Requirements Document

Project XScorch
Team Core Dump
January 22, 2003

Change Record:

Date	Version	Changes/Additions	Responsible Person
1/22/03	1.0	Created document	Jeremy Stolarz
1/28/03	1.1	Added requirement numbers	Jeremy Stolarz
2/4/03	2.0	Fixed up all the issues stated in correction form	Jeremy Stolarz
3/12/03	3.0	Removed mention of Team functionality. Updated user interface illustration	Alon Gotesman

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Overview

XScorch is a Linux port of an old MS-DOS game named Scorched Earth. In it, tanks shoot a variety of weapons at each other (from clods of dirt to nuclear warheads) in the attempt to be the last tank standing. Aiming shots consists of selecting a turret angle and firing power with the arrow keys. Basic game play (including various AI types, inventory items, and tank types) has already been implemented, along with somewhat unstable networking code.

Features we wish to add to the game are another AI known as the Economist, the Free Market Economy option, greedy scoring, in-game music, parachute and teleporter accessories, and a hostile environment (lightning and meteors) option. If time allows (i.e. wish list) we would also add sound effects, try to make scoring more fair, and/or improve the networking code to make it more stable.

The original project description in the Project Selection document is very inaccurate. It was written before anyone play tested the game and with only a cursory look at the source code. As a result the mention of tanks not falling and no wind was erroneous; these features are fully implemented. Also, the small shield bug (along with some others) has been fixed with a patch from the original creators.

Reference Documents

Original project website: "chaos2 – xscorch"; http://chaos2.org/xscorch/; This site contains a brief description of the game, screenshots, and the project's source code in tarball form.

User Manual: docs\xscorch.txt; This is the original user manual for the game, written in man page format, causing strange characters to be displayed unless viewed with "more" or "man xscorch". To use the latter option, one must first install the game using "make install" after compiling.

Website for mikmod: "MikMod.org: The Home of MikMod and libmikmod, freeware sound player and library to play module formats." http://www.mikmod.org; This site has the information on how to use the mikmod library for Linux/Unix and latest builds.

Website for GTK+: "GTK+ - The GIMP Toolkit"; http://www.gtk.org; This site has the information on how to use the GTK+ library for Linux/Unix and the latest builds.

Website for GNOME: "The GNOME Development Site"; http://developers.gnome.org/; This site has the information on how to make programs for the GNOME environment.

docs\NOTES; This document describes things that need to be worked on for the game and is where we got most of our ideas for features.

docs\AI; This document describes things to add to the AI, including the description for the Economist AI.

Definitions

AI: Artificial Intelligence. Computer players with varying degrees of "intelligence." The easiest AI to beat is Moron, while the hardest is Insanity. There are various other computer players of different levels of difficulty.

Auto-defense: An accessory item that can be purchased that allows the activation of defensive accessories at the beginning of a round rather than during a player's turn. This allows a player to have shields, parachutes, and other accessories set up before shooting starts, and therefore before possibly getting damaged or destroyed.

Baby missile: The weakest type of weapon available to tanks. They are free and are nearly unlimited in supply.

Napalm: A weapon available to tanks that, upon impact, fills a small area with flaming liquid.

Scoring: Currently, XScorch is scored in either Basic or Standard mode. In basic scoring, you only get money for killing others, and you lose money if you are killed. The winner is the player who survives. In standard scoring, you still get money (or lose money) for killing other tanks (or being killed) but the amount is smaller. However, you also gain money every time you damage another tank, and you lose money every time you are damaged. A new feature will be the implementation of Greedy scoring, which follows the motto "He who dies with the most toys wins." It is described below in the Requirements section

Shield: An accessory that can protect you from incoming shots. There are three types of shields—normal, force, and magnetic—all of which come in three sizes—baby, normal, and heavy.

Requirements
1) <u>Economist AI:</u>
    1.1. In the Players/Rounds setup dialog a new player type "Economist" must be made available in the drop down menu (Fig. 3, p. 6).
    1.2. The AI buys the strongest shields possible and auto-defense so the shields can be raised immediately. The AI should also buy solar panels to replenish shields.
    1.3. The AI buys missiles and napalm with which to weaken opponents' shields.
    1.4. The AI will select a single opponent (preferably one with shields) and attack it until it is eliminated. While the opponent still has shields, it will aim close to the target rather than on target. Once shields are eliminated it will then shoot on target.
    1.5. This AI will compensate for wind when targeting using pre-existing AI functions.

