

Ranger Regiment Systems Architecture Version 1.0 Analysis

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Ranger Regiment Systems Architecture

1. Purpose

The primary purpose of the Ranger Regiment analysis is to provide relevant feedback to the Architecture Integration and Processing Center to support the verification of the Ranger Regiment Systems Architecture (RGR REGT SA). Given that quality assurance (QA) is essential to the architecture development process, the AIPC Analysis Branch conducted a review of the RGR REGT SA database version 1.0 and accompanying network diagram (SV-1 and SV-2). This report will detail the results of that evaluation, focusing on the following: requirements verification, network configuration, radio nets design, and platform connectivity.

2. Background

The AIPC developed the Ranger Regiment SA to support the Army digitization effort. Specifically, the RGR REGT SA must confirm Unit Set Fielding (USF) numbers, provide an illustrative C4ISR system laydown that supports network configuration, and identify the level of C4ISR modernization required for the Ranger Regiment. The AIPC developed the SA based on many sources, including: requirements identified by the Infantry proponent, Special Operations Command, and 75th Ranger Regiment; Land Warrior Operational Requirements Document (ORD); Tables of Organization and Equipment (TOEs); Tables of Distribution and Allowances (TDAs); Subject Matter Expert input; and other pertinent requirements documents. Operational Architecture (OA) products were not available.

3. Scope

Given the limited development time for the RGR REGT SA, communications analysts conducted a “desktop review” of the RGR REGT SA database and network diagram. Time did not permit a completely comprehensive review of the SA. TDA related issues are outside the scope of this analysis.

4. Results of Examination

4.1 Requirements Verification

A Systems Architecture should respond to requirements set forth in an Operational Architecture, ORDs, TOEs, and other requirements documentation. Analysts must evaluate whether the systems solution applied by the RGR REGT SA actually corresponds to documented requirement.

4.1.1 Information Exchange Requirement Support

This section verifies whether equipment in the architecture is supported by a documented traffic requirement, that is, an appropriate number of Information Exchange Requirements (IERs) stored in the Army Architecture Repository Management System (AARMS). The vast majority of equipment in the SA is supported by at least one IER. However, analysts were unable find documented requirements for some equipment.

The following Operational Network Nodes (ONNs) relate to Operational Facility (OPFAC) rules containing more equipment than IERs justify:

- ONN: 1ZZ00IF9J0, IN COMBAT MEDIC/CBT MED SEC
No IERs for OPFAC IF9J0
- ONN: 9ZZ01IJC0, LAND WARRIOR SOLDIER
No IERs for OPFAC IJC0
- ONN: 4ZZ00IJC0, ANTI-ARMOR TM MEMBER
No IERs for OPFAC IJC0
- ONN: 1ZZ00IJC0, SNIPER OBSERVER
No IERs for OPFAC IJC0
- ONN: 1ZZ00IJ300, RTO GATEWAY/RTO
No IERs for OPFAC IJ300

- ONN: 2ZZ00IJ300, RTO GATEWAY/RTO
No IERs for OPFAC IJ300
- ONN: 9ZZ01IJ300, RTO GATEWAY
No IERs for OPFAC IJ300
- ONN: 1QA00I5DZ0, RANGER RGT LOG SYS SPT
Only two Data IERs for OPFAC I5DZ0 support the requirement depicted in figure 4.1.

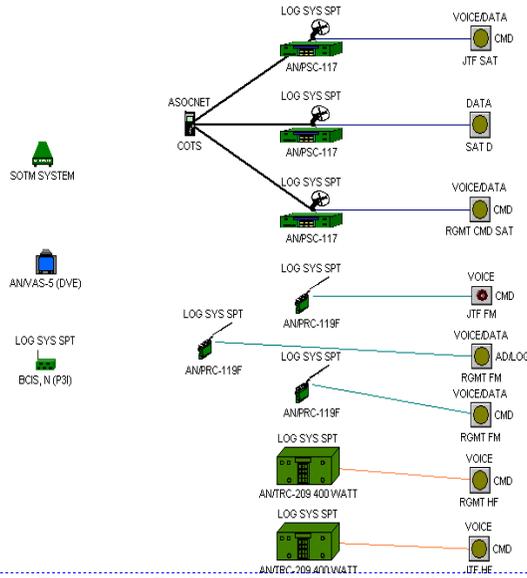


Figure 4.1 RANGER RGT LOG SYS SPT

- ONN: 2ZZ00I5DZ0, TREATMENT TM
Only two Data IERs for OPFAC I5DZ0 support the requirement depicted in figure 4.2.

