(KC) Accelerating the Kill Chain

Engagements against Anti-Access/Area Denial (A2/AD) targets requires rapid execution of the kill chain in the face of ever more complex and difficult combat environments: (1) mobile and extended range target engagements compress decision times; (2) advanced sensors provide high volumes of raw data that must be processed to extract target information; and (3) expectations of precision targeting at long ranges extend kill chain execution times.

"Accelerating the Kill Chain" will consider approaches to accelerating and improving all links of the kill chain for air-to-surface, air-to-air, surface-to-air, and surface-to-surface engagements. In addition, this topic will explore the innovative algorithmic, architectural, hardware, software, and system integration solutions; near-term operational lessons learned; the legal decisions and processes involved in target selection; and current and emerging fire control requirements for all services.

(AT) Advanced Technologies

Emerging concepts of technologies will be part of the warfighter's future arsenal and fire control capabilities. These are the "seed corn" for advanced fire control sensors and systems, giving tomorrow's military forces an overwhelming advantage in future conflicts within both the conventional and unconventional (asymmetric) military environments. To be successful, both offensive and defensive technologies must be pursued.

(CID) Combat ID

Development and deployment of a reliable and accurate Combat Identification (CID) capability for warfighters is critical to the success of fire control for future military operations. CID enables the warfighter to locate and identify critical targets with high precision, permits use of long-range weapons, aids in fratricide reduction, enhances battlefield situational awareness, reduces leakage and wastage, and reduces exposure of U.S. Forces to enemy fire.

This topic will explore the innovative algorithmic, architectural, hardware, software, and system integration solutions, as well as near-term operational lessons learned, the legal decisions and processes involved in CID, and current/emerging CID requirements for all services.

(CW) Cyber Warfare

Cyber warfare is the most prevalent form of ongoing attack the DoD and the national infrastructure face. Continuous probing and successful attacks are pervasive. It is a warfare domain in which military commanders must operate and fire control systems must be robust and resilient under cyber attack. The threat is increasingly easy to deploy and very complex to defend against.

(DE) Directed Energy

Directed Energy (DE) technology has reached the stage where services need to look seriously at the integration into the operational capability of our military. It has long been seen as a 'weapon of the future,' but the technology has advanced, and is advancing, so quickly that the operational realities need to be addressed. They will have the inherent ability for quick, highly accurate engagement of threats with little or no collateral damage for hardkill and non-lethal solutions. The very nature of the weapon that allows for the highly accurate engagement also presents a new challenge to traditional methods of fire control.

(EMW) Electromagnetic Maneuver Warfare

Electromagnetic Maneuver Warfare (EMW) is the Navy's warfighting approach to gain decisive military advantage in the electromagnetic spectrum (EMS) to enable freedom of action across all Navy mission areas. EMW, and its associated active and passive activities, directly support the overall fire control capabilities of operational forces. Success demands a holistic systems-of-systems focus looking not only at the systems themselves, but also the "interstitial" space which is the dimension between the systems. EMW will require coordination and integration across all domains from land, sea, subsurface, air, and space. Dominance of the EMS is a key enabler to all domain access. EMW will drive changes in operational CONOPS to better leverage and employ capabilities across all warfare areas.

(EW) Electronic Warfare

Electronic Warfare (EW) is becoming a weapon of choice given the current emphasis on affordability, re-use, and minimizing collateral damage – especially in urban environments. Whether it is enemy Electronic Attack (EA) against U.S. radars, Electro-Optical (EO) or Infrared (IR) systems; U.S. EO/IR Countermeasures; Electronic Protection (EP) of U.S. systems; U.S. EA systems targeting enemy radars and missiles (i.e., softkill weapons); or Electronic Surveillance (ES) to improve situational awareness - EW has an increasing role in fire control.

(EOLL) Exercises & Operational Lessons Learned

Lessons learned from operational employment, exercises, wargames, test, evaluation, and training activities of our fire control systems, platforms, and processes are crucial to enhancing our warfighter's capabilities. Recent tactical fire control events in overseas operations highlight the importance of constant refinement of our systems and processes. Warfighter discussions of lessons learned from these operational experiences provide invaluable insight for weapon control engineers, scientists, researchers, and product developers. Equally valuable and of key interest to this national fire control community, are significant exercises, experiments, and wargames that provide realistic venues to evaluate hardware, software, tactics,

techniques, procedures, and concepts of operation. Assessments and insights gained from these and other test venues are crucial to the future of fire control. We must be able and prepared to learn from "on-the-fly" and "in-the-field" adaptations, as well as focusing on new technologies and capabilities to facilitate rapid development, and change in conjunction with these current and emerging capabilities.

