Developing standards for interoperability of tactical communications systems

Christopher J. Echols

Abstract— The lack of interoperability in tactical communications systems has been a known fact in the North Atlantic Treaty Organization (NATO) since the end of the Cold War. This condition still exists today. The only alternative to obtain tactical communications systems with the interoperability necessitated by future operational requirements are through the establishment of NATO standards. This paper examines the tactical communications systems Post 2000 (TACOMS) project whose aim is to develop technical standards that will allow for achievement of interoperability between multinational tactical communications networks.

Keywords— TP2K, TACOMS Post 2000, NATO Tactical Communications Interoperability.

1. Introduction

Within NATO, interoperability is defined as: "The ability of Alliance Forces and when appropriate operate effectively together in the execution of assigned missions and tasks" [2]. As early as 1978, the Tri-Service Group on Area Communications (TSGCE) (SG/1) recognized the requirement for interoperable tactical communications systems. In 1985, the TSGCE formed Project Group 6 to establish standards for tactical communications in the land combat zone.

2. PG/6 Phase II Report

In 1986 NATO project Group Six, (PG/6) produced a report of their findings to the TSGCE. PG/6 divided its work into three phases. Phase I completed pre-feasibility studies and produced a report to the TSGCE documenting a recommended architectural framework. Phase II produced a second report documenting the refinement of the architectural framework upon which the draft STANAGs would be developed in Phase III [3]. The TACOMS Project Steering Group (PSG) was formed to conduct the work specified in Phase III. In April of 1998, the MOU was originally signed by 12 NATO Nations: Belgium (BE), Canada (CA),

France (FR), Germany (GE), Italy (IT), Netherlands (NL), Norway (NO), Turkey (TU), Portugal (PO), Spain (SP), the United Kingdom (UK), and the United States of America (USA). Poland joined the TACOMS Project in 2004.

The TACOMS nations agreed to establish an International Project Office (IPO), and fund the project with the objective of developing draft standardization agreements or draft STANAGs to be implemented by NATO nations and Coalition Forces in both peacekeeping and in war fighting environments [4].

3. The IPO and contract team

The International Project Office (IPO) is located outside of Paris, France, within facilities maintained by the Délégation Général pour l'Armement (DGA). The IPO has overall programme and systems engineering management responsibility under the contract. Under the guidance of the 13-member nation PSG, the IPO serves as the focal point for any technical guidance and/or direction necessary during the conduct of the contract. The TACOMS contract was
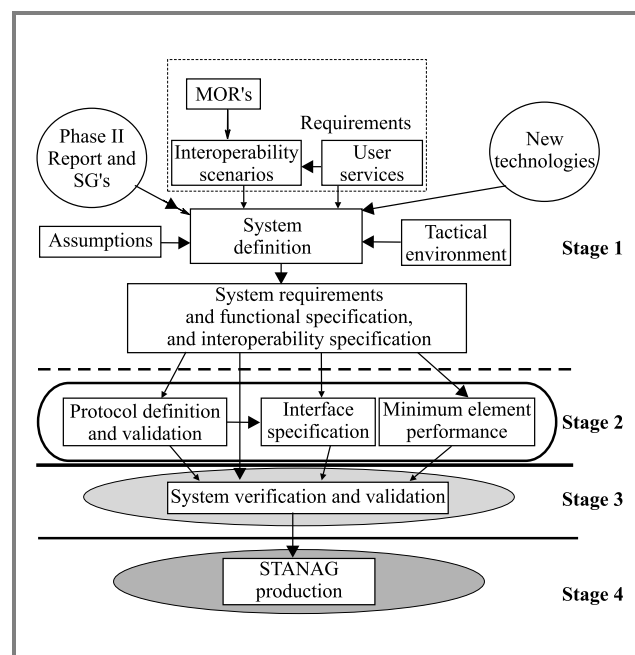

