Interoperability requires understanding of culture, business value, governance, and technology

Interoperability: finally an innovative approach

by Harald Kujat, General (ret), former Chairman of the NATO Military Committee, Berlin

Recently I had the opportunity to contribute to a paper on interoperability that went to the president of the United States. Of course many papers reach his desk, but I know that he read this paper and had an initial good reaction, saying: "We're not doing this already?"

No, Mr President, we are not doing this in the US, nor in NATO, nor in Europe. Something he considers so common sense as to be shocking in its absence is nevertheless accepted.

The paper outlined that the cost of systems integration will be 180 billion dollars a year. It highlighted several major US programmes that will require extensive improvements in the near future and it also portrayed uncalculated damage that has resulted and will result again because products and services do not work currently together.

This short document comes from the Network Centric Operations Industry Consortium (NCOIC), a small non-profit organisation formed of individuals who firmly believe that making information flow as easily as possible between systems is a global issue *(see page 46–47)*. This issue has industry and governments on both sides of it and is thereby producing noise rather than clarification. National budgets squandered, lives risked, and the required conversation is muted by both industry and the governments that serve the populace. Interoperability is the solution, integration is the perpetual fix and money and social benefits are the cost. Interoperability built into the systems that carry information. Interoperability built into the devices that soldiers, doctors and first responders carry to their jobs, interoperability from the first second to the last as each product is designed, built and used.

Initiative enhancing interoperability

It is this understanding that is the starting point for NCOIC and NATO Allied Command Transformation on an initiative to enhance the interoperability of NATO's Federated Mission Networking (FMN) capability. The latter is being developed to support command, control and decision making in future operations through improved information sharing.

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NCOIC will assess the evidence of interoperability within different solutions and whether they meet FMN needs. Having this evaluation in hand before products and services are purchased can help reduce cost, delays and risk in the development of the FMN environment.

By getting products and services that work together before acquisition, the investment needed for integration can be lowered or eliminated: fixing interoperability issues after system acquisition can add up to 40 percent in integration costs.

Interoperability – a broad approach

Interoperability requires a foundational understanding of culture, business value, governance and technology. This broad approach requires simplification of thought. It also requires the government to ask the product suppliers very basic questions: "Are you interoperable with my system?" Simplicity at a macro level does not trans-

General (ret.) Harald Kujat

Photo: private

was born in 1942 in Mielke. He joined the German Armed Forces on 1 July, 1959 and completed the 20th General Staff Course (Air Force), at the Command and Staff College, Hamburg. 1992–1995 Chief of Staff and Deputy German MilRep to the NATO Military Committee and Western European Union, Brussels. 1996–1998 Director, IFOR Coordination Centre (ICC), SHAPE, Belgium and later Assistant Director, International Military Staff (Plans & Policy) and Deputy Director, IMS, NATO Headquarters, Brussels. 1998–2000 Director of Policy and Advisory Staff to the German MOD, Berlin. 2000–2002, Chief of Defence (CHOD), Federal Armed Forces, Berlin. 2002–2005, Chairman of the NATO Military Committee, Brussels.

Closing ceremony for multinational exercise Iron Sword 2014 with nine NATO member countries, 13.11.2014, Lithuania

Photo: © US Army Europe, public domain, Flickr.com

late to interoperability at a micro level. However, the basic failure of government agencies is the inability to maintain a macro level simplicity. Without the macro effort first and foremost, broad government interoperability fails every time, integration costs increase, so does the time necessary for implementation and social impacts continue.

Most organisations and agencies view making a technical change as the quickest path to achieving an interoperable solution. Yet as is typically the case, a single technical solution completely fails or falls significantly short of the objective,

▶ terminology

The Federated Mission Networking (FMN) capability aims at supporting command and control and decision-making in future NATO operations through improved information-sharing.

FEDERATED FMN is a key contribution to the Connected Forces Initiative (CFI), helping NATO and Partner forces to better communicate, train and operate together.

MISSION FMN enables a rapid instantiation of mission networks by federating NATO organisations, NATO Nations and Mission Partner capabilities, thereby enhancing interoperability and information sharing.

NETWORKING Federated Mission Networking is a governed conceptual framework consisting of people, processes and technology to plan, prepare, establish, use and terminate mission networks in support of federated operations.

Source: www.nato.int

primarily because it has become obsolete by the time it is implemented.

