

C4ISR Battle Group/Amphibious Ready Group (BG/ARG) Functional Design

SPAWAR

This case study describes the C4ISR Battle Group/Amphibious Ready Group (BG/ARG) Functional Design developed at the Space and Naval Warfare Systems Command. The purpose of the C4ISR BG/ARG Functional Design is to depict a notional BG/ARG functionality that can be used by Navy C4ISR resource sponsors, system planners and system implementers to help:

- assessing future battle group functionality
- planning efficient allocation of battle group system resources
- tracing the operational requirements and supporting system capabilities
- ensuring interoperability among and external to the battle group
- identifying interoperability issues and system shortfalls

Figure 1-1 illustrates an overview of the BG/ARG Functional Design concept. The concept demonstrates a logical linkage from operational activities to system functions supported by interoperability standards. The Functional Design starts by identifying all the operational

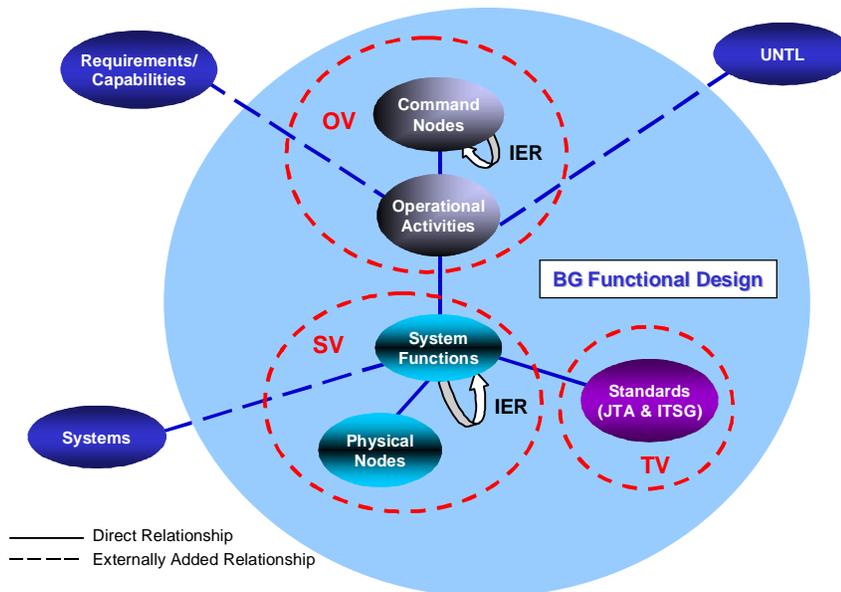


Figure 1-1 BG/ARG Functional Design overview.

activities with associated information exchange requirements (IERS) that apply to the BG/ARG warfare command node(s). The operational activities are then linked to the system functions for subsequent allocation to the physical nodes. System function IERS are also developed, attributed, and documented. System functions are analyzed to derive applicable service areas and appropriate interoperability standards are defined for each service area. Accordingly, the BG/ARG Functional Design with three Architecture Framework views is developed: the Operational View (OV), the Systems View (SV) and the Technical View (TV).

Rationale/Purpose

This case study demonstrates the usage of the DoD Technical Reference Model (TRM) as an aid in the development of the TV for the BG/ARG Functional Design. The DoD TRM was used as the reference for a list of all possible service areas that may be applicable to the BG/ARG Functional Design. The TV was developed by identification of DoD TRM service areas applicable to the BG/ARG system functions (from the SV). Standards were then selected for each service area based on review and analysis of the Joint Technical Architecture (JTA) and the DoN CIO Information Technology Standards Guidance (ITSG).

Description of Process Used

The process used for defining the BG/ARG Technical View (TV) is as follows:

1. Review the DoD TRM System Services for possible application to the BG/ARG Functional Design
2. Determine applicable TRM System Services that apply to the BG/ARG system functions
3. Select standards to pertinent System Services

Service Areas for the BG/ARG TV were derived from Service View in DoD TRM dated 5 NOV 99 and were amplified for application to the BG/ARG Functional Design. The BG/ARG service areas are mapped to the Systems Services in the DoD TRM as follows:

Table 1-1 DoD TRM System Services to BG/ARG Service Areas

BG/ARG ServiceAreas	DoD TRM System Services
Document Interchange, Graphics Interchange, Geospatial Interchange, Still imagery Interchange, Motion Imagery Interchange, Audio Interchange, Atmospheric Interchange, Oceanographic Interchange, Signal Intelligence Imagery Intelligence	Data Interchange Services (DoD TRM Section 4.4.2.1.4)
E-Mail VTC Network Services Transmission Media	Communication Services (DoD TRM Section 4.4.2.1.6)
Information Modeling	Engineering Support (DoD TRM Section 4.4.1.2.6)
Data Management	Data Management Services (DoD TRM Section 4.4.2.1.3)

Human Computer Interface	User Interface Services (DoD TRM Section 4.4.2.1.2)
Security	Security Services (DoD TRM Section 4.4.2.1.7)

Results/Findings

Using the detailed descriptions of the System Services in the 5 NOV 1999 TRM document, suitable service areas (listed above in Table 1-1) can be easily synthesized. These service areas provide a framework for interfaces and subsequent analysis of interoperability issues. There are a number of useful applications that can be derived from the BG/ARG function design by using the design elements (e.g. operational activities, system functions, standards, physical nodes) shown in Figure 1-1.

- Interoperability Issues - Identify any difference in standards or performance parameters that jeopardizes information exchange among command nodes. Ensure that standards are compliant with mandated and governing documents such as the JTA and ITSG/ITIA. The set of service areas derived from the DoD TRM provides a common framework for selection of interfaces and standards.
- System Tradeoff Threads - Identify links between system functions and systems; compare systems providing similar functions
- Functional Gaps and Overlaps - Analyze system functions to determine functional redundancies and/or deficiencies
- Personnel Loading - Analyze system functions to determine personnel requirements and further assess overlapping efforts

Expectations

The DoD TRM is useful in providing insight into the selection of service areas applicable to the BG/ARG functional design. The set of service areas derived from the DoD TRM provides a common framework for selection of interfaces and standards. Analysis of these standards and interfaces across a multitude of command nodes enables identification of interoperability issues that need to be resolved.

References

Relevant reference material used to develop the Technical View of the BG/ARG Design Document comprises the documents identified herein.

1. DoD Technical Reference Model (DoD-TRM), Version 1.0, 5 November 1999
2. SPAWAR C4ISR BG/ARG Functional Design, Version 0.2, 31 January 2000
3. C4ISR Architecture Framework, Version 2.0, dated 18 December 1997
4. Department of Defense Joint Technical Architecture, Version 3.0, dated 15 November 1999

5. DoN Information Technology Standards Guidance (ITSG), Version 99-1, dated 5 April 1999
6. Department of the Navy Information Technology Infrastructure Architecture, Version 1.0(Proposed), dated 16 March 1999
7. OPNAVINST 3500.38, Universal Naval Task List (UNTL), Version 2.0, Draft # 7, August 1999
8. Strike Warfare C4ISR Operational Architecture and Preliminary Improvement Analysis (STWOA) Report, June 1997