2) <u>Free Market Economy:</u>
    2.1. In the Economy setup dialog the Free Market option must be made available (Fig.1, p. 6).
    2.2. A counter must be created to keep track of the number of purchases of each item.
    2.3. If a high demand for a product exists this round (many were purchased) raise the price of that item next round. Exact increments to be determined for each item (probably a function of the original price).

2.4. If a low demand for a product exists this round (few were purchased) lower the price of that item next round. Exact increments to be determined for each item (probably a function of the original price).

2.5. If many of a single item are sold back by players lower the price of that item next round. Exact increments to be determined for each item (probably a function of the original price).

2.6. Prices cannot go below $0 but have no upper limit.

3) Greedy Scoring:

3.1. In Economy setup dialog add "Greedy" to "Scoring:" drop down menu (Fig. 1, p. 6).

3.2. Money distributed to players at end of round is given just like in standard scoring.

3.3. Declare winner of round by adding the net worth of the tank (summing market value of inventory) and the amount of money in the bank. This value can be below 0. The winner is the person with the highest amount. Even if a tank is destroyed the items in the inventory are not lost and therefore counted.

3.4. At end of round winner display must reflect this (have a net-worth listing) (Fig. 8, p. 8).

4) Music:

4.1. Must create music files to load for each of the cases below.

4.2. Need songs (1 for each) for main/options screen, inventory purchasing, regular game play, end of round, and end of game.

5) Hostile Environment:

5.1. In Landscape setup dialog "Hostile Environment" option must be made available (Fig. 2, p.6).

5.2. If selected, each round will randomly either have lightning or meteors as the hostility.

5.3. Both missiles and lightning occur at random times throughout a round, and their striking points are random.

5.4. Lightning must be drawn from the top of the screen in jagged line to its target. If a tank is where the lightning hits, it takes damage (equivalent to a baby missile). If the tank has a shield, the shield is also damaged. If lightning hits the ground, the land is not deformed (Fig. 10, p. 9).

5.5. Meteors fall from the sky in a straight path and do the same amount of damage as a baby missile (including land deforming). Shields act on meteors just like they act with other projectiles.

6) Parachutes:

6.1. Parachutes must be purchasable from the inventory menu at the beginning of a round (Fig. 5, p. 7).

6.2. Under the extended status bar in the main game window the number of parachutes in the player's inventory should be shown (Fig. 7, p. 8).

6.3. When a tank falls (when land from under the tank is removed, by caving in or explosion), a parachute deploys if there is one in the tank's inventory, and the tank does not take damage. The number of parachutes left in the inventory of the tank should then be decremented.

6.4. A parachute should be drawn from the tank as it falls on screen (Fig. 9, p. 9).

6.5. The auto-defense dialog should have the "Parachutes" portion implemented (Fig. 6, p. 7).

7) Teleporters:

7.1. Teleporters must be purchasable from the inventory menu at the beginning of a round (Fig. 5, p. 7).

7.2. Under the extended status bar in the main game window the number of teleporters in the player's inventory should be shown (Fig. 7, p. 8).

7.3. When a player selects to use a teleporter by pressing 't' or 'T' during his turn, the tank should disappear from the screen and reappear in a random location.

7.4. The tank must not reappear on top of another tank, and it must not reappear in mid-air. If the coordinates generated are those of another tank, generate a new set of coordinates

7.5. The number of teleporters left in the inventory of the tank should be decremented after one is used (Fig. 6, p. 7). When there are zero teleporters left, a tank cannot teleport.

