



unitar

United Nations Institute for Training and Research

UNOSAT

Civil Unrest & Arson



22 June 2010

17:35 UTC - Version 1.0

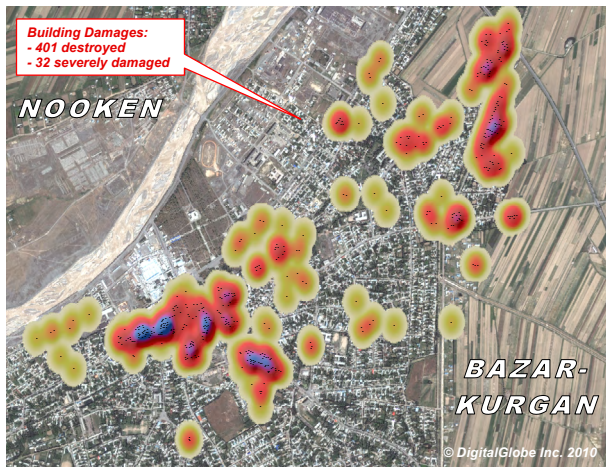
CE-2010-000113-KGZ

22 JUNE 2010 - V1

DAMAGE ASSESSMENT FOR BAZAR-KURGAN, KYRGYZSTAN

Damage Analysis Based on QuickBird02 Satellite Imagery Recorded on 18 June 2010

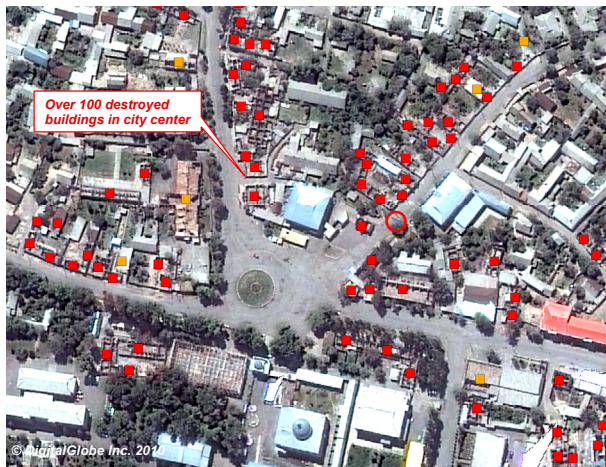
Map overview of damages in Bazar-Kurgan



Example (1) of Building Damages in Bazar-Kurgan



Example (2) of Building Damages in Bazar-Kurgan



Example (3) of Building Damages in Bazar-Kurgan



BUILDING DAMAGE CLASSIFICATION

- Building: Likely Destroyed
- Building: Likely Severely Damaged

ACTIVE FIRES BY LOCATION

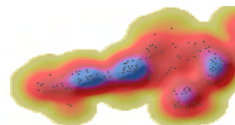
Active fire detected within 1km² area of Modis satellite pixel

- 13 June 2010
- 12 June 2010

MISC. SITE IDENTIFICATION

- ⊕ "SOS" Distress Signs
- Roadblocks

DAMAGE BUILDING DENSITY



Density of damaged buildings: red to blue shift indicates increased clustering of building damages

Note: Damage building symbols can be turned off for screen display or printing - See PDF Layers Tab at Left

Satellite Imagery : QuickBird 02
Resolution : 60cm
Imagery Date : 18 June 2010
Source : Eurimage S.p.A.
Copyright : DigitalGlobe 2010
Fire Data : MODIS Aqua - Terra
Fire Processing : U.of Maryland, NASA
Fire Dates : 9 - 14 June 2010
Admin. Data : OCHA
Analysis : UNITAR / UNOSAT
Projection : UTM Zone 43N
Datum : WGS-84

ANALYSIS NOTES: the following damage analysis is based on crisis satellite imagery from 18 June 2010 and pre-conflict satellite imagery from 21 July 2002 (provided by Google Earth). Affected buildings were classified as destroyed or severely damaged by standard image interpretation methods. The figures on building damages likely represent minimum estimates. Actual damages could be higher, especially for severe and moderate levels of building damages which are more difficult to identify with a high degree of confidence from the available satellite imagery. This is an initial damage assessment and has not yet been validated on the ground. Please send additions / corrections to UNITAR / UNOSAT at emergencymapping@unosat.org.

