

Requirements for a Future COP-Display Based on Operational Experience

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SUMMARY

My personal experience from recent military operations tells that today's and future COP-displays need to give the commander and decision-makers in general a much quicker and much better mental picture of the situation than from current display systems. This is due to the increased speed and complexity of military operations and the demands for very low own losses and collateral damage. Also, the increasing supervision from politicians and involvement of non-military decision-makers require COP-displays easy to understand. A key is "to show the world as it looks". This implies a big display-surface with very high resolution. A "table" where a team of decision-makers gather around, will support the communication process towards a shared understanding.

The "Common Operational Decision System" (CODS) developed by the "Norwegian Battle Lab & Experimentation" (NOBLE) complies with such ideas. It consists of high-resolution flat screens horizontally arranged by 3x3 to 5x5, and is able to transparently display maps, ortho-photos, and satellite images superimposed over maps. It can receive track-info and other data from a number of existing operational systems. CODS has participated in international military exercises, included the last JWIDS in Great Britain 2004.

1. TRENDS AND PERSONAL EXPERIENCE

My operational experience in addition to numerous NATO exercises, are mainly from serving a year and a half in Former Yugoslavia, under UN command, (93-95) and as a Battle Staff Director during the air campaign in Serbia/Kosovo (1999). These conflicts made it clearer and clearer to me, that military organizations like NATO is still struggling with a complex transformation into the new world order. Everybody is talking about NCW (Network Centric Warfare), shorter OODA loops (Observe, Orient, Decide, Act), joint operations and interoperability. But large portions of the military in many countries are still at large organized for the total war.

Among the challenges are conflict scenarios less than full war, scenarios somewhere between peacekeeping and full war, and against enemies that are not always visible, or maybe not even definable. Additionally, the last conflict scenarios have clearly shown that there is a lack of balance between air, sea and land situation awareness pictures. The air picture is reasonable, the sea picture is variable, but the most difficult is the land picture, which in most areas is unacceptably poor.

Most members of NATO have put much effort into the genuine transformation into the future. We have for years spent enormous resources on various sensors and high tech data links, but my experience is that

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we have not used enough resources on the link between the information and the decision-makers! With the new challenges already at NATO's doorstep, we have not managed to take over us the practical implementations, this means.

With extreme media coverage of military operations, with politicians being under pressure to finish any military operation as quickly and "clean" as possible, decision-makers must have the best tools and must prepare for a variety of scenarios. Command & control systems must be flexible to meet this variety of future challenges of scenarios.

Effective visualization is the key issue in order to get a necessary "feeling"/mental picture and understanding of the situation. People having been in war and been forced to make serious decisions involving life and death easily understand this. Their hope is to have a sort of "God's eye", seeing the exact situation there and then – with information as close to real time as possible!

Maps are of course indispensable tools, but useful only to a certain point. Their symbolism does not easily transfer to necessary terrain understanding, and maps often lack the proper information due to lack of updates or level of detail. Ortho-photos and satellite images (superimposed on maps) are far better in this respect, if sufficiently detailed and updated. These sources supply complementary information to the viewer when being presented together properly.

My recent experience has taught me that detail, coordination, and timing of information-presentation, are crucial for obtaining a quick and sufficient understanding of a situation. Detailed and live pictures from an UAV might be useless, if one does not know where exactly its camera is pointing. On the other hand, an experienced commander might get the essence of a situation by only a small glimpse of a crucial part the battlefield.

2. CHALLENGES TO A FUTURE COP-DISPLAY

A COP-display is a crucial element in conveying understanding of the current situation to a commander, his team, and decision-makers on lower levels – let alone executers! A sort of feeling of being there is needed in order to have sufficient insight in complex situations where quick and difficult decisions have to be made. Detailed information presented with high resolution seems necessary. The answers to questions like "who is hiding under that bridge, refugees or paramilitary?" are crucial! Dynamic maneuver warfare and asymmetrical conflicts are no longer just theoretical theses.

Displays of a COP might come in several convenient forms, from a huge display on a wall in a command bunker to laptops in the field, all giving their viewers non-conflicting understanding. However, where high-level, quick, and difficult decisions have to be made, the big challenge is to give the involved people a "situation awareness" as close to real time as possible. The clue is gathering relevant information, displaying it for the relevant decision-makers and act. In some way a COP-display has to be extremely simple and direct, it has to be intuitively understandable without special training. Additionally, the conclusions might have to be reached by close interaction of a "mixed expert team" viewing the same picture.

