



By establishing the Command and Control Support Centre (C2SC) in 2001, all tasks related to Operational Information Management (OIM) have been brought together in a single centre of excellence. Inasmuch as the C2SC has been charged with the tasks of policy preparation, development, testing, implementation and maintenance, the centre also administers the architecture of the Royal Netherlands Army. On that basis, it contributes to achieving the goal of integrated operational information and communications systems to assist ground-based operations.

Projects should match the operational information requirement. The same developments should take place within several projects. Systems should demonstrate a mutual coherence. It will therefore come as no surprise that the decision was taken to develop a C3I architecture. That architecture serves as a common framework and is continuously being coordinated with international developments and with the all-service Defence Information Management Architecture (DIVA). The development of an architecture is a continuous process whereby both a top-down approach (through a team of architects) and a bottom-up approach are used. In the latter case, input comes from all or some of various C2 projects' system design.

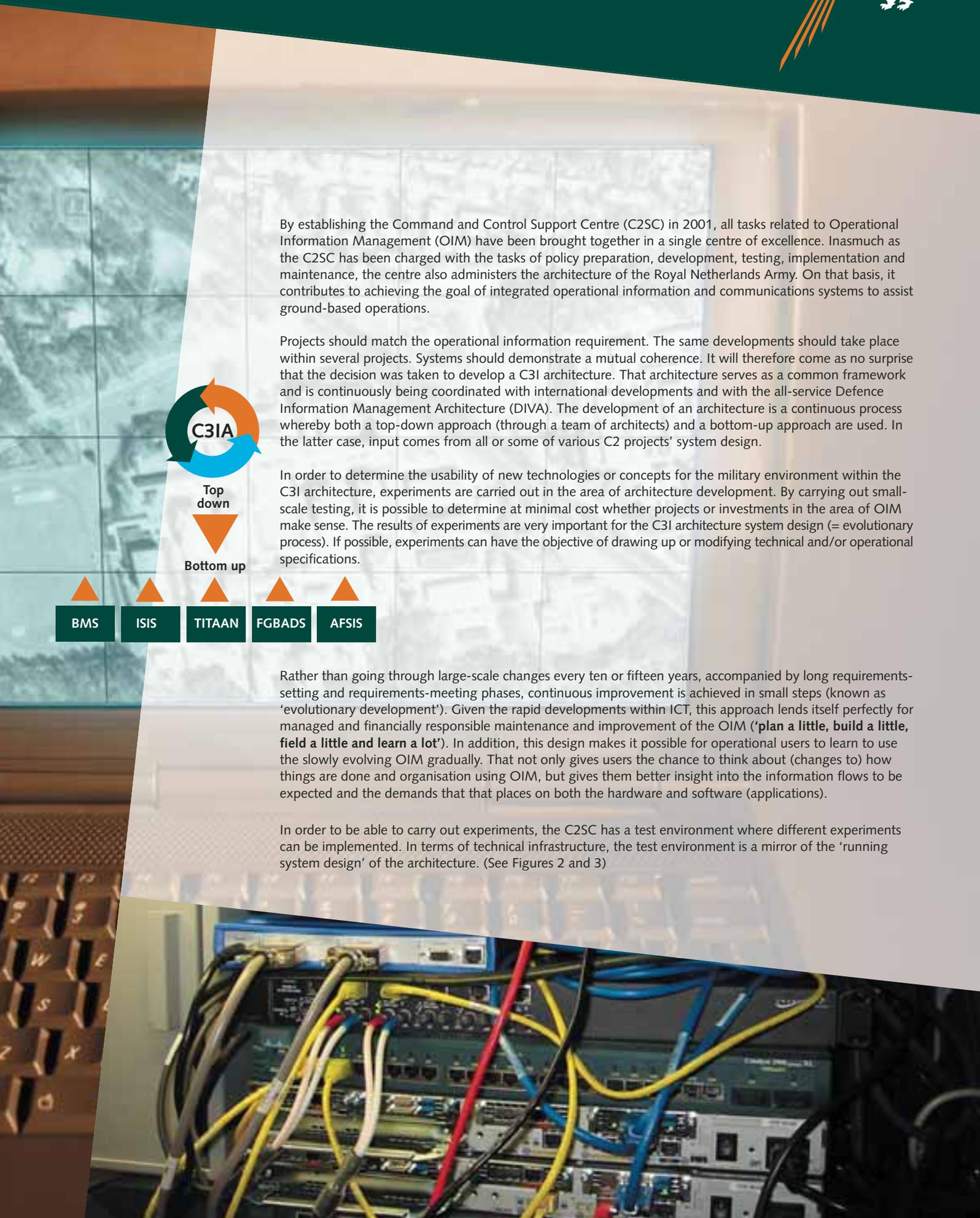


In order to determine the usability of new technologies or concepts for the military environment within the C3I architecture, experiments are carried out in the area of architecture development. By carrying out small-scale testing, it is possible to determine at minimal cost whether projects or investments in the area of OIM make sense. The results of experiments are very important for the C3I architecture system design (= evolutionary process). If possible, experiments can have the objective of drawing up or modifying technical and/or operational specifications.



Rather than going through large-scale changes every ten or fifteen years, accompanied by long requirements-setting and requirements-meeting phases, continuous improvement is achieved in small steps (known as 'evolutionary development'). Given the rapid developments within ICT, this approach lends itself perfectly for managed and financially responsible maintenance and improvement of the OIM (**'plan a little, build a little, field a little and learn a lot'**). In addition, this design makes it possible for operational users to learn to use the slowly evolving OIM gradually. That not only gives users the chance to think about (changes to) how things are done and organisation using OIM, but gives them better insight into the information flows to be expected and the demands that that places on both the hardware and software (applications).

In order to be able to carry out experiments, the C2SC has a test environment where different experiments can be implemented. In terms of technical infrastructure, the test environment is a mirror of the 'running system design' of the architecture. (See Figures 2 and 3)





In recent years, a number of C3I experiments have been carried out within the C2WS, including:

