

# Fort Future: Simulation and Modeling for Installation Transformation: Program Overview

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## Challenges of Transformation

Army and Defense Transformation are imposing new and unprecedented demands on the ability of installations to provide a full spectrum of mission support to the nation's armed forces. In the future, installations will play increasingly important roles in application of combat power around the globe. The Objective Force 2015 white paper (now "Future Force") identifies five important roles for installations, to function as:

1. Information hubs
2. Power projection platforms
3. Secure sanctuaries (Force Protection)
4. Holistic communities (community support)
5. Combat preparation and sustainment bases.

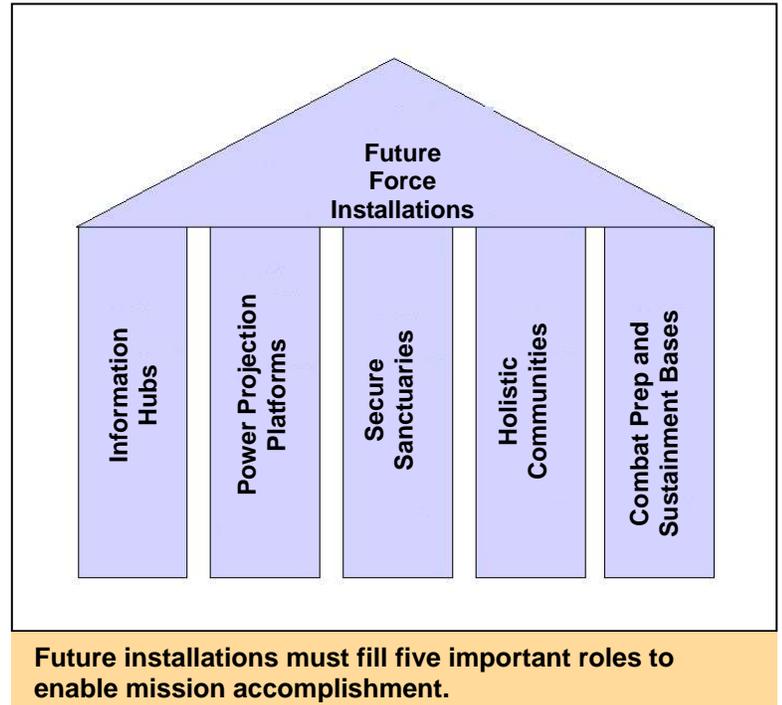
Although today's installations fill some aspect of these roles already, plans for transformation call for the installation to be an even more integral part of the fight: projecting, commanding, and sustaining forces around the globe more rapidly than ever before. This Technical Note gives an overview of the Fort Future research program. Additional information about the Fort Future modules can be found in separate technical notes, which are posted at URL: <http://ff.cecer.army.mil/>

## Planning for the Future

In a series of two Installation Transformation Wargames,\* senior leaders and forward thinkers from the Army, Joint Services, and the civilian sector identified several key challenges facing Installations in the years to come. They found that, to be successful, the Army must:

- Better articulate the linkage between installations and combat power
- Go beyond traditional Master Planning to include regions and joint services ("Meta-Planning")

\* The Assistant Chief of Staff for Installation Management (ACSIM) was the proponent of the games. The games were sponsored by the Commanding Officer of the U.S. Army Corps of Engineers.



- Increase the adaptivity of installations
- Use the "game" artifice to test alternatives, build constituencies, and deepen partnerships
- Focus on the five roles identified above.

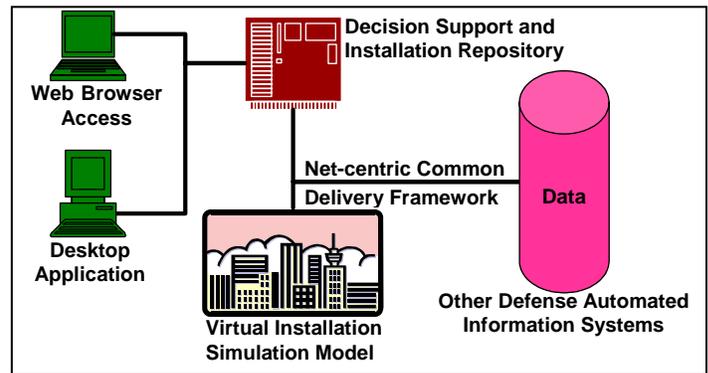
Transformation is a process, not a one-time event. As the Future Force evolves, an increasing pace of change and adaptation will become the emerging reality for installation management. To be successful, installation planners at all echelons need tools that will help them to understand the potential consequences and pitfalls of their decisions, not just now, but in the decades to follow. In short, the Army needs planning tools and processes that are predictive and that allow decisionmakers to "try out" proposed courses of action before spending millions of dollars on acquisition.