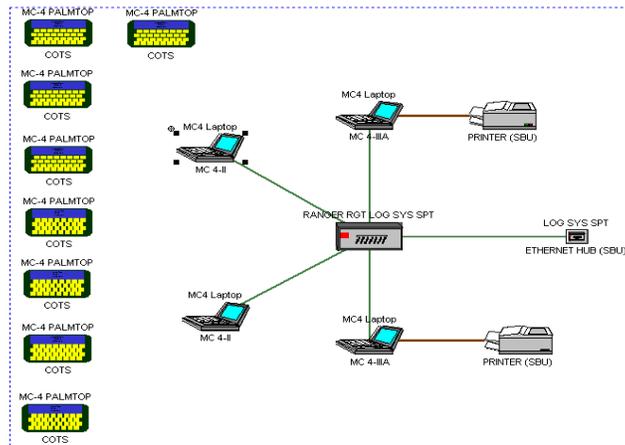


Figure 4.2 TREATMENT TM

- ONN: 1ZZ00I5181 RANGER RGMT FWD COMM BASE
Only two Voice IERs for OPFAC I5181. However, no Data IERs support the requirement depicted in figure 4.3.

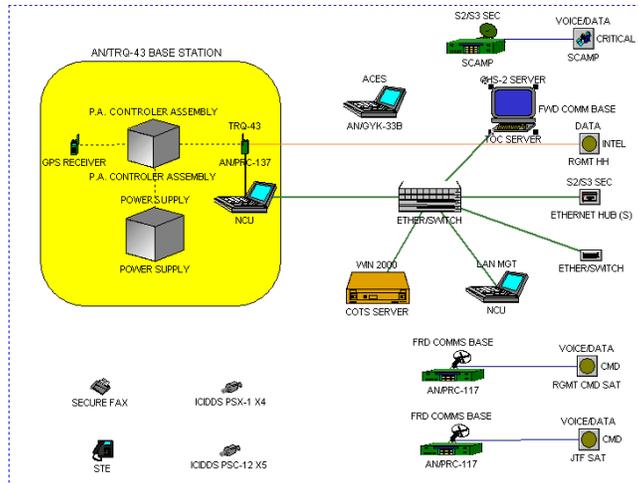


Figure 4.3 RANGER RGMT FWD COMM BASE

- ONN: 1ZZ00IGTR0, MEDICAL TREATMENT SQD
Only one Voice IER for OPFAC IGTR0. However, no Data IERs support the requirement depicted in figure 4.4.

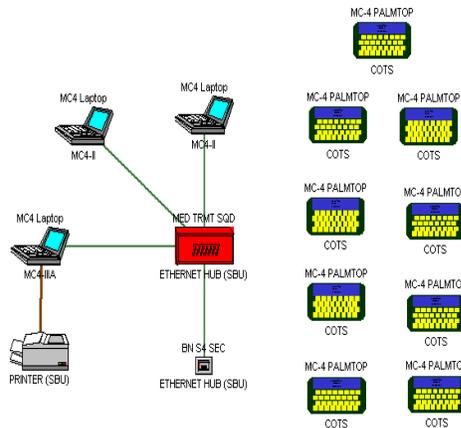


Figure 4.4 MEDICAL TREATMENT SQD

4.1.2 Equipment assignment

The following ONN is assigned to the INF SQD OPS net, but has no equipment listed in the database:

- 1ZZ01IJCVO, RGR CHEM SEC

4.1.3 Operational Facility (OPFAC) crosswalk

Analysts were unable to crosswalk the last five characters of the following ONNs to OPFACs in the AARMS database:

