ATDI

PnC

palm-size radio planning

Solutions in radiocommunications

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PnC Support Material – Example scenario to demonstrate PnC use

PnC enables military mission planners and tactical leaders to plan, design and model point-to-point links and area coverage for radio systems whenever and wherever the need arises. PnC is ideally suited to many planning tasks including:

- **predicting tactical radio coverage, and showing where base station coverage can reach portable devices**
- **planning point-to-point data-bearing links for tactical communications**
- **planning intermediate relay stations for end stations in difficult-to-reach situations**
- **predicting optical coverage to determine areas of visibility**

PnC has a simple interface that leads the mission planner through the various stages of the workflow from location to equipment selection, and goes on to produce coverages and profiles. This workflow-based approach is easy for the user to follow and minimises the chance of errors.

The following scenario is designed to demonstrate how PnC is being actively used in the field by military mission planners. The scenario is fictitious but gives a realistic representation of some of the applications that PnC is used to plan.

Scenario Background

Location: Lashkar Gah, Afghanistan

Intelligence suggests insurgents are operating in a specific area near Lashkar Gah. Allied forces are to be deployed to capture the insurgents. To ensure the safe operating of the allied forces, communications stations need to be in place to enable both local and rearward communications back to the Forward Operating Base (FOB). The key objective is to plan and support communications to mobiles as well as providing a link back to the FOB to support the allied forces.

Mission Details

Mission Name: **Friendly Comms**

Mission Objective – to plan and provide tactical radio coverage to hand portables in a target area to support the allied forces' capture of insurgents.

Tasks:

1. Identify the area of operation to provide communications to ground troops
2. Identify the location(s) to install the radio equipment to provide radio coverage to hand portables in the target area
3. Identify the locations to install the point to point data link from the area of operations to the FOB.

The planning should include any intelligence about areas to avoid (e.g. intelligence mark-up layers with landmines)

Mission Preparation

Stage I: Configuring the Mapping Data

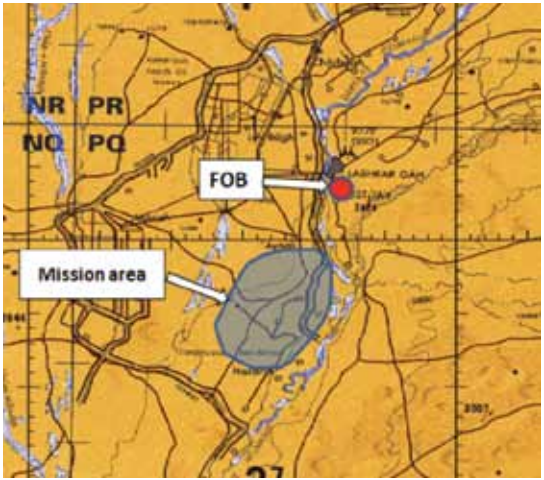

Figure 1: Lashkar Gah with the mission area and Forward Operating Base (FOB) marked.

Mapping data for Afghanistan has been produced by a Geo Cell in advance using standard mapping formats. PnC uses standard mapping formats to prevent lengthy conversion timescales and reduces configuration times for maps in the FOB. PnC uses a multi-layer map set that contains progressively more detailed information as the mission planner zooms in. This dynamic zooming allows the mission planner to view maps with appropriate detail at the right time, guaranteeing the most suitable level of detail throughout the process.

The mission planner should delineate the mapset to include the area of the mission and add information on the target area of operation for the communications (see Figure 1.)

Mission Preparation

Stage II: Equipment Data

Figure 2: Radio parameters screen in PnC. The simple interface requires minimal input from the user.

Equipment data is pre-populated into PnC by the mission planner in the FOB. The simplicity of PnC enables entry of equipment quickly with minimal details required (see Figure 2). PnC allows data exchange with other ATDI tools and data can be imported directly from tools such as HTZ Warfare.

The next step is to define the equipment configuration to be used for the mission. The mission planner selects the intended equipment plus any secondary equipment that may be required. This ensures that when the mission is executed in the field, operatives only have pre-defined configurations of equipment to select from, reducing setup time while in the field and reducing the chance for errors.

Mission Preparation

Stage III: Predicting radio coverage for hand portables

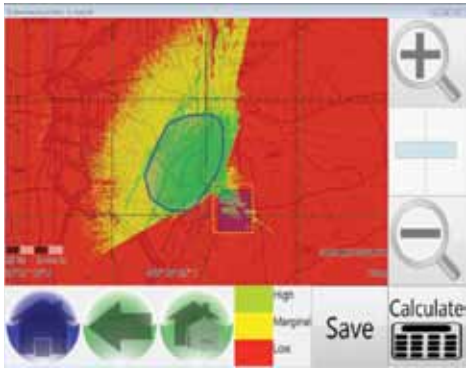

Figure 3: Radio coverage from the transmitter site (Tx 1). The mission area is shown by the blue polygon.

Using PnC the mission planner selects the coverage workflow to identify suitable locations to place the radio equipment to provide area coverage to the handhelds. The touch screen interface allows locations to be positioned manually or entry can be via a grid reference (e.g. MGRS).

