

Command Control Communication & Information Architecture (C3IA)

Royal Netherlands Army



General

The execution of military operations by the armed forces, including the Royal Netherlands Army (RNLA), has changed substantially over the past few years. The RNLA is organised to carry out land-based operations. Types of deployment range from various types of Non-Article V Crisis Response Operations to (small-scale) Article V operations and national tasks. In addition to those tasks, combating terrorism and strengthening European military capabilities have been designated as spearheads for the coming years. In this dynamic situation, units of the RNLA operate in a wide range of environmental circumstances and under quite different conditions, usually in a joint and combined context.

Information and information superiority is crucial to all of these types of operations. Depending on the level and the conditions, operational commanders up to the level of the Chief of the Defence Staff (CDS) must have a common and identical picture of the operational environment, known as the Common Operational Picture (COP). Supplemented with up-to-date information and knowledge of politics, doctrine and other issues, that must lead to individual understanding of the situation, known as Situational Awareness. All this is important for the effectiveness with which operations are led and carried out.

Objective of the architecture

The command, control, communications and information architecture (C3IA) is designed to assist units in an operational environment. Characteristics of this environment are (highly) mobile operations, interoperability with other armed forces Services (joint), interoperability with other nations' armed forces (combined) and interoperability with civilian organisations.

The objective of the architecture is to create a basis for the integrated and controlled development and implementation of information and communication infrastructure. An important underlying principle is that the architecture must clarify the relationship with the organisation and the operational processes (including information requirements and the system services that are required). Within the C3I architecture, therefore, the operational processes not only have been elaborated in terms of architecture, but the operational requirements have also been translated into concrete system requirements. In turn, the system requirements have been translated into requirements for the technical infrastructure.

The C3IA makes it possible to manage these developments, based on content, and to keep costs manageable. In addition, the C3IA provides concrete guidelines, basic concepts, standards and starting principles for the individual projects.

The architecture layers

The C3I architecture is structured in layers.

- the operational architecture: the organisation, operational processes and the resulting information requirements;
- the system architecture: the information and communication systems that deliver services to the business processes;
- the technical architecture: the infrastructure for the storage and exchange of data, operating systems, networks and means of transmission that are required for the various applications.





One of the characteristics is that each layer delivers services to a higher level in the architecture. That leads to the creation of a direct relation between the operational requirements on the one hand and the services offered on the other hand.

Each layer is built up of components that deliver particular services. The implementation of a component is 'hidden' to other components. That means that components that provide the same services can be exchanged with no consequences for the other components.

Additional aspects of the architecture

In addition to the three layers, three additional aspects of the architecture have been identified which result in specific areas requiring attention: functionality and security as well as management & administration. The functional architecture forms the basic architecture. The areas of security and management & administration concentrate on specific requirements and solutions for every part within the architecture layers. By considering these aspects as extra dimensions, integrated coordination is achieved. Measures on one level, therefore, sometimes provide solutions for other levels or, on the other hand, make demands on the other levels. An example is the move to physical security if technical solutions are inadequate.

Evolutionary approach

It is impossible to design and implement a fully developed architecture in advance to the last detail. For that reason, an evolutionary approach was chosen for the development of the C3I architecture. The C3IA framework, with its different architecture layers and aspects, serves as a guideline in this approach. Sub-components are worked out further and developed in individual projects. The results are then fed back to the main project and used for the further modification and completion of the C3IA. The C3IA has a layered, service-oriented and component-based design, which offers a high degree of flexibility. In a rapidly changing world, such an adaptive architecture is required to keep in step with the current developments in the areas of processes, organisation and technology.