- 1ZZ00I1001, RGMT CDR SPT VEH
- 1ZZ01IH800, RGMT S3 OFF/ASSIST
- 1ZZ00I5000, INFLIGHT COMMS PACKAGE/CMD
- 2ZZ00I5000, INFLIGHT COMMS PACKAGE/STD
- 1ZZ00I5D20, PBO TM
- 1ZZ01IH500, RGR RGMT CDR/DEPUTY CDR

- 1ZZ00IBX01, CO SNIPER
- 8ZZ00IJ300, RTO GATEWAY/FDC
- 6ZZ01IJ300, AF WEATHER TM RTO
- 2ZZ00IJC00, RIFLE SQD MEMBER
- 3ZZ00IJC00, RANGER MG SQD MEMBER
- 8ZZ00IJC00, FDC COMPUTER OP
- 1ZZ01IJC00, RGR CHEM SEC

4.2 Network Configuration

To evaluate network configuration, this analysis reviewed the following:

- Suitability of assigned C4ISR equipment relative to the mission of the unit,
- Correctness of placement of C4ISR equipment, and
- Ability of local networks to support expected voice and data demands.

This analysis found network configuration to be suitable for this architecture. The C4ISR equipment assigned to these OPFACs will support the expected voice and data traffic loads as they are currently understood.

The review produced three recommendations:

The government should evaluate the AN/VRC-94 for use as the tactical radio in lieu of the PSC-117 for use in OPFACs with a vehicle platform. The AN/VRC-94 is a vehicle-mounted radio, which provides 50 Watts power. The power would provide increased range of tactical radio communication, which is crucial for this type of unit. The following ONNs are candidates for this recommendation:

- 1ZZ00I5209, RANGER RGMT C&C TEAM
- 1FR00I5NC0, RANGER RGMT NCS/TOC/ S2/3 SEC
- 1QA00I5DZ0, RANGER RGT LOG SYS SPT
- 1ZZ00I5180, RANGER RGT COMMO BASE
- 1ZZ00I8181, RANGER BN COMM SEC

To connect up to four tactical radios together to input/output devices, the government should consider using a Tactical Network Radio Access Hub in ONNs, such as those listed above, which contain multiple radios.

Architects should evaluate the use of a high frequency (HF) or other long-range radio to support Admin/Logistics (A/L) connectivity between the Ranger Battalion and Regimental A/L base. The operational deployment of this unit may necessitate an A/L HF network between the Battalion and Regimental elements.

4.3 Radio Nets Design

To evaluate the design of radio networks, this analysis reviewed the following:

- Suitability of network memberships relative to the mission of the communicator,
- Correctness of the number of radios per net, and
- Ability of radio networks to support expected voice and data demands.

Throughout the RGR REGT SA, the structure of radio nets appeared sound. Net memberships with respect to the mission of radio users are correct. There are no radio networks with more members than supported by the radio. The radio networks should support expected voice and data traffic loads.

4.4 Platform Connectivity

Platform connectivity was evaluated by reviewing the following topics:

- Interoperability capabilities among physically connected C4ISR equipment and
- Accuracy of physical connections between C4ISR equipment.

The review found no issues relative to platform connectivity. Physical connections between different pieces of C4ISR equipment appeared correct. No interoperability issues were uncovered.

4.5 Other issues

This analysis uncovered minor problems that may impact the architecture as a deliverable. Although these problems may be considered editorial, not addressing them would adversely affect the architecture as a whole.

While a comparison of the network diagram and database was not a focus of this evaluation, analysts did make two recommendations with respect to the consistency of the two products:

- 1ZZ00I5D20, PBO TM is not shown in the network diagram
- Medical Treatment Squad: Recommend displaying the MC4 PALMTOP-1 with the combat medic in each infantry platoon. This will help determine the primary user of the equipment.

5. Conclusion

Subject to the previous comment that time did not permit an exhaustive review of the RGR REGT SA, there appear to be no major issues with respect to its accuracy or content.

6. Recommendation

With respect to the RGR REGT SA, there are no additional recommendations to be made other than those already mentioned. Future quality-oriented analyses should begin early in the SA development phase and include a totally comprehensive review of the SA, time permitting.