Damage Assessment for Bazar-Kurgan, Kyrgyzstan

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

Example (1) of Building Damages in Bazar-Kurgan

Example (2) of Building Damages in Bazar-Kurgan

Example (3) of Building Damages in Bazar-Kurgan

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

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: Eumige S.p.A.
Copyright: DigitalGlobe 2010
Fire Data: MODIS Aqua - Terra
Fire Processing: L3 Lot Maryland, NASA
Fire Dates: 9 - 14 June 2010
Admin. Data: OCHA
Analysis: UNITAR / UNOSAT
Projection: UTM Zone 43N
Datum: WGS-84

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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 2002\(^1\). 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 Nooken, 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 the city. No damages were identified to the 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).

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\(^1\) 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

Building Damage Summary for Bazar-Kurgan:
- 401 destroyed
- 159 severely damaged
- 3 roadblocks

Damage Cluster 1:
- 14 severely damaged
- 1 roadblock

Damage Cluster 2:
- 1 severely damaged

Damage Cluster 3:
- 47 destroyed
- 4 severely damaged

Damage Cluster 4:
- 37 destroyed
- 3 severely damaged

No identified damages to main industrial complex of Bazar-Kurgan

Largest cluster of building damages within city:
- 159 destroyed
- 14 severely damaged
- 1 roadblock

Probable fire damages concentrated on residential buildings

Individual building damages identified outside of the main clusters may be unrelated to recent conflict

MISC. Site Identification
- "SOS" Distress Signs
- Roadblocks

Data Frame Rotated 19 degrees

Map Scale for A4: 1:10,000

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BAZAR-KURGAN FOCUS: DAMAGE CLUSTER 1

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

DAMAGE SUMMARY:
- 159 destroyed
- 14 severely damaged
- 1 roadblock

Probable fire damages concentrated on residential buildings

No identified damages to main Mosque

No identified damages to main industrial complex of Bazar-Kurgan

DAMAGE SITE CLASSIFICATION
- Building: Destroyed
- Building: Severely Damaged

MISC. SITE IDENTIFICATION
- "SOS" Distress Signs
- Roadblocks

Satellite Imagery: QuickBird 02
Resolution: 60cm
Image 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

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BAZAR-KURGAN FOCUS: DAMAGE CLUSTER 2

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

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

DAMAGE SUMMARY:
- 46 destroyed
- 1 severely damaged
- 0 roadblock

Probable fire damages concentrated on residential buildings

No identified damages to large commercial warehouses

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

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

Data Frame rotated 102 degrees from North

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

BUILDING DAMAGE
SUMMARY:
- 37 destroyed
- 3 severely damaged

Probable fire damages concentrated on residential buildings

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

Remote Sensing: UNITAR / UNOSAT
Analysis Date: 18-19 June 2010
Projection: UTM Zone 43N
Datum: WGS-84

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

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