Bazar-Kurgan Damage Assessment by UNITAR/UNOSAT – 21 June 2010

ANALYSIS NOTES: the following damage analysis is based on crisis satellite imagery from 18 June 2010 and pre-conflict satellite imagery from 21 July 2002¹. Affected buildings were classified as destroyed or severely damaged by standard image interpretation methods. The figures on building damages likely represent minimum estimates. Actual damages could be higher, especially for severe and moderate levels of building damages which are more difficult to identify with a high degree of confidence from the available satellite imagery. This is an initial damage assessment and has not yet been validated on the ground. Please send additions / corrections to UNITAR / UNOSAT at emergencymapping@unosat.org.

DAMAGE ASSESSMENT SUMMARY:

A total of 433 affected buildings were identified within the city of Bazar-Kurgan. Of this total, 401 buildings were totally destroyed and a further 32 buildings were severely damaged. As illustrated in the overview map on page 3, a density analysis of the affected building sites indicated there are multiple clusters of building damages, located in the center and north-east of the city. Four of the largest clusters are described in detail below with a corresponding focus map within the report.

A preliminary assessment of building damage signatures indicates that arson was the probable cause because of the prevalence of destroyed rooftops with visibly intact load-bearing walls, a common signature of fire-related damages; a finding supported by the satellite detection of two active fire zones within the city at 8:10 UTC (2:10 local time) on 13 June 2010. 72% of affected buildings identified in the very high resolution satellite of the 18 June also fall within the two active fire zones, suggesting that a large majority of the identified building destruction likely occurred as a result of the detected fires on 13 June 2010.

Almost all affected buildings appear to have been residential or situated within residential neighborhoods, however there are a few cases of destroyed or severely damaged industrial warehouses or commercial / government facilities. No damages have been observed to the transportation network (e.g. roads, bridges) or other key infrastructure sites within the city. Virtually all affected buildings are directly accessible from main primary or secondary roads suggesting that the suspected arson attacks were perpetrated by individuals or groups who restricted their movement to these main transport routes. In contrast with Osh, no SOS distress signs and only three possible roadblocks were detected in Bazar-Kurgan. A small number of damaged buildings identified outside of the main damage clusters may be unrelated to the recent conflict, possibly due to recent construction / demolition or accidental house fire. No damages were identified in the town of Nookan, on the west bank of the Kara Unkur River.

BAZAR-KURGAN DAMAGE ASSESSMENT BY CLUSER SITE: (See adjacent overview map for exact location of damage clusters).