The concept to win the future

A three-step concept creates the overall intertwined high level direction:

1. What are the communities of interest?
2. What attributes make the products in the community interoperable?
3. Do the products purchased have those attributes?

First responders, health providers, surveyors and even librarians are all communities of interest. Each has unique as well as not so unique aspects. The aspects become attributes. Communities have attributes and the products and services that the communities purchase also have attributes. The attributes may exist in one or more community. One community, one attribute – simple! Multiple communities, multiple attributes – complex!

This three-step thought process is simple in the macro sense, keeps government agencies aligned, and moves toward the simple goal of interoperable products and services.

Stop wasting common goods

The small group of NCOIC thinkers has defined the process so that interoperability is phased into a short term period, aligning products with legacy systems, as well as providing a future that is far more effective and cost effective. Governments, starting with our defense ministers, will need to step back and determine that for the common good and because of the waste of resources, it is no longer acceptable for the solution to remain at our doorstep.

Interoperability is the torch in the darkness

by Marshall Slater, CFO, Network Centric Operations Industry Consortium, Washington

Several general officers with experience in military crises realized that the new age of information dominance wasn't working for their forces. These generals, from both Europe and the US, were watching twentieth century forces struggle to enter the twenty-first century. One of these officers, LtGeneral Carl O'Berry, retired from the US Air Force and convinced his new civilian employer to help an industry consortium tackle some of the challenges facing the military. As is typical of a general, he considered the benefits for the greater good rather than the bottom line profit margin. Thus, the vision for a new consortium was set and the Network Centric Operations Industry Consortium (NCOIC) was created.

As luck would have it, during a trip to NATO headquarters in Brussels, LtGen O'Berry met with another visionary, chairman of the NATO Military Committee, the German General Harald Kujat. That initial fifteen-minute courtesy call extended into a two-hour meeting, sending staff into a frenzy to reschedule multiple high level meetings. The two generals had a similar vision that would move military and non-military organizations into the new century with a torch that would assemble armies. Not just armies of soldiers, but also communities of interest (COI) such as armies of military and non-military organizations, countries, and NGOs; and all with the ability to instantly band together to create the greatest multinational assistance effort since World Word II. I had the opportunity to work for them.
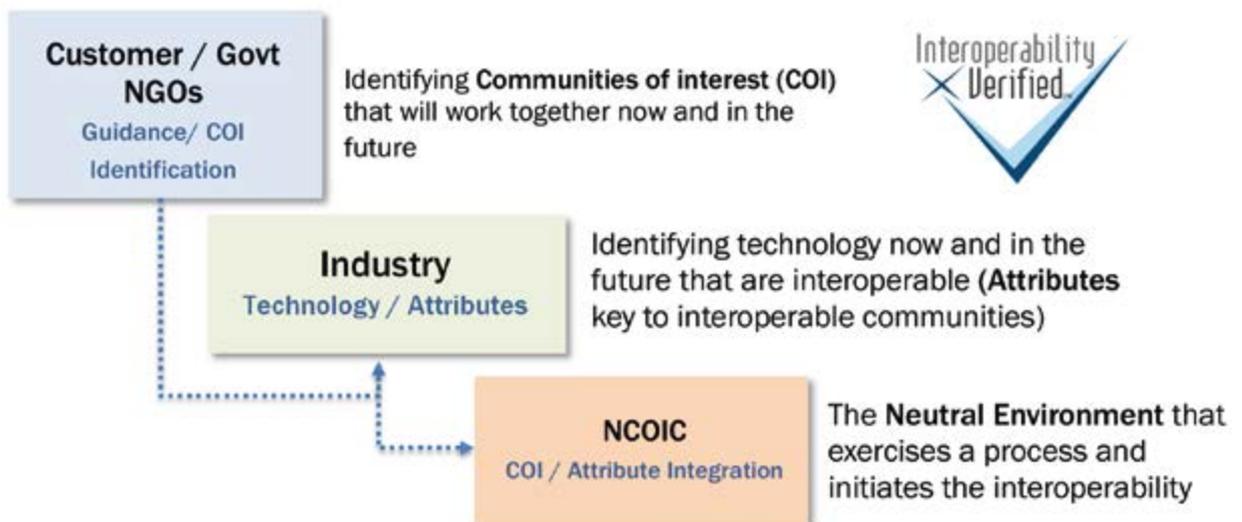
Marshall "Tip" Slater

Photo: private

is Chief Financial Officer of the Network Centric Operations Industry Consortium (NCOIC). He received a Master of Aeronautical Science degree from Embry-Riddle Aeronautical University in Florida and a Bachelor of Science degree in business administration from the University of Massachusetts Lowell. Mr Slater had a distinguished career in the US Air Force, retiring as a Colonel. Before joining NCOIC, he worked for a decade with the Boeing Company, where he was director of Virtual Operations. His other positions included deputy director of Strategic Architecture for Boeing Integrated Defense Systems and director of Business Development for Boeing Government Information and Communications Systems.