Preliminary User Interface

Though the following user interface (UI) pictures look like screenshots, they are not really screenshots of the current UI. Screenshots of XScorch's current UI were taken and then modified to show our preliminary UI.
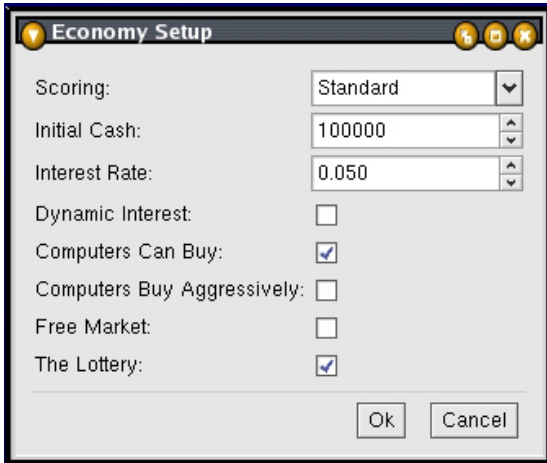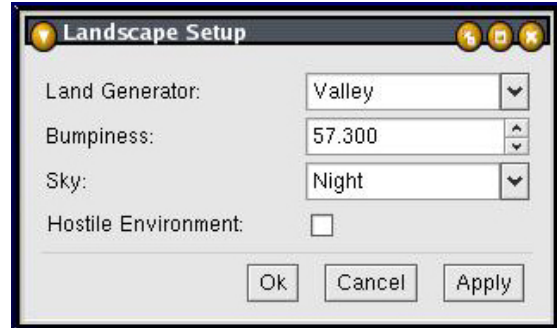

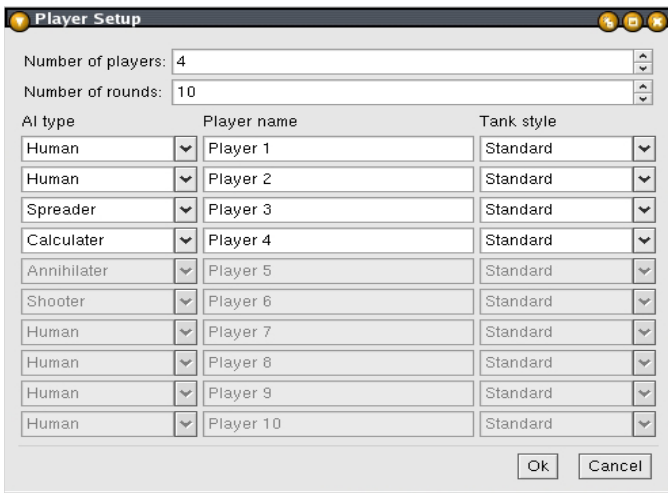**Fig. 1** Economy setup dialog.

Fig. 2 Landscape setup dialog.
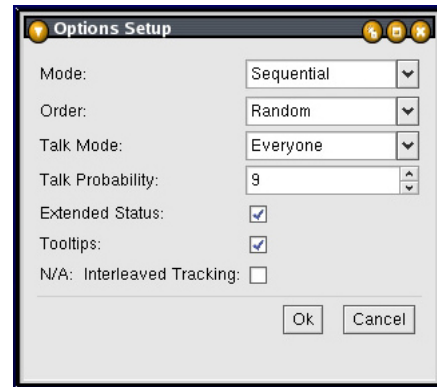

Fig. 3 Player/Rounds setup dialog.