# The Fort Future Concept: An Innovative New Approach to Sustainable Planning

The core idea of the Fort Future Concept is simple — simulate the likely results of changes to an installation before investing time and funding. To be successful, three elements are required:

- A set of tools is needed to properly frame questions and analyze alternatives. The innovative Fort Future Tools will combine a web-based decision support framework with a “Virtual Installation” capable of supporting evaluation of alternatives through simulation. Results will be presented both visually and in a balanced scorecard decision matrix.
- A group that can be assembled rapidly is required to evaluate innovative new ideas. A virtual “Installation Battle Laboratory” has conducted several studies already, including the two transformation war games. A charter for a more formal version has been proposed to the ACSIM.
- A support team is required to assist installations in conducting planning exercises. Once the Fort Future Virtual Installation tools are delivered (October 2004), a trained cadre will be available to assist installations and regions in using the tools. The foundation of this cadre is being formed through a bi-annual “Facility Planning and Acquisition Workshops.”



## Fort Future Tools: Decision Support for Sustainable Installations

The Fort Future Tools Version 1.0 (available October 2004) are a product line currently under development, that will support sustainable planning using simulation at a national, regional, and installation level. Version 2.0 (available October 2007) will add support for operations and maintenance.

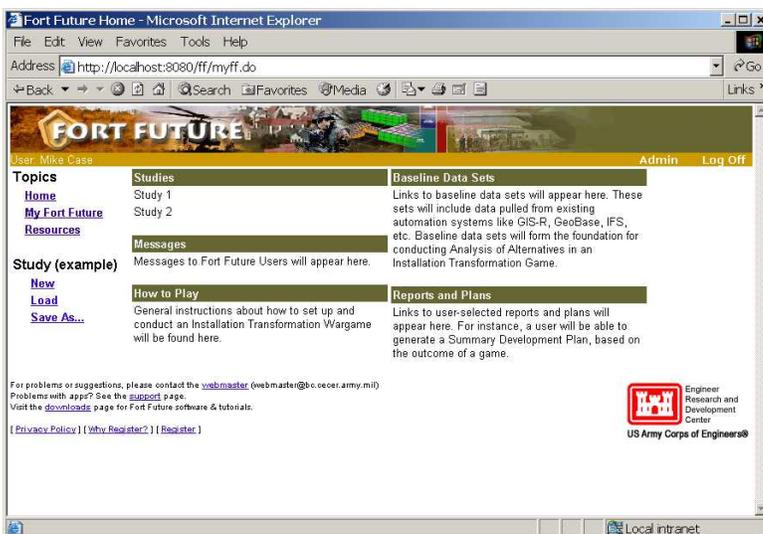
The system is designed as a net-centric system-of-systems, with a mix of web applications, desktop applications, and high performance computing when needed. The systems are linked through the Corps’ Common Delivery Framework, which uses industry web services standards to support communications between commercial and government systems.