From vision to action

Have you ever worked for a visionary? It can be simultaneously a terrific and terrible job. Terrific because it's new and always exciting, terrible because it's new and always exciting. There's the constant push of new ideas that the visionary loves, as well as the tracking, cataloguing and costing of those ideas, which the visionary hates. The latter was and often still is my job. It's time for governments to know that interoperability across domains is possible, and above all achievable. This is the description of the ideas and the cataloguing that have taken place for fourteen years – fourteen years of study regarding the vision and tools of interoperabil-

Government Need – Industry Tools and NCOIC Processes

Customer / Govt NGOs
Guidance/ COI Identification

Identifying **Communities of interest (COI)** that will work together now and in the future

Interoperability Verified

Industry
Technology / Attributes

Identifying technology now and in the future that are interoperable (**Attributes** key to interoperable communities)

NCOIC
COI / Attribute Integration

The **Neutral Environment** that exercises a process and initiates the interoperability

Graphik: ESDU, Source: NCOIC

Meeting of NCOIC and NATO ACT leaders to discuss interopeability verification, December 2016, Arlington/Virginia   *Photo: © NCOIC*

ity that actually make it work crossing COIs. Interoperability crossing countries and market COIs, allowing vast groups of players to rapidly assemble, solve large complex problems and ultimately be disassembled when no longer needed is a real problem. Common examples are first responders, medical communities, military operations and banking. Each has its own COI and operates within these unique communities very neatly. Yet there are times when the communities need to overlap and produce unique results for a much greater need. There must be, for the rapid integration of capabilities, the ability to change while operating and to implement a swift disassembly. This need increases as the twenty-first century moves forward and the interrelationships of communities increase in both desire and complexity.

A revolution in interoperability

Fourteen years later, the NCOIC's new ideas have become the tools and cataloguing has become the process. The range of tools that were developed began with the simple yet necessary cataloging of an interoperability document of terms and definitions. Once it was determined that industry and government could talk to one another, concepts such as minimum level of interoperability were established. Subsequently, the uniquely odd relationship between technology, business value, culture and governance was identified and quantified. In order to actually build an interoperable system, a refocused technical model became the Management Model. The model was tested and used in a real world organizational development within NATO. The latest project that capped the NCOIC processes identifies a future where products and services are built to be interoperable using a simple but unique cross-domain Interoperability Verification (IV) initiative. After fourteen years of work by technical and demonstration teams and contracts with government organizations, the NCOIC sits upon the most comprehensive collection of inter-

operable tools and processes ever created. This cross-domain interoperability, now very doable, still requires a modicum of thought and effort to establish so that it enables the creation of a rapid assembly process. This can be done in the highly unique environment that formed these tools and processes. This unique tool that resides within the NCOIC's uniquely neutral and legal environment allows industry, academia and governments to come together and use these tools to solve large complex issues.

Making the complex simple

All the ideas mentioned fall into three boxes *(see diagram on the left)*:

- The organizations and government identify their needs and communities.
- The industry provides the tools, technology and the market vision.
- The NCOIC enables the processes, brings the communities together to assemble, change and disassemble.

Thus the processes developed by the NCOIC over fourteen years find common ground for each community, enabling capabilities to be used in governance documents that highlight rules of interoperable needs, capabilities for acquisition, and processes for organizations to rapidly integrate and subsequently dissolve.

All these years of dedication to solve the interoperability challenge have resulted, as each of the NCOIC advisors has pointed out, in making the complex simple. Reviewing all the work the NCOIC has accomplished in this area and reading all the verbiage feels exhausting, but simplicity truly is the key. Years ago came a vision, today the tools to make it work, and tomorrow the ability to make the world a better place.

···⟩ **Web NCOIC Website:** https://www.ncoic.org