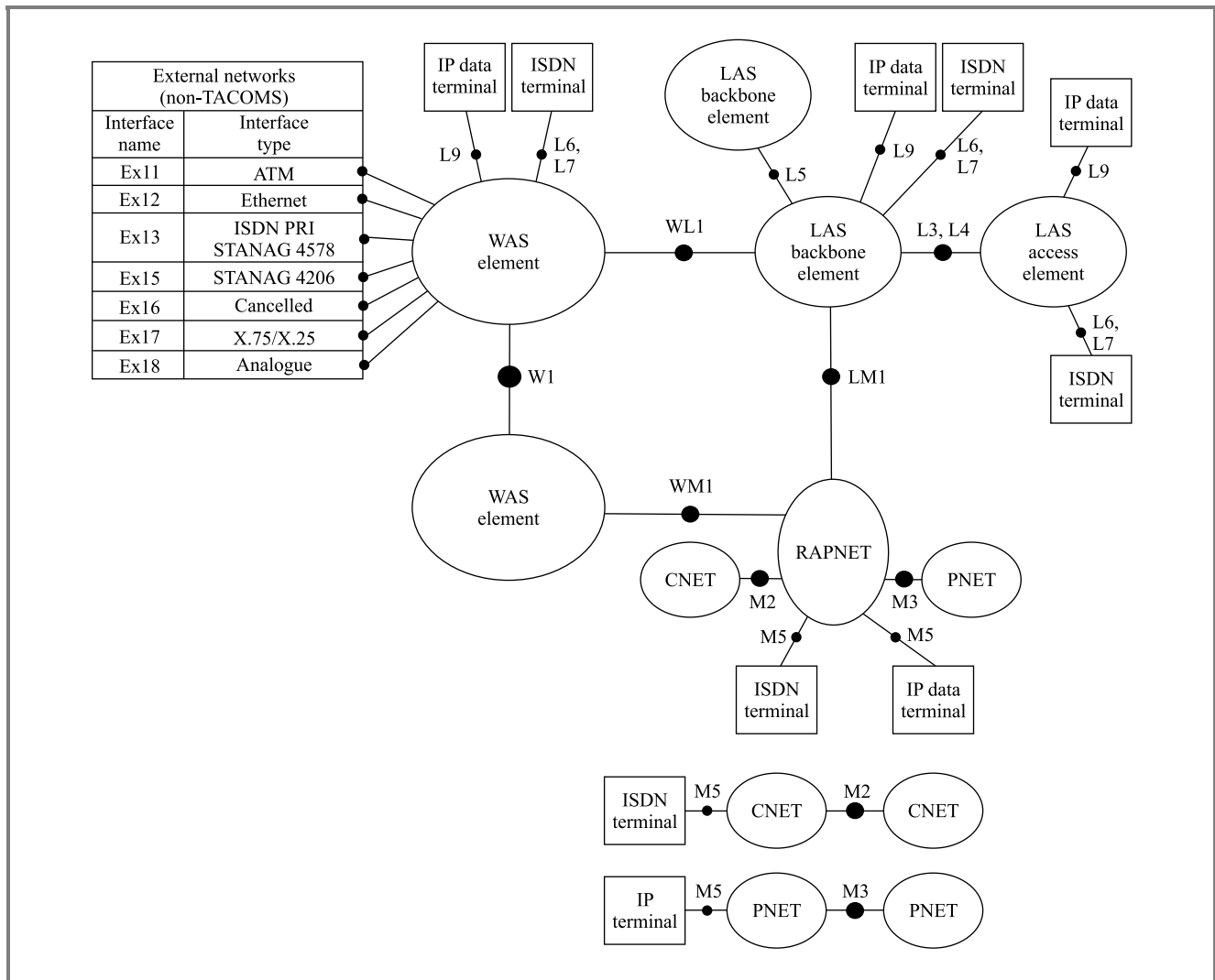*Fig. 1.* TACOMS Post 2000 STANAG methodology of development.

Fig. 2. TACOMS Post 2000 architecture.

awarded to the TAC ONE consortium in December of 2000. TAC ONE, is an international joint venture consortium with shareholders from five major defense telecommunications companies: International Telephone and Telegraph, British Aerospace Systems, Marconi-Selenia, EADS, and THALES-France. In addition, there are 13 sub contractors representing the national industry of the TACOMS MOU signatory nations. The initial contract period was for three years. However, it was extended until March 2005 after the reorientation of the TACOMS network was changed from technology specific, to be technology independent.

4. TACOMS STANAG development methodology

The TACOMS standards will be based to the maximum extent possible on existing civil standards in order to facilitate the use of civil technology, and on commercial

off the shelf (COTS) equipment in the design of defense communications systems. The methodology being used in the development of the standards specified in the Phase II report is being conducted in four stages as illustrated in Fig. 1.