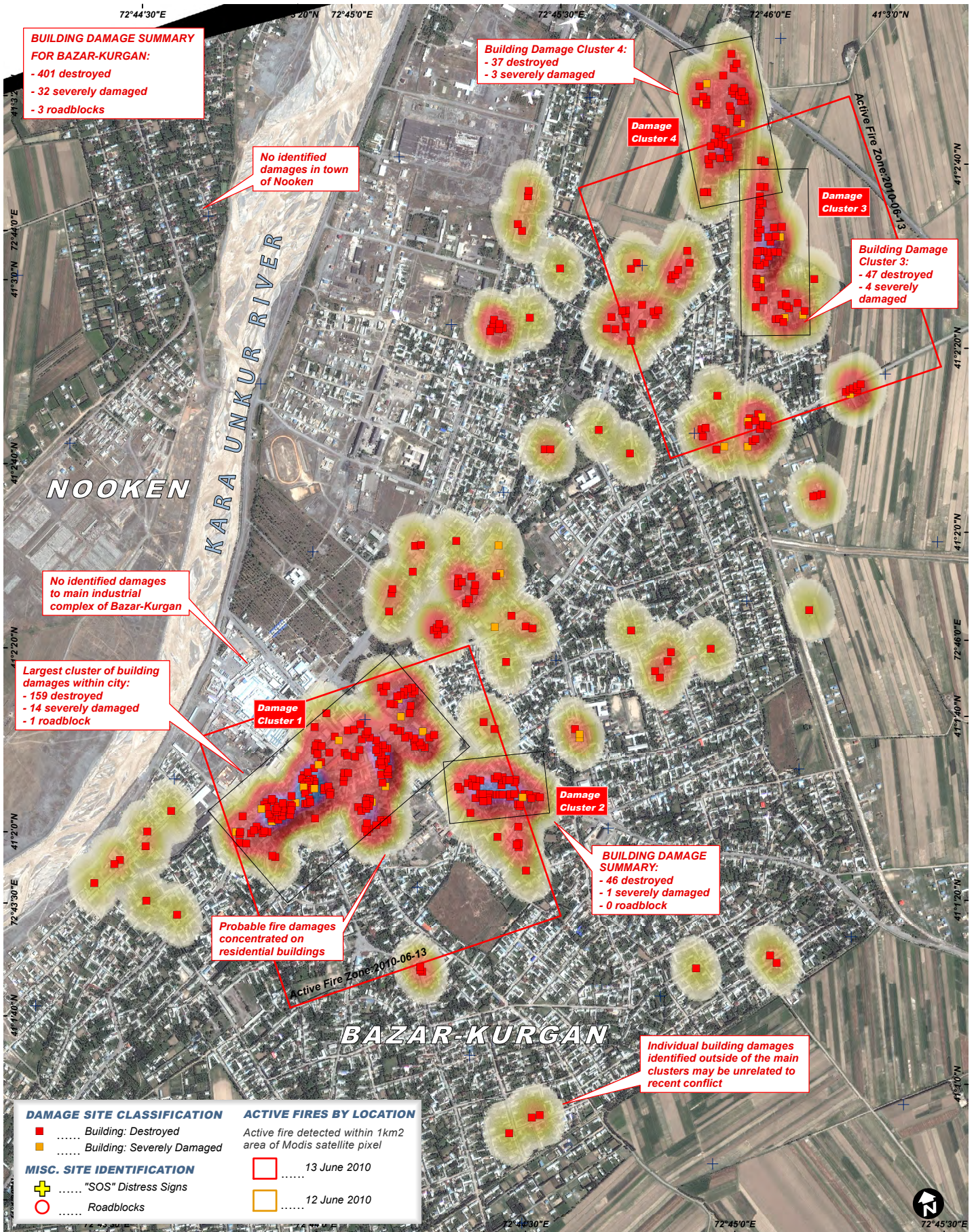
- 1) **Damage Cluster 1:** A total of 173 affected buildings were identified (159 destroyed and 14 severely damaged making this the largest cluster of building damages within city. No damages were identified to main industrial complex located immediately across a main road from the destroyed buildings, and further no damages were identified to the main city mosque.
- 2) **Damage Cluster 2:** A total of 47 affected buildings were identified in this cluster (46 destroyed and 1 severely damaged). Probable fire damages concentrated on residential buildings with no visible damages to adjacent commercial warehouses / building complexes.
- 3) **Damage Cluster 3:** A total of 51 affected buildings were identified in this cluster (47 destroyed and 4 severely damaged).
- 4) **Damage Cluster 4:** A total of 40 affected buildings were identified in this cluster (37 destroyed and 3 severely damaged).