Fig. 4 Gameplay Options setup dialog.
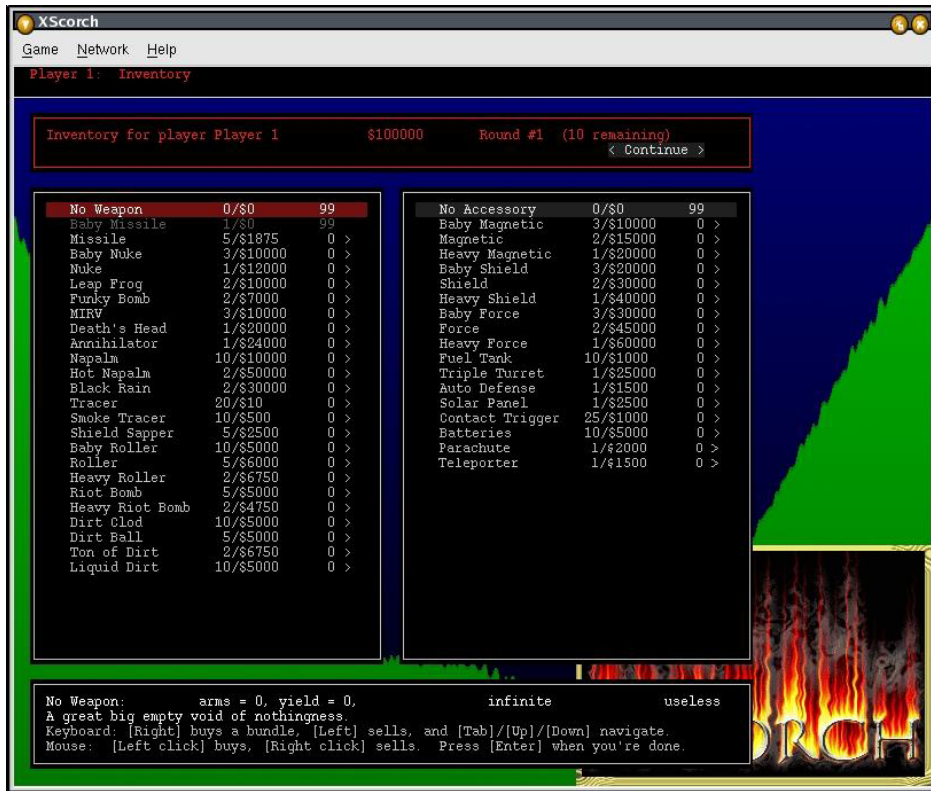
Fig. 5 Inventory purchasing screen.
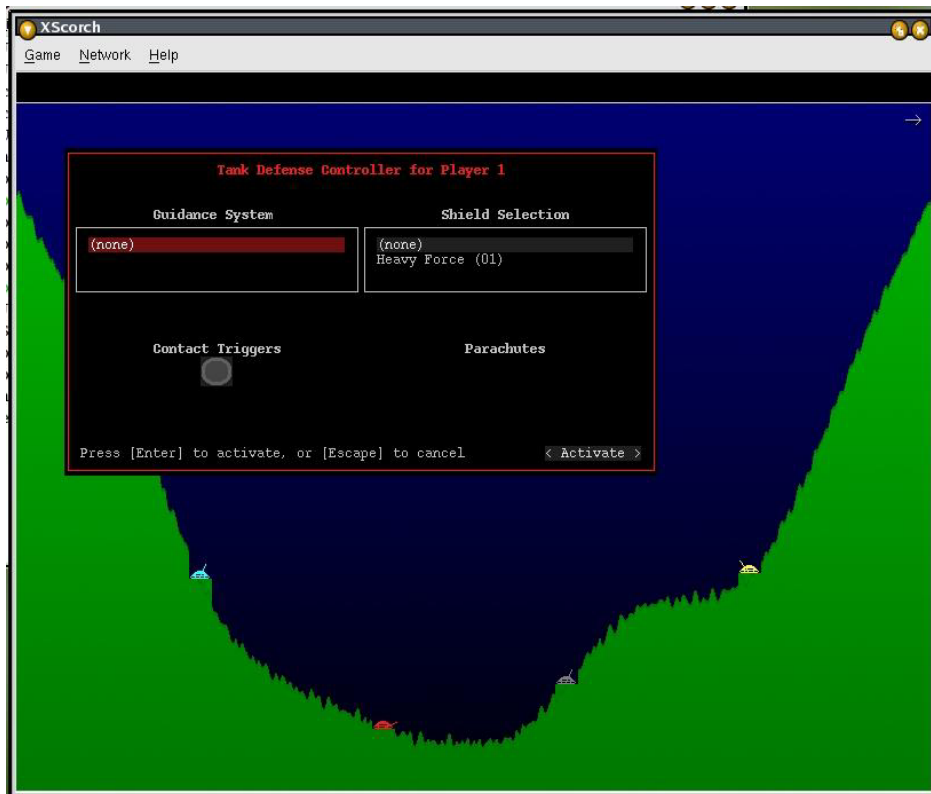