### Collaborative Decision Support Framework

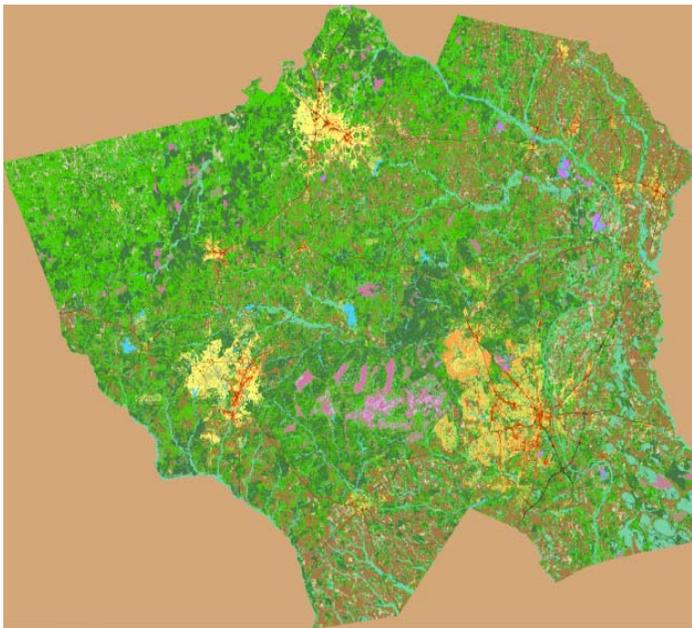
Users of Fort Future will access the system using their web browser and their Army Knowledge Online username and password. Once in the system, authorized users will be able to set up studies, create baseline data sets, invite stakeholders, create scenarios, and conduct planning sessions. Stakeholders will collaboratively generate decision criteria and alternative courses of action (COA), which will be sent to the virtual installation for simulation and analysis. Outcomes will be displayed and ranked in a decision matrix.

### The Fort Future Virtual Installation

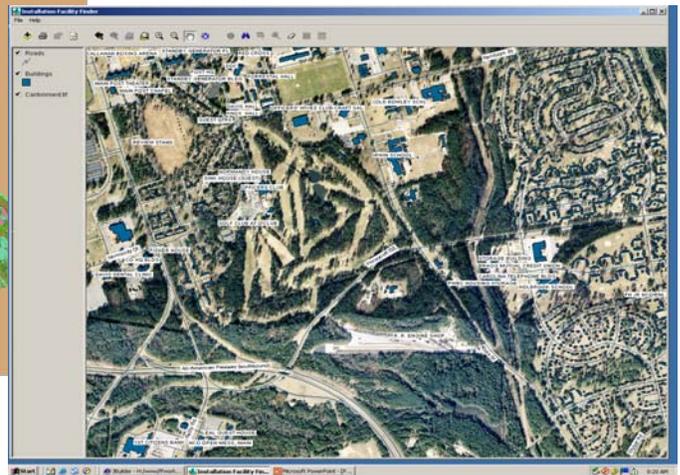
The Fort Future Virtual Installation is the heart of the Fort Future tools. Its repository holds a 2-D or 3-D model of one or more installations that is tailored to the questions being asked in the study. This model will be visualized and edited in a GIS format in version 1.0 and then in 3-D in a later version. Master planners and other stakeholders will use the virtual installation to lay out and



Users will log on to a "My Fort Future" page where they can participate in collaborative studies.



Two views of a “Virtual Installation.” The model is captured in an Installation Repository, then simulated using DIAS technology for deployment simulation and LEAM for encroachment simulation.



analyze new facilities, transportation networks, utilities, and land use alternatives.

The repository feeds data to multiple simulation models as required to answer the particular questions required by a study. Current model frameworks supported include LEAM\* for encroachment and DIAS† for deployment. These simulations will be capable of modeling properties and behaviors of facilities, roads, utilities, training lands and ranges, ecosystems, and landuse (e.g., encroachment) for multiple installations and their surrounding regions.

### Facility Modeling

At the highest scale, Fort Future will model individual facilities and facility complexes to assess their cost and ability to perform their mission. The current model uses the IAI IFC model, the MicroStation™ CAD system, and the PACES cost engineering system. Users can download a standard set of requirements by facility type, conduct a planning charrette (workshop), generate a cost estimate, and produce documentation for the DD1391 system. By version 1.0, features will include modules for sustainability (SPiRiT) and blast effects analysis using BEEM.

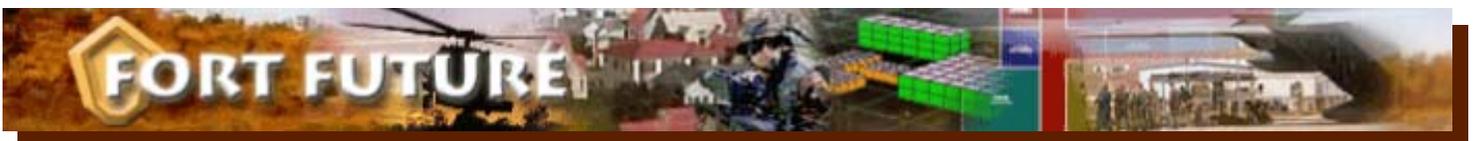
## The Fort Future Modules

The Fort Future Tools represent a growing set of capabilities. Modules planned for version 1.0 are listed below, broken out by national, regional, and facility scales. Individual technical notes are available for each of these areas.