¹ Pre-conflict imagery from Google Earth recorded on 21 July 2002



OVERVIEW OF DAMAGES IN BAZAR-KURGAN

DAMAGE ANALYSIS BASED ON QUICKBIRD02 SATELLITE IMAGERY RECORDED ON 18 JUNE 2010



Satellite Imagery : QuickBird 02
Resolution : 60cm
Imagery Date : 18 June 2010
Source : Eurimage S.p.A.
Copyright : DigitalGlobe 2010

Admin. Data :OCHA
Analysis :UNITAR / UNOSAT
Analysis Date : 18-19 June 2010
Projection :UTM Zone 43N
Datum :WGS-84

Note: Damage building symbols can be turned off for screen display or printing - See PDF Layers Tab at Left

Map Scale for A4: 1:18,000
Data Frame Rotated 19 degrees

0 250 500 Meters

UNOSAT

The depiction and use of boundaries, geographic names and related data shown here are not warranted to be error-free nor do they imply official endorsement or acceptance by the United Nations. UNOSAT is a program of the United Nations Institute for Training and Research (UNITAR), providing satellite imagery & related geographic information, research and analysis to UN humanitarian & development agencies & their implementing partners.



unitar

United Nations Institute for Training and Research

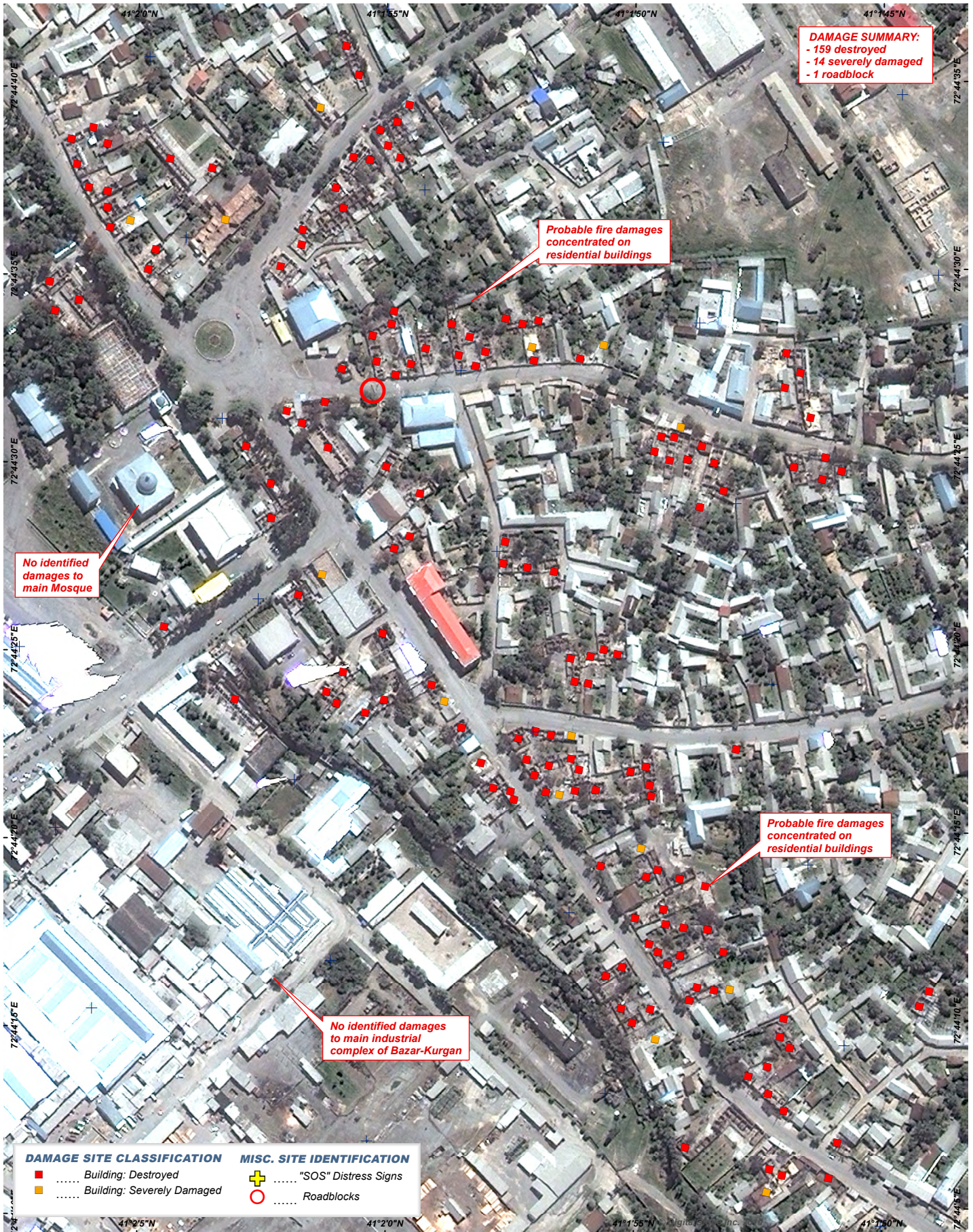
Contact Information: unosat@unitar.org 24/7 Hotline: +41 76 487 4998 www.unosat.org