Fig. 6 Auto-defense controls.
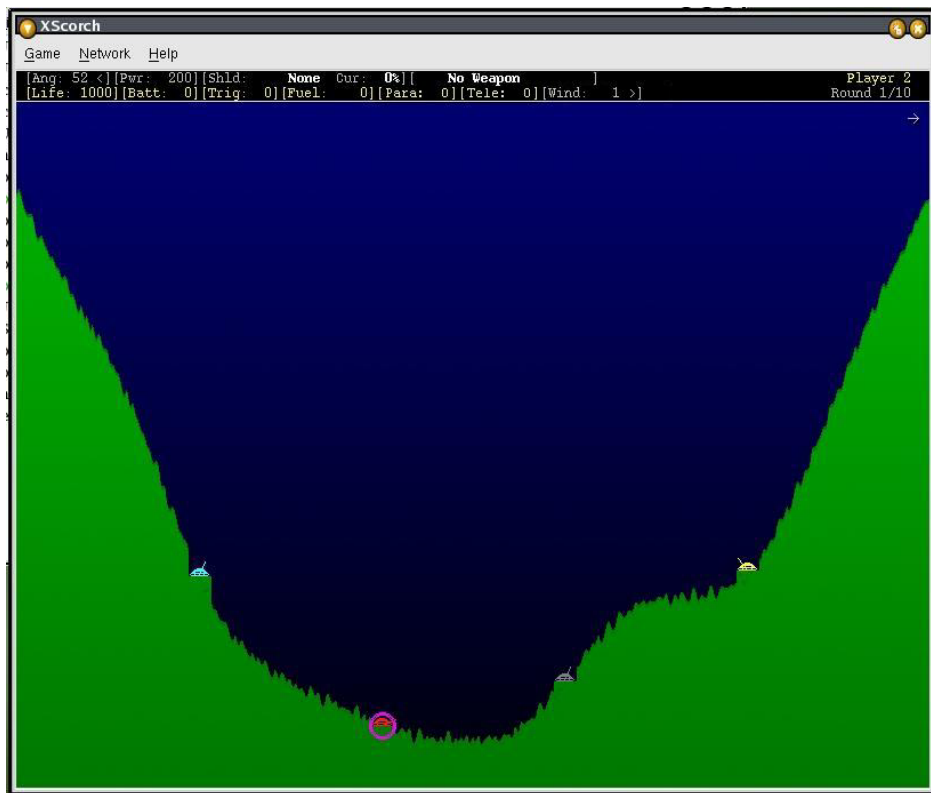
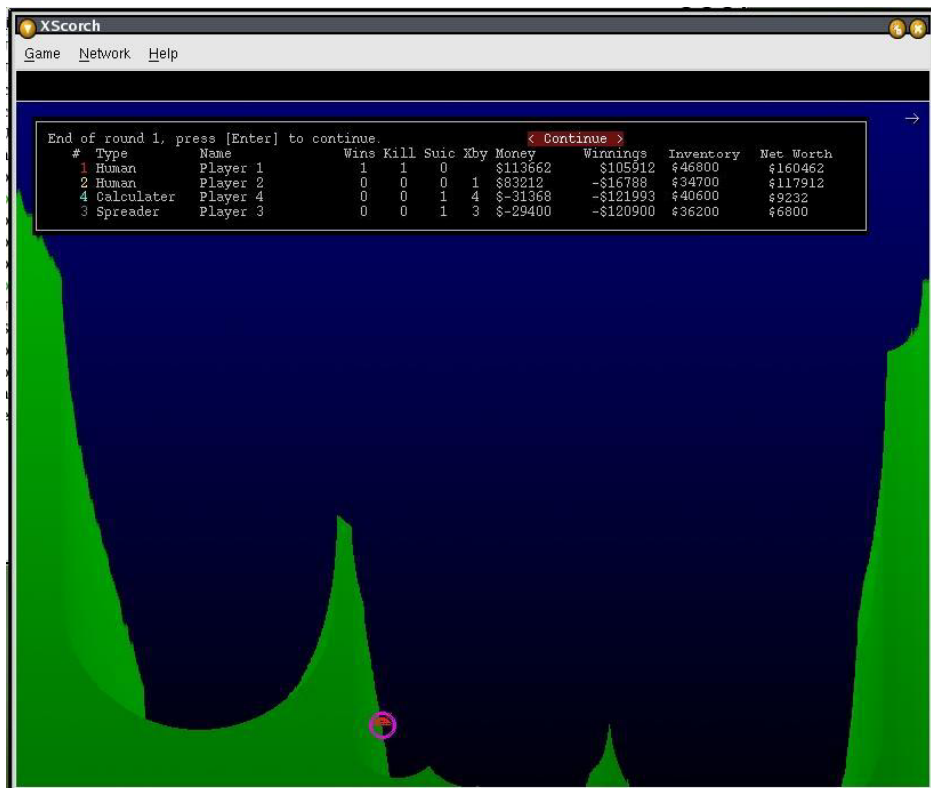**Fig. 7** In-game screen with extended status bar.