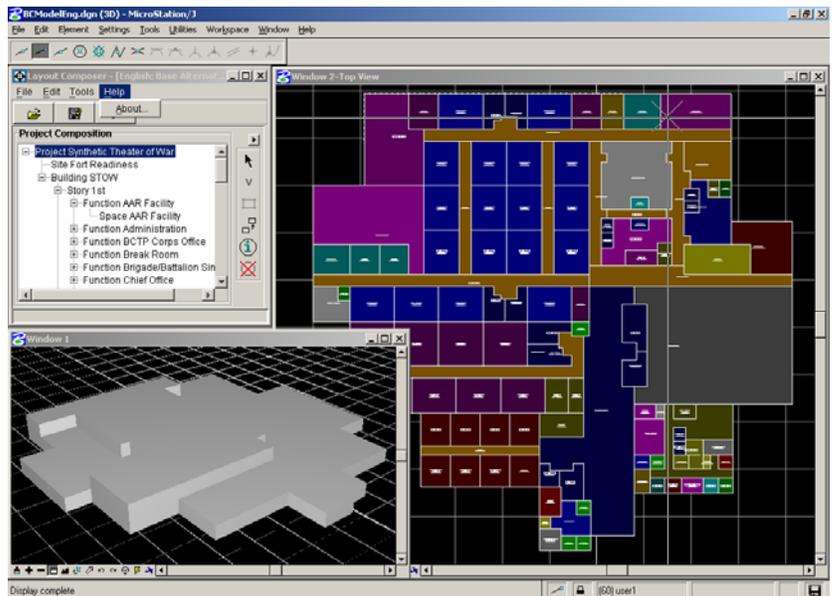
- Integrated Installation Planning: Technology for Sustainable Installations.** Describes the Mission Essential Task List (METL) Tool and the use of the Virtual Installation to simulate deployment in DIAS. Includes an example of adding facilities to the simulation in a GIS environment.
- Facility Composer: Building a Computable Facility Model.** Describes the Facility Composer suite of products for facility design. Includes Requirements Composer, Planning Composer, Layout Composer, Sustainable Designer’s Aid (for SPiRiT), export to PACES (cost estimating), the Minimum Anti-Terrorist Wizard, the BEEM export wizard, and the 1391 report wizard.
- Sustaining Military Training Capabilities.** Provides an overview of the Sustainability, Encroachment, and Room to Maneuver element of Fort Future.

\* Landuse Evolution and impact Assessment Model (University of Illinois at Urbana-Champaign).

† Dynamic Information Architecture System.



- **Sustainable Installations Regional Resource Assessment (SIRRA).** Describes a methodology to assess sustainability risk factors across over 200 Department of Defense installations in the continental United States.
- **Analysis of Regional Risks to Military Installations.** Demonstrates methods to identify regional encroachment trends and impacts on military installations.
- **Landuse Evolution and Impact Assessment Model (LEAM).** LEAM is used to predict encroachment in Fort Future. It describes a sophisticated model to simulate the evolution of urban systems in a visual and dynamic decision support tool. The simulations are evaluated for their probable environmental, economic, and social impacts.



**Facility Composer captures standard facility requirements in downloadable libraries. Users can rapidly conduct planning charrettes and conduct sustainability analyses.**

- **Modeling and Simulation for Force Protection.** Describes a number of tools that are available in Fort Future to support decision analysis in the area of Anti-Terrorism and Force Protection. Tools include the Explosive Threat Force Protection Wizard, the Minimum Anti-Terrorism Standards for Buildings Wizard, the CBR Modeling and Simulation Tool, and the Integrated Anti-Terrorism Force Protection Rating Tool.
- **Fort Future Utility Systems Tools.** Describes the utility models of Fort Future, including power, water, and fuel. These models are used to assess capacity and vulnerability to terrorist attack.

## Availability

Fort Future Tools Version 1.0 will be available October 2004. LEAM and SIRRA are available now. Limited use versions of the Mission Essential Task List (METL) tool, deployment simulation, and Facility Composer are also available now.

## For more information

### Fort Future Web Site

<http://ff.cecer.army.mil/>

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