(FCPC) Fire Control Platform Capabilities

Fire control performance is generally dependent on a set of sub-systems integrated into an air, space, or surface platform. This topic focuses on contribution to the fire control solution from the platform perspective and emerging FC technology developments. We will discuss the environmental impacts on the fire control system performance. In addition to considering offensive fire control performance and improvements in Ballistic Missile Defense, this topic also addresses defensive capabilities that enable the fire control system to perform in contested environments.

(IAMD) Integrated Air & Missile Defense of the Homeland & Operational Forces

Integrated Air and Missile Defense (IAMD), supporting both Homeland Defense and Operational forces, continues to evolve from organic sensor-shooter systems to networked sensing, decision tools, and weapon elements that can support integrated fire control. These capabilities can expand the defended battlespace; accommodate multiple engagement conditions by improving defense capability against a full spectrum of threats to include cruise missiles, ballistic missiles, fixed-wing and rotary-wing aircraft, unmanned vehicles (UAV), rockets, artillery and mortars; and extend the radar horizon limitations.

(MS) M&S Live, Virtual, and Constructive Modeling and Simulation

Live, Virtual, and Constructive (LVC) Modeling & Simulation (M&S) in tactical scenarios plays an increasingly important role in the development, assessment, and organizational training of integrated fire control capabilities. As the number, diversity, and complexity of interconnected fire control systems grow, field testing the resulting "integrated" capability becomes increasingly expensive and logistically demanding, requiring the coordination of assets from across the services. These same considerations pose significant limitations on the accomplishment of training objectives once systems are successfully fielded.

(PISR) Persistent Intelligence, Surveillance & Reconnaissance

Persistent Intelligence, Surveillance, and Reconnaissance (PISR) is critical to the warfighter's ability to deliver precision effects. Abundant challenges exist for the effective collection, processing, exploitation, dissemination, and management of the extensive and diverse set of data sources which can provide warfighters with timely, concise, precise, and actionable

combat information. Abstracts are sought for current and proposed PISR systems and technologies that solve these challenges and improve the warfighter's ability to deliver precision effects.

(RTNT) Rapid Transition of New Technology to the Warfighter

DoD continues to transform into a lighter, highly flexible, and more effective fighting force. Changes on the battlefield accelerate the need for speed and efficiency in meeting warfighter needs. In a fiscally constrained environment, new capability development often requires being reliant on mature and adaptable technology with short acquisition schedules.

(SRM) Sensor Resource Management

As our fire control systems become more complicated depending on multi-sensor inputs (EO, IR, RF, offboard), there needs to be a capability to integrate and manage on-board and dispersed sensors to efficiently reach a fire control solution. This topic includes sensor resource management (SRM) at the data, feature, and decision levels. Additionally, abstracts will be accepted that address technologies that incorporate SRM as a top tier system-of-systems function with real-time (or near real-time) interfaces to battle management and planning, command, and control.

(FUS)Sensor & Data Fusion (NEW)

Providing the Warfighter with long-range, reliable, and robust information about the battle space is a prerequisite for effectively and efficiently developing a fire control solution and responding to threats. While single-sensor systems can provide such capability under restricted scenarios and conditions, fused and networked systems-of-systems approaches have the potential to greatly enhance robustness and reliability of providing information to the Warfighter. Sensor and data fusion is the process of automatically extracting data from multiple sensors, and then aggregating, filtering, and further mining that data to provide relevant composite information both to the warfighter and future autonomous systems. This session provides a cross-section of topics in this area including descriptions of fusion algorithm and architecture approaches and analyses of the application of fusion technologies to fire control.

(UAS) Unmanned & Autonomous Systems (Sensors, Weapons & Platforms)

Unmanned systems continue to expand their presence on the battlefield from strategic High Altitude Long Endurance (HALE) systems conducting strategic surveillance, down to small hand launched systems. Today many unmanned systems serve to carry Intelligence, Surveillance, and Reconnaissance (ISR) sensors or communications relay payloads, while a

number of platforms are being weaponized. Unmanned systems of all types will continue to be an integral part of modern-day combat fire control.

(WEA) Weapons, Munitions, & Engagement Alternatives

There are many options available for weapon engagement that are enabled by the future of netted systems and the increasing array of available weapons. The ability to engage targets globally is still a high priority that brings its own set of challenges.