BAZAR-KURGAN FOCUS: DAMAGE CLUSTER 1

Note: Damage building symbols can be turned off for screen display or printing - See PDF Layers Tab

DAMAGE ANALYSIS BASED ON QUICKBIRD02 SATELLITE IMAGERY RECORDED ON 18 JUNE 2010

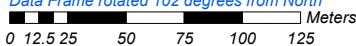


Satellite Imagery : QuickBird 02
Resolution : 60cm
Imagery Date : 18 June 2010
Source : Eurimage S.p.A.
Copyright : DigitalGlobe 2010

Admin. Data :OCHA
Analysis :UNITAR / UNOSAT
Analysis Date: 18-19 June 2010
Projection :UTM Zone 43N
Datum :WGS-84



Map Scale for A4: 1:3,250
Data Frame rotated 102 degrees from North



The depiction and use of boundaries, geographic names and related data shown here are not warranted to be error-free nor do they imply official endorsement or acceptance by the United Nations. UNOSAT is a program of the United Nations Institute for Training and Research (UNITAR), providing satellite imagery & related geographic information, research and analysis to UN humanitarian & development agencies & their implementing partners.



unitar

United Nations Institute for Training and Research

UNOSAT

Contact Information: unosat@unitar.org 24/7 Hotline: +41 76 487 4998 www.unosat.org



BAZAR-KURGAN FOCUS: DAMAGE CLUSTER 2

Note: Damage building symbols can be turned off for screen display or printing - See PDF Layers Tab

DAMAGE ANALYSIS BASED ON QUICKBIRD02 SATELLITE IMAGERY RECORDED ON 18 JUNE 2010



Satellite Imagery : QuickBird 02
Resolution : 60cm
Imagery Date : 18 June 2010
Source : Eurimage S.p.A.
Copyright : DigitalGlobe 2010

Admin. Data : OCHA
Analysis : UNITAR / UNOSAT
Analysis Date : 18-19 June 2010
Projection : UTM Zone 43N
Datum : WGS-84



Map Scale for A4: 1:1,900
Data Frame rotated 102 degrees from North
0 12.5 25 50 75 Meters

The depiction and use of boundaries, geographic names and related data shown here are not warranted to be error-free nor do they imply official endorsement or acceptance by the United Nations. UNOSAT is a program of the United Nations Institute for Training and Research (UNITAR), providing satellite imagery & related geographic information, research and analysis to UN humanitarian & development agencies & their implementing partners.



unitar

United Nations Institute for Training and Research

UNOSAT

Contact Information: unosat@unitar.org 24/7 Hotline: +41 76 487 4998 www.unosat.org



BAZAR-KURGAN FOCUS: DAMAGE CLUSTER 3

Note: Damage building symbols can be turned off for screen display or printing - See PDF Layers Tab

DAMAGE ANALYSIS BASED ON QUICKBIRD02 SATELLITE IMAGERY RECORDED ON 18 JUNE 2010

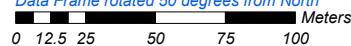


Satellite Imagery : QuickBird 02
Resolution : 60cm
Imagery Date : 18 June 2010
Source : Eurimage S.p.A.
Copyright : DigitalGlobe 2010

