

An aerial photograph showing a heavily damaged urban area. The ground is covered in rubble, debris, and charred remains. Several large, rectangular structures, possibly warehouses or industrial buildings, are visible, many of which appear to be partially destroyed or reduced to skeletal remains. The surrounding area is a mix of light-colored earth and dark, charred patches. The overall scene conveys a sense of significant destruction and devastation.

**INCREASING TACTICAL
SITUATIONAL AWARENESS BY
MEAN OF OPEN
SOURCE MULTIPURPOSE
INTEGRATED UAS-C2 SYSTEM**

ROADMAP OF DEVELOPMENT

- ▶ July 2014 – roll out version 1, Android-based digital map system for tactical level operation (Situational awareness at group and company levels)



- ▶ September 2014 – version 2, the first version of field artillery C2 system including 3D digital maps, guns libraries and calculators

- ▶ November 2014 – integration with counter artillery radar system AN/TPQ-48 (NATO)



ROADMAP OF DEVELOPMENT

- ▶ March 2015 – connectivity add-on module, its integration with Russian AZK-7 artillery radar system (A3K-7 "ME3OTPOH"), which is still used by the Ukrainian Army



- ▶ April 2015 – roll out own mobile high-level encrypted router, its integration with Motorola and Harris communication systems (NATO)
- ▶ December 2015 – integration with firefinder weapon locating system AN/TPQ-36 (NATO)



ROADMAP OF DEVELOPMENT

- 2015-2016 – UAV integration (aerial reconnaissance, weather observation, relay radio communications)



- 2016-2017 – integration with Aselsan communications system and SatCom
- 2017-present – integration with armored C2 vehicle and UAV fleet



MATERIALS

- ▶ Open source Linux OS
- ▶ Open source Android OS
- ▶ Open source Java programming language
- ▶ Off-the-shelf moderately priced rugged laptop and lightweight commercial tablet
- ▶ Moderately priced COTS UAV

**AND CRUCIAL THING IS
BRIGHT AND TALENTED BRAINS**



DESCRIPTION: Standard configuration



- Rugged laptop or tablet
- Encrypted modem
- Radio/comm module (BT, Wi-Fi, USB, RJ-45)
- Fuzzy module (calculator, visualization, reports, scenes)
- Guns libraries (basic, optional customer dependent)
- UAV module
- Digital maps (optional customer dependent)





MAIN FUNCTIONS

- 2D/3D battlefield visualization
- Target definition
- Gun definition
- Real time field artillery fire control
- Real time aerial video surveillance
- Real aerial reconnaissance
- Aerial weather forecast using UAV
- Real time communications