Fig. 8 End-of-round screen showing winners ordered according to greedy scoring rules.
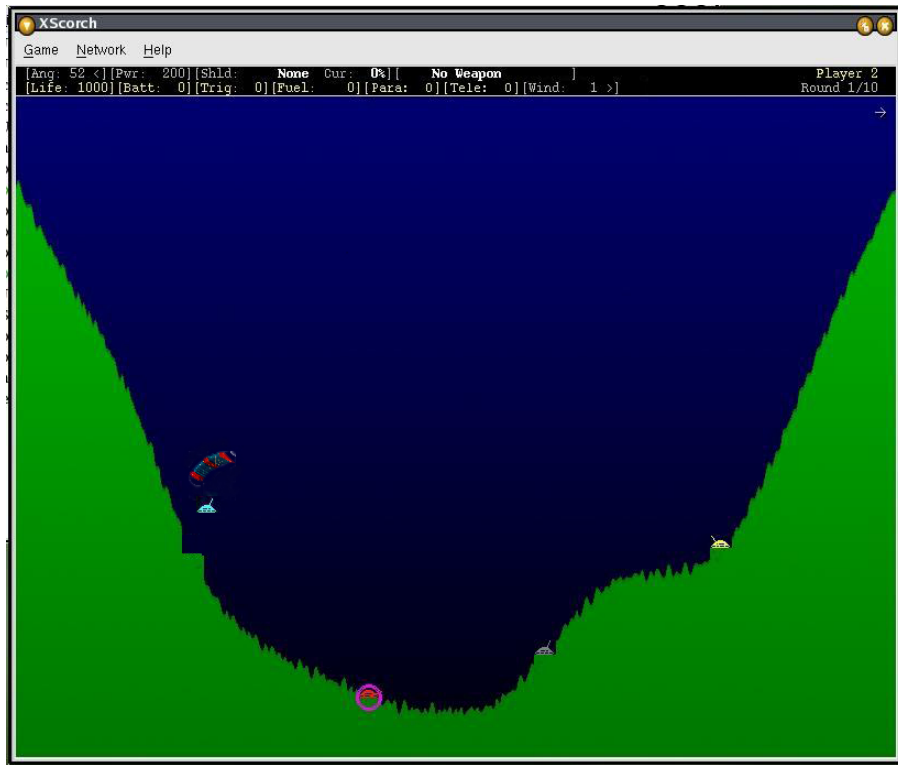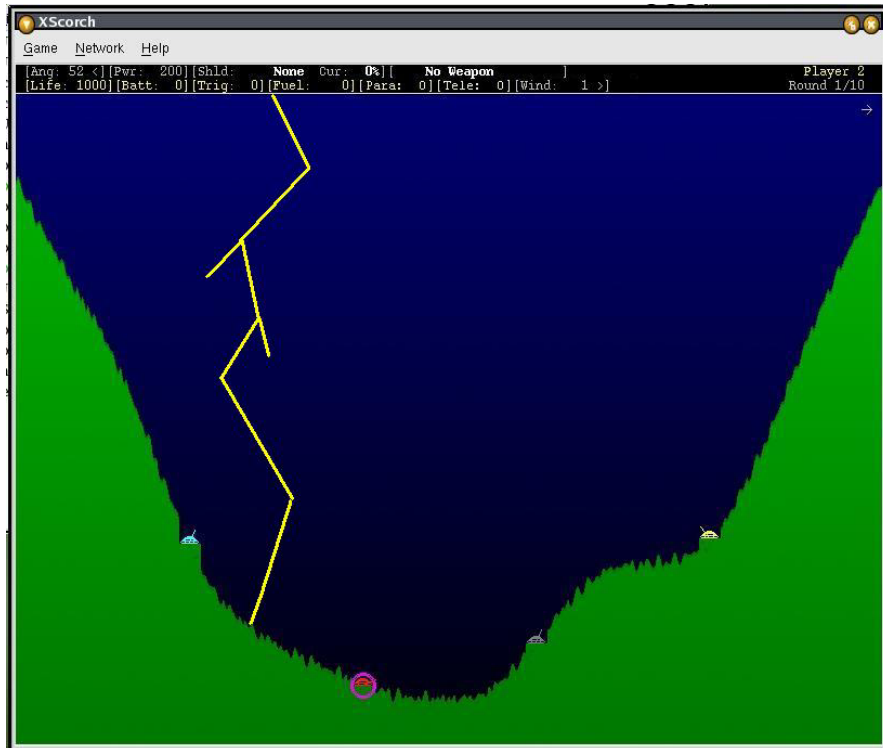
Fig. 9 In-game shot showing tank falling with parachute.

Fig. 10 In-game shot showing lightning strike in random location.