defence’s current attitude to autonomy within the land force? Are there more believes than there were 12 months ago?
- Do the traditional, platform-centric modes of thinking about fighting vehicle acquisition inhibit the integration of unmanned and autonomous systems? Can we refine a system of systems approach?
- In the short to medium term, what are the most immediate ways in which UGVs can act as force multipliers for manned fighting vehicles?

## AFTERNOON SESSION

### ENABLING AUTONOMY

**BRIEFINGS**

**THEME: ENABLING PERSISTENT AUTONOMOUS PLATFORMS – ASSURING COMMS, ADVANCING AI, INTEGRATING EFFECTIVE POWER SOLUTIONS AND REDUCING THE COGNITIVE BURDEN**

### ACHIEVING PERSISTENCE FOR AUTONOMOUS PLATFORMS

- Maximising range for autonomous platforms operating in contested and congested operating environments
- Integrating novel approaches to power to support greater persistence for highly-capable unmanned platforms
- Sustaining assured communications in a dense land warfare environment to enable the platform to operate further, more safely and for longer

**BRIEFINGS**

**THEME: OVERCOMING BARRIERS TO AUTONOMY**

## CLOSE OF UNMANNED GROUND VEHICLES FOCUS DAY