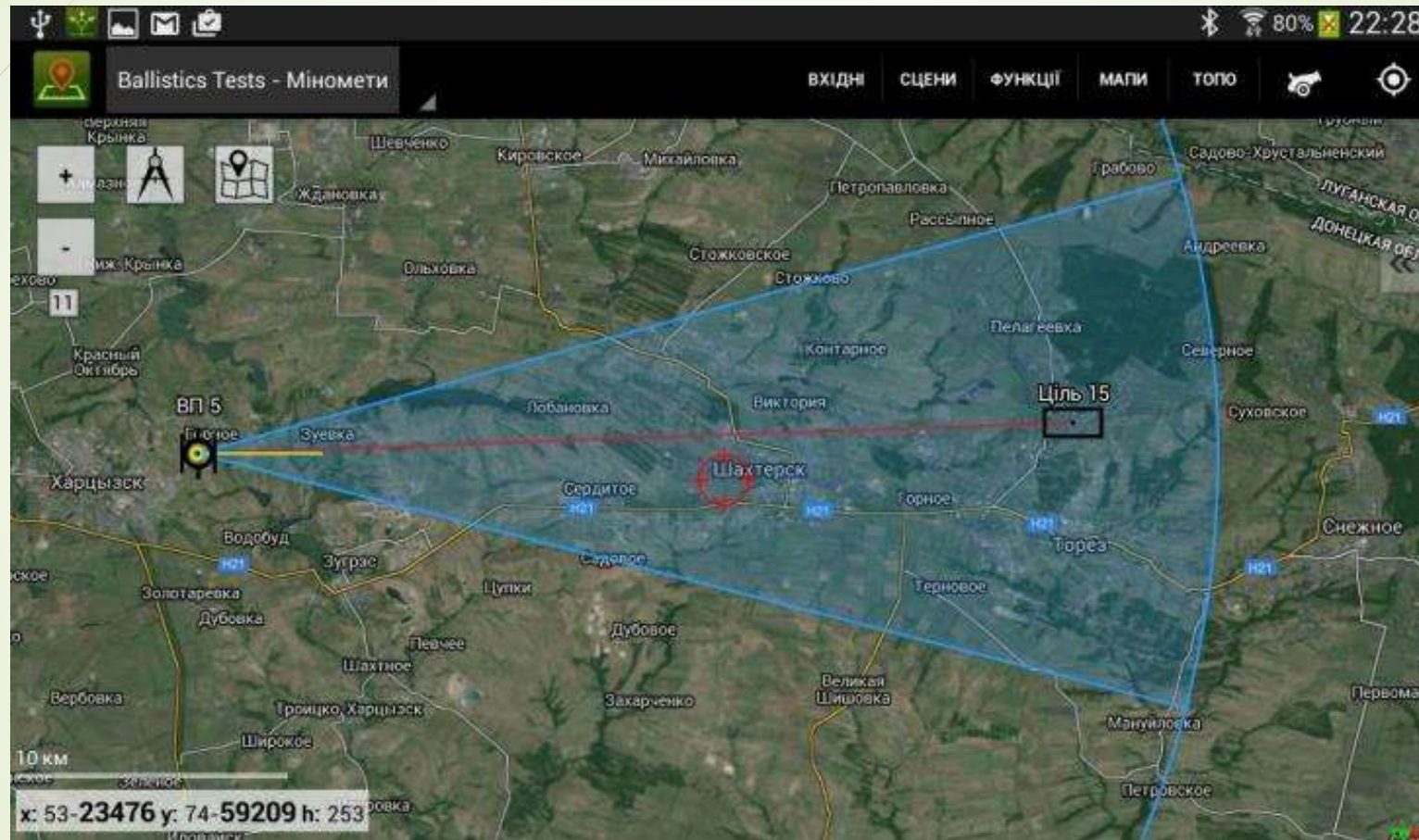
Different configurations are currently used by:

- Defense Forces
- Border Guards
- National Guards

MAIN PERFORMANCES

| Feature | Value | Comments |
|--------------------------------------|---|----------------------------------|
| Operating system | Android | 4.4+ |
| Communications | Bluetooth, Wi-Fi, RJ-45, USB, radio, SatCom, Internet | AES-256, VPN, IP |
| Geo | Offline and online maps, WGS-84, UTM and CG-42 | OpenStreetMap, Google, propriate |
| GUI language | English, French, Ukrainian | Easily customizable |
| Outdoor operating temperature | -20 ... +40 °C | |
| Weight, kg | 0.710 | Fieldbook K80 - Rugged 8" |
| Size, mm | 226 x 145 x 22 | Fieldbook K80 - Rugged 8" |
| Power supply | AC 220 W, DC 12/24 W | |

CONCLUSIONS



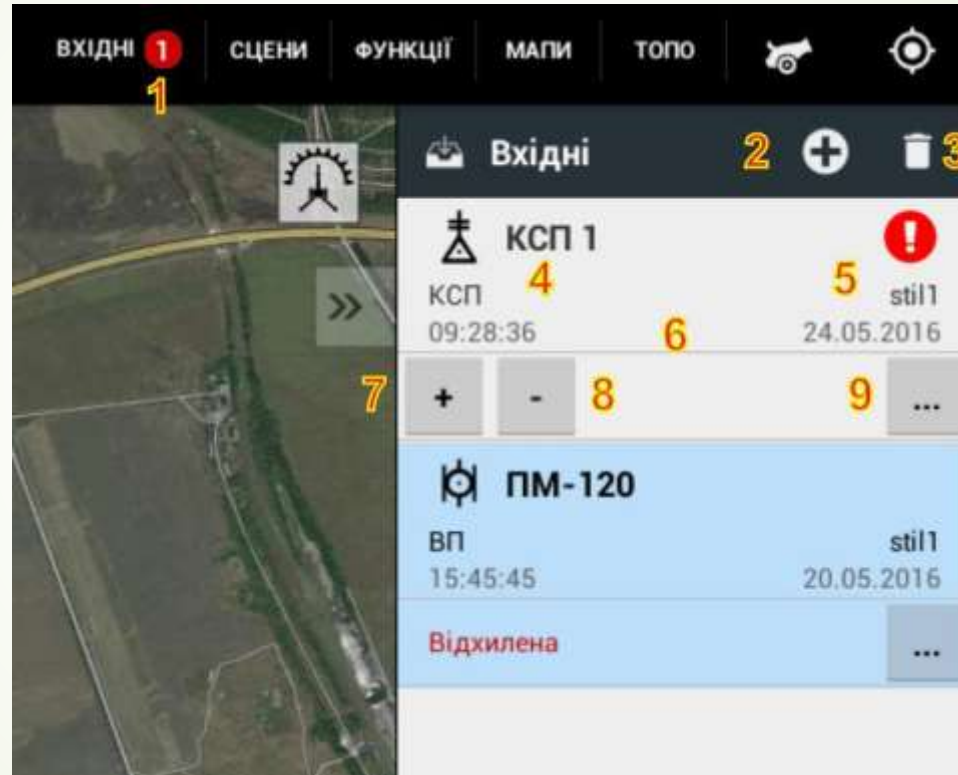
Scene visualization, target estimation and gun fire sector