Admin. Data : OCHA
Analysis : UNITAR / UNOSAT
Analysis Date : 18-19 June 2010
Projection : UTM Zone 43N
Datum : WGS-84



Map Scale for A4: 1:2,700
Data Frame rotated 50 degrees from North



The depiction and use of boundaries, geographic names and related data shown here are not warranted to be error-free nor do they imply official endorsement or acceptance by the United Nations. UNOSAT is a program of the United Nations Institute for Training and Research (UNITAR), providing satellite imagery & related geographic information, research and analysis to UN humanitarian & development agencies & their implementing partners.



unitar

United Nations Institute for Training and Research

UNOSAT

Contact Information: unosat@unitar.org 24/7 Hotline: +41 76 487 4998 www.unosat.org



BAZAR-KURGAN FOCUS: DAMAGE CLUSTER 4

Note: Damage building symbols can be turned off for screen display or printing - See PDF Layers Tab

DAMAGE ANALYSIS BASED ON QUICKBIRD02 SATELLITE IMAGERY RECORDED ON 18 JUNE 2010



Satellite Imagery : QuickBird 02
Resolution : 60cm
Imagery Date : 18 June 2010
Source : Eurimage S.p.A.
Copyright : DigitalGlobe 2010

Admin. Data :OCHA
Analysis :UNITAR / UNOSAT
Analysis Date: 18-19 June 2010
Projection :UTM Zone 43N
Datum :WGS-84



Map Scale for A4: 1:2,000

Data Frame rotated 50 degrees from North



The depiction and use of boundaries, geographic names and related data shown here are not warranted to be error-free nor do they imply official endorsement or acceptance by the United Nations. UNOSAT is a program of the United Nations Institute for Training and Research (UNITAR), providing satellite imagery & related geographic information, research and analysis to UN humanitarian & development agencies & their implementing partners.



unitar

United Nations Institute for Training and Research

UNOSAT

Contact Information: unosat@unitar.org 24/7 Hotline: +41 76 487 4998 www.unosat.org

Knowledge to lead

■ UNITAR/UNOSAT satellite solutions

The UNITAR advantage

Since its establishment in 1965, UNITAR has built a unique set of expertise, experience, knowledge and capacities to design and implement a variety of research and training activities. In keeping with its mandate to “enhance the effectiveness of the United Nations in achieving the major objectives of the Organization” the Institute contributes with concrete actions to developing the capacities of Member States in the fields of economic and social development, diplomacy, and peace and security

Reaching out to beneficiaries

UNITAR programmes provide training to approximately 80,000 professionals every year in some 200 different types of training activities, applying both face-to-face and distance-learning methodologies. Technology and satellite applications are gaining an important place in these activities as a growing number of UN and national entities adopt satellite derived geographic information methodologies in which UNOSAT, the Operational Satellite Applications Programme of UNITAR, excels since 2001

A challenging mission

UNITAR mission is to deliver innovative training and conduct research on knowledge systems to develop the capacity of beneficiaries. Building on our experience, we optimize expertise, information and knowledge-sharing to achieve this mission. The specific mission of UNOSAT is to develop applied solutions and use training to make the UN system and member states benefit from space technology in the areas of human security and humanitarian relief, disaster prevention and territorial planning, and all other relevant areas

UNOSAT: setting a new paradigm in satellite applications

Since 2001, UNOSAT has delivered satellite solutions to relief and development organisations within and outside the UN system and member states to help make a difference in the life of communities exposed to poverty, hazards, and conflict or affected by humanitarian and other crises. Our skills are focused on satellite derived geographic information and data analysis. Our work record includes over 1000 analyses since 200, and 150 activations during humanitarian crises since 2003. UNOSAT is also a specialised training force with capacity to train national experts in situ or at headquarters in Geneva.

For information and contacts: Unosat@unitar.org or www.unitar.org/research