The key for the mission planner is to find locations that provide coverage of the target area with sufficient signal strength. The mission planner uses PnC to identify potential locations to install the radio equipment. PnC guides the user through the coverage workflow to produce a coverage plot. The plot uses a traffic light colour scheme to distinguish between coverage areas with high, medium and low probability of successful communication enabling easy interpretation of results.

The transmitter location(Tx 1) selected by the mission planner is in Figure 3. The transmitter location provides good radio coverage of the mission area (blue polygon) with the majority of the area shown as green indicating high probability of successful communications.

Mission Preparation

Stage IV: Identify locations for the point to point link

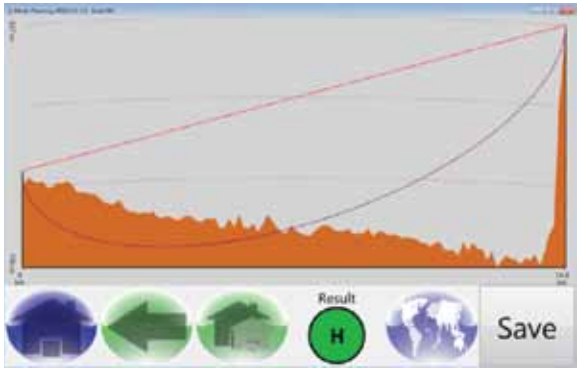

Figure 4: Path profile showing the terrain in orange and the line of sight between the transmitter and receiver. The green circle with the letter H for the result indicates high probability of a successful link.

Lastly, the mission planner identifies the locations for the point to point data link from the area of operations back to the FOB. For this task the path profile workflow in PnC is selected. A list of preconfigured equipment is used in conjunction with the terrain map data to determine a suitable path to be used. The profile results screen uses a traffic light style output to provide a simple and intuitive result to the mission planner in a similar way to the coverage result. The planner chooses the locations to provide a green result that means there is a high probability of a successful link. The link that is planned is shown in Figure 4. This shows the terrain profile (and clutter if present) and the result of this link – in this case a green circle with the letter H, indicates a high probability of a successful link.

Operational mode: Executing the mission

Once complete, the plan must be executed by the field operatives.

PnC enables a smooth transfer of the mission data to the handheld patrol devices in the field. Data is transferred from the planning device to multiple handheld patrol units. PnC pushes a single mission plan to each handheld device along with supporting maps and equipment data. This function ensures that only mission relevant information is transferred to the device, thereby reducing the amount of data transferred to a minimum and decreasing security risk if the device is compromised. The transfer between the planning and patrol devices uses an automated transfer mechanism to ensure identical data on all of the devices and maintain a controlled configuration.

Once the data is transferred to the patrol devices the field operatives can execute the mission.

Adapting the plan

To improve likelihood of success, plans can be adjusted to conditions on the ground. PnC provides instant information needed to dynamically adapt to local circumstances.

In this scenario, the field operatives are unable to use the planned location for the VHF radio selected by the mission planner due to local screening or because the intended area was not secure.

Using PnC, the field operatives can re-plan while on the ground and are able to select a secondary location for the radio equipment to achieve the required coverage for the mission. The new location can be selected from the My Location feature in PnC, which uses GPS to locate the device's current position. Alternatively, grid references can be used to input a position.

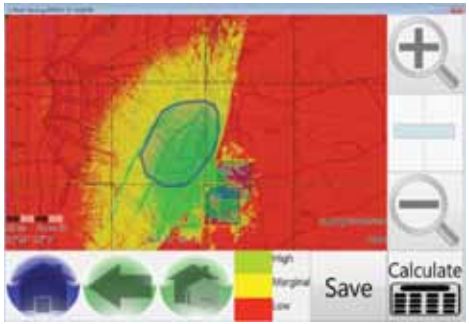

Figure 5: Radio coverage from the alternative transmitter site. The mission area is shown by the blue polygon and has good radio coverage from the new site (Tx 2).

The re-planned alternative radio site produces the following coverage shown in Figure 5. The new site provides good radio coverage of the mission area and so is a suitable alternative to the original.

Without PnC, the alternative would be to try to get the mission planner in the FOB to re-plan and then to redistribute the new plan. This option would take significantly more time and is viable only if a communications path exists to distribute the new plan. PnC helps the field operative to quickly adapt and overcome challenges.

Debrief

PnC represents power tactically on the move

The real-time information it delivers is the difference between effective communications and unintended radio silence. And when field operatives return for debrief, their intelligence can be immediately incorporated into network plans, informing decisions for the next mission.

About ATDI

ATDI Ltd specialises in the exploitation of spectrum- dependent systems including communications links, electronic warfare sensors, radio jammers and radars.

The company's systems and capabilities enable operators to plan missions via detection, interception and direction finding equipment.

Using ATDI software solutions and methods, the deployment of available sensors can be optimised to maximise the probability of mission success while minimising the number of systems that need to be deployed; this can be achieved for airborne, terrestrial and maritime platforms.

As well as mission planning for live operations, ATDI's battle-proven systems are also used for operational analysis to aid development of new systems, technology assessment to predict and prove the performance of proposed new technologies and for training purposes.

The ATDI group has hundreds of customers throughout the world. See **www.atdi.co.uk** for more information.

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