CONCLUSIONS



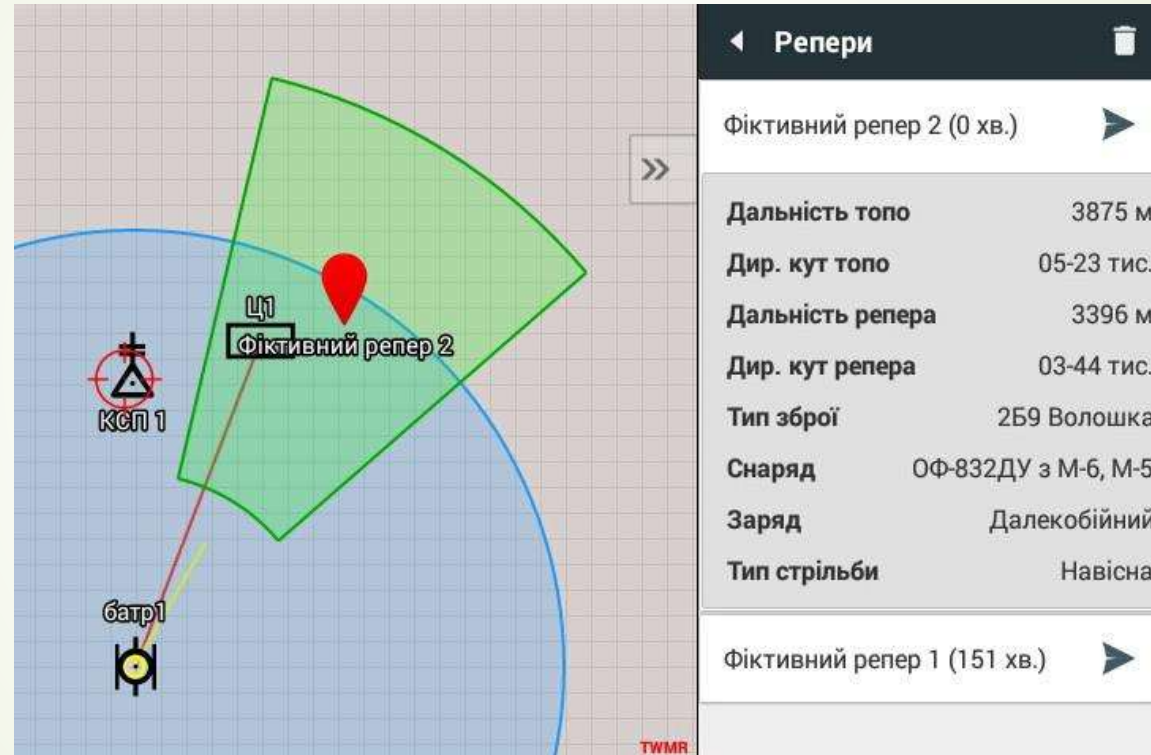
Calculation and visualization of direct fire visibility and the terrain elevation profile

CONCLUSIONS



The scene definition and the gun setup on the map:
model, position, avatar, and time in position

CONCLUSIONS



| Репери | |
|-----------------------------|---------------------|
| Фіктивний репер 2 (0 хв.) | |
| Дальність топо | 3875 м |
| Дир. кут топо | 05-23 тис. |
| Дальність репера | 3396 м |
| Дир. кут репера | 03-44 тис. |
| Тип зброї | 2Б9 Волошка |
| Снаряд | ОФ-832ДУ з М-6, М-5 |
| Заряд | Далекобійний |
| Тип стрільби | Навісна |
| Фіктивний репер 1 (151 хв.) | |

The gun settings:
maximum fire distance, parameters of fire sector, type of gun,
type of shell, shell feature, type of gun fire