An efficient fusing of data from various sensors and sources before being presented on a COP-display is a long time desire that seems to continue to be just that. Today's and future COP-displays have to make much of the "fusion" themselves by effectively presenting the information in a coordinated fashion. Overlays of 2D sensor- and GIS-data is a good example of this. The current poor land-part of the COP is both due to lack of data, but also the number and variety of different objects. The latter being one of the many challenges to a COP-display.

Even today there are big efforts to agree on the appearance of “simple” military symbols for displays. This seems a bit wasted due to our current technical ability to graphically present objects as they look. Even military viewers will benefit from more intuitive understanding, especially in time-critical and stressing situations, not to speak of non-military viewers playing an increasingly important role in future conflicts.

3. CODS – DEVELOPED ACCORDING TO THE OPERATIONAL EXPERIENCE

When I came back from Yugoslavia in 1995, I was asked to build up a Norwegian Battle Lab in order to move fast towards the new challenges, and select projects that were suitable for enhancing operational demands, much quicker than by established procurement procedures. There are of course necessary bureaucratic rules and political guidelines that must be adhered to. However, operational demands should sometimes have priority over bureaucracy when operations is a matter of life and death! CODS was the first project that was initiated at NOBLE. It was the first and most important project because it represented – and still represents one of the most complicated challenges in future military operations.

CODS is a high resolution visualization system. It is designed for use with existing Command and Control systems to display and work with the information that exists in the electronic battlefield today. Using the CODS mapping technology any satellite image, ortho-photo, raster image or vector data may be added to the system. CODS accepts both military and civilian GIS data formats. Combined with a digital elevation model the terrain and situation will be displayed in 3D for better situational awareness. (3D presented by 2D is often termed 2½ D.) Combined with the high-resolution GIS data, standard military data messages and data links may be connected. This allows the user to display a common operating picture in the CODS 3D environment. Multiple data links and formats can be connected at any time. Any symbols or 3D models may be used to display the tactical data in CODS. Standard symbols like 2525B or custom data sets may be added.

The CODS displays are designed for high resolution and use in mobile environments. Based on LCD technology the screens have a total resolution of 11 to more than 40 mega pixels depending on size and model. The displays are designed as “map tables” arranged “glass by glass” as 3x3, 4x4, or 5x5 configurations. An integrated motorized 90° tilt enables tables to be used in environments where floor space is an issue. For more information, visit <http://www.lencods.com>.

There are currently CODS in use and in experimental configurations in Norway. One has been deployed at the Joint Operations Center (JOC) at the National Joint HQ, Jåtta, Stavanger. Another has been deployed with an F-16 squadron as a part of existing mission planning/debrief system. One CODS is already a part of base defence at one of Norway’s main air bases. In addition, CODS has being deployed as a tactical capability in use with UAV training at a Norwegian Army unit.

CODS has been tested and demonstrated at several large national and international exercises:

Multilateral Interoperability Programme (MIP) Exercise 2003 in Ede, The Netherlands

The CODS installation received MIP data from the 11 participating nations through the Norwegian NorTAC C2I system and displayed the information real-time using MIL-STD-2525B symbology. For the duration of the exercise the system was operated by Norwegian Army personnel. Training took about half a day, and no support was needed during the exercise.

Exercise Northern Light 2003 Northwood, UK

During the Northern Light naval exercise a large 25-screen CODS display with accompanying hardware was set up in the JOC at Northwood. It provided advanced mapping functionality and also imported and displayed sea track information.

Exercise Joint Winter 2004 Northern Norway

During Joint Winter 2004 the supplied CODS system imported data from the Norwegian NorCCIS II C2I system using standard message formats such as OTH-Gold, thus displaying the allied Common Operating Picture.

UK JWID 2004 at Ports Down West, UK

During this 6-week exercise a CODS installation with a 9-screen CODS display was connected to the main JWID infrastructure and received, displayed and stored data from several sources. This included the Coalition Recognized Air Picture (RAP) in Link-16 XML format, the Top Common Operating Picture (TopCOP) in OTH-Gold and planned flight routes from various flight planning systems in CRD format. Exercise map data were also imported, among other things a high-resolution satellite image covering the exercise area.

After being one of three finalists in the 2004 NCW Awards from the Institute for Defence & Government Advancement (IDGA), CODS received “Honorable Mention”, see <http://www.site-members.com/NCW/winners.htm>.

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