- **Data Radio Experiment**

The objective of this experiment was to demonstrate the added value for the RNLA of a new generation radio for the lower tactical level, the so-called 'data radio'. That radio, operating in the UHF frequency band, has standardised interfaces (Ethernet) and can achieve higher data transmission speeds than is possible with the current VHF radios.

Ten radios of this type were leased for the experiment. The radios were extensively tested for several months in both a test environment on the base as well as installed into a Mercedes-Benz vehicle during movements. A great many technical aspects, such as data transfer speed, range, interception and detection, etc., were thoroughly tested.

- **Wireless LAN**

When applying a C2 information system (such as the Battlefield Management System) at battalion command posts, it will still be necessary to lay a cable network between the various vehicles for the time being. In order to investigate the advantages and disadvantages of a wireless network (Wireless LAN based on the open 802.11b standard) in a command post at this lower tactical level, an experiment was set up. For that reason, a number of vehicles were equipped with WLAN components during a battalion exercise. Access Points, Bridges and antennas.

- **Voice over IP**

Voice over IP (VoIP) is increasingly viewed as a serious, flexible successor to the current voice network for military applications. That would make it possible for the RNLA to replace its ZODIAC network with VoIP-oriented networks, with voice and data using the same infrastructure. During an experiment lasting several months, it was determined that VoIP was suitable for use under operational conditions, both quantitatively and qualitatively. The conclusions were based on several linked networks (LANs) where voice communications using IP had been set up.

- **FM200 Adapter box**

The RNLA uses the FM200 Line of Sight radio (and others) for radio communications. That type of radio has been used for years within the ZODIAC network, which is based on the old EUROCOM standard. Based on experiments carried out in close cooperation with TNO Physics and Electronics Laboratory, a module was developed between the FM200 radio and the new TITAAN standard based on commercial standards.

- **Satellite communication**

This experiment was intended to answer the question of the degree to which tactical and operational Local Area Networks could be linked via a satellite connection in a military, operational and dynamic environment. Both voice, data and other types of (data) information were used on this type of connection.

- **Mini-router (mobile application)**

For the local network within TITAAN, commercially available products, such as routers and switches, were used. For the lower tactical and mobile level (brigade and lower), products were sought with at least the same functionalities, but that could also be installed in military vehicles. An example is the Cisco Mobile Access Router. The C2SC has a number of these components and has carried out experiments with them.