5. TACOMS Post 2000 architecture

The TACOMS Post 2000 architecture is based on the following four subsystems: Local Area Subsystem (LAS), Wide Area Subsystem (WAS), Mobile Subsystem (MS), and System Management and Control Subsystem (SMCS). These subsystems are described in Fig. 2.

- **Local Area Subsystem (LAS)**. The LAS provides the means for local communications services in the local area (Head Quarters) and provides its users the connectivity to the Wide Area and Mobile Subsystem as well as to other local area subsystems.

- **Wide Area Subsystem (WAS)**. The WAS provides the backbone links for communications for the longer distances. The WAS allows for transit and interconnection of other subsystems and external systems. Interfaces with civilian and military strategic networks are also available in the WAS. The WAS shall also include a minimal access for users.

- **Mobile Subsystem (MS)**. The MS consisting of various radios (MRR's) and connectivity to the WAS and LAS that provide users the capability to communicate reliable while stationary or mobile in a physically and electronically hostile environment. The radios themselves and the Over the Air (OTA) interoperability are not part of the TACOMS project.

- **System Management and Control Subsystem (SMCS)**. Each of the subsystems have inherent network management and control requirements. A management and control subsystem will implement the network management protocol.

6. Implementing interoperability

In the 2002 Prague Capabilities Commitment it states that individual NATO nations have now made firm commitments to improve capabilities in more than 400 specific areas. Included among them are command control and communications, and combat effectiveness. "The many reforms, initiatives and programs agreed in Prague are the beginning of a transformation process essential to guaranteeing the security of the territory, populations and forces of NATO members against all threats and challenges" [5]. In 2005, the draft STANAGs will be presented to the PSG then forwarded to the NATO Communications Network Sub Committee (CNSC) to begin the promulgation process. Depending on the time allowed for promulgation and ratification of the STANAGs, TACOMS is not expected to be ratified until the year 2008. The TACOMS STANAGs will be sufficiently detailed to allow national industries of NATO nations to produce their own compliant systems. The STANAGs will however not define the switching technologies to be used. That decision is based on national preferences. The STANAGs will define user services, network elements and their minimum required performance, interoperability points (IOPs), the directory, naming and addressing structure, etc. With this capability, each nation should then evolve their existing and soon-to-be-fielded systems towards the common standards, thus progressively enhancing interoperability in the tactical communications systems of NATO nations and coalition forces.

7. Conclusion

Achieving true interoperability will require full support from all nations to support the sharing of security information among coalition nations, and the development of national systems. In addition to contributing the funding for prototyping and testing of the draft STANAGs to validate the TACOMS standards. It is desired to have the TACOMS Interopability standards included in the NATO Response Forces (NRF) requirements, just like the Multilateral Interoperability Program (MIP) standards have been. The inclusion into the NRF requirements will help to ensure implementation by all nations, and provide multi national coalition forces the capability necessary to interoperate and communicate real-time without the interoperability problems they are faced with today. The PG/6 Phase II report helped to established the TACOMS project which can be used as a model for developing not only land but also air and maritime interoperability standards.

References

[1] Defense News, Jan. 2003.
[2] NATO Project Group SC-6/PG/ 6 Phase II Report, Executive Summary, issue 2, Sept. 1994.
[3] T. D. Johnson, Canadian Army, TACOMS Project, Draft Executive Summary, 2000.
[4] TACOMS Post 2000, Memorandium of Understanding, Apr. 1998.
[5] NATO After Prague, NATO Office of Information and Press, 2003, online: http://www.nato.int

Christopher J. Echols born in the United States. He holds a M.Sc. degree in project management, and a B.Sc. degree in computer science. He is a graduate of the U.S. National Defense University Chief Information Officers (CIO) Certification Course and the Information Resource Management College Advanced Management Program. Since October 2002, he has served as the Project Manager, Tactical Communications (TACOMS) Post 2000 Project, Paris, France. The TACOMS project is a 22 million dollar multi-national project to develop interoperable tactical communication standardization agreements (STANAGs) for use by NATO and its coalition forces. As the PM he is responsible for the overall project management of the International Project Office (IPO), located on Fort d'Issy, Paris. e-mail: christopher.echols@tacoms.dga.defense.gouv.fr
TACOMS Post 2000, International Project Office
18 Rue du Docteur Zamenhoff
92131 Paris, France