

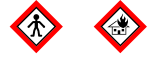


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United Nations Institute for Training and Research

UNOSAT

Civil Unrest & Arson



25 June 2010

17:45 UTC - Version 1.0

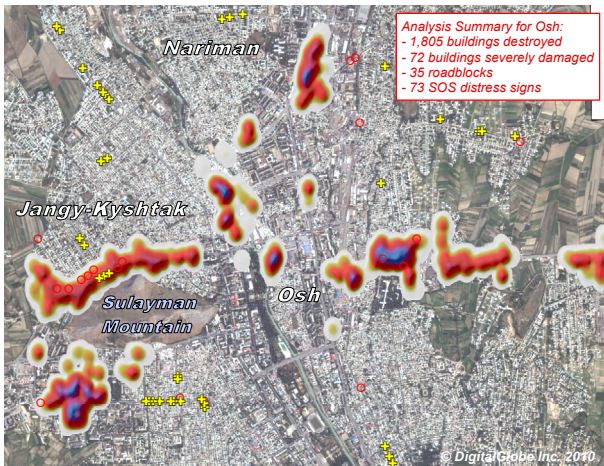
CE-2010-000113-KGZ

25 JUNE 2010 - V1

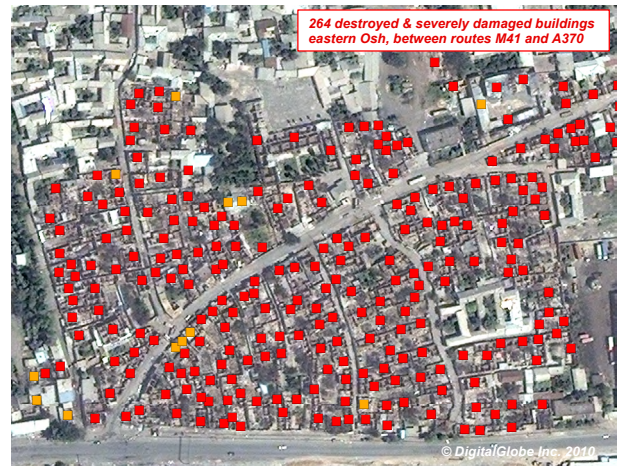
DAMAGE ASSESSMENT FOR OSH, KYRGYZSTAN

Damage Analysis Based on QuickBird-02 Satellite Imagery Recorded on 18 June 2010

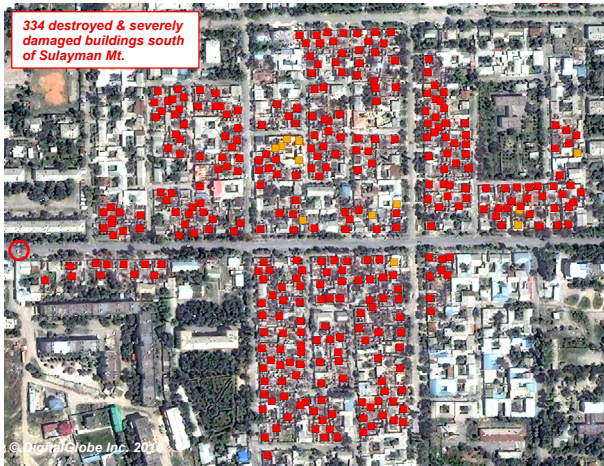
Overview of Building Damages in Osh



Example (1) of Building Damages in Osh



Example (2) of Building Damages in Osh



Example of SOS Distress Signs in Osh



BUILDING DAMAGE CLASSIFICATION

- Building: Likely Destroyed
- Building: Likely Severely Damaged

MISC. SITE IDENTIFICATION

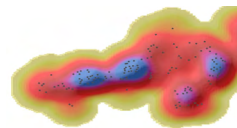
- ⊕ "SOS" Distress Signs
- Roadblocks

ACTIVE FIRES BY LOCATION

Active fire detected within 1km² area of Modis satellite pixel

- 13 June 2010
- 12 June 2010

DAMAGE BUILDING DENSITY



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

Note: Damage building symbols and imagery 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. 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.

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Osh, Kyrgyzstan Damage Assessment by UNITAR/UNOSAT – 25 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:

This is a quantitative damage summary for the city of Osh based on a detailed analysis of crisis satellite imagery acquired on the morning of 18 June 2010. A total of 1,877 affected buildings were identified within the city of Osh. Of this total, 1,805 buildings were totally destroyed and 72 were severely damaged. A further 73 SOS distress signs and 32 roadblocks were also identified as likely indications of distressed ethnic-Uzbek neighborhoods. As illustrated in the overview map on page 3, a density analysis of the affected building sites indicated there are seven major clusters of destruction located along an approximate east-west axis through the center of the city². Within these spatial clusters there is a pronounced degree of damage type homogeneity of near total building destruction, with sharply defined boundaries between affected and unaffected neighborhoods.

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 six active fire zones within the city at 6:25 UTC (12:25 local time) on 12 and 13 June 2010. 52% of affected buildings identified in the satellite imagery of 18 June also fall within the six active fire zones, suggesting that a majority of the building destruction likely occurred as a result of the detected afternoon fires on 12 and 13 June 2010.

A significant majority of 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. 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.

There is compelling evidence to suggest that there are several ethnic-Uzbek neighborhoods within the city of Osh that are potentially still heavily populated and relatively undamaged by the reported arson attacks. These distressed neighborhoods have been identified by the presence of multiple road blocks at main road and bridge entry points, as well as the presence of multiple "SOS" signs painted on interior roads within clearly defined residential areas. In most of these neighborhoods, a large majority of buildings appear to be undamaged and thus could still provide shelter to thousands of local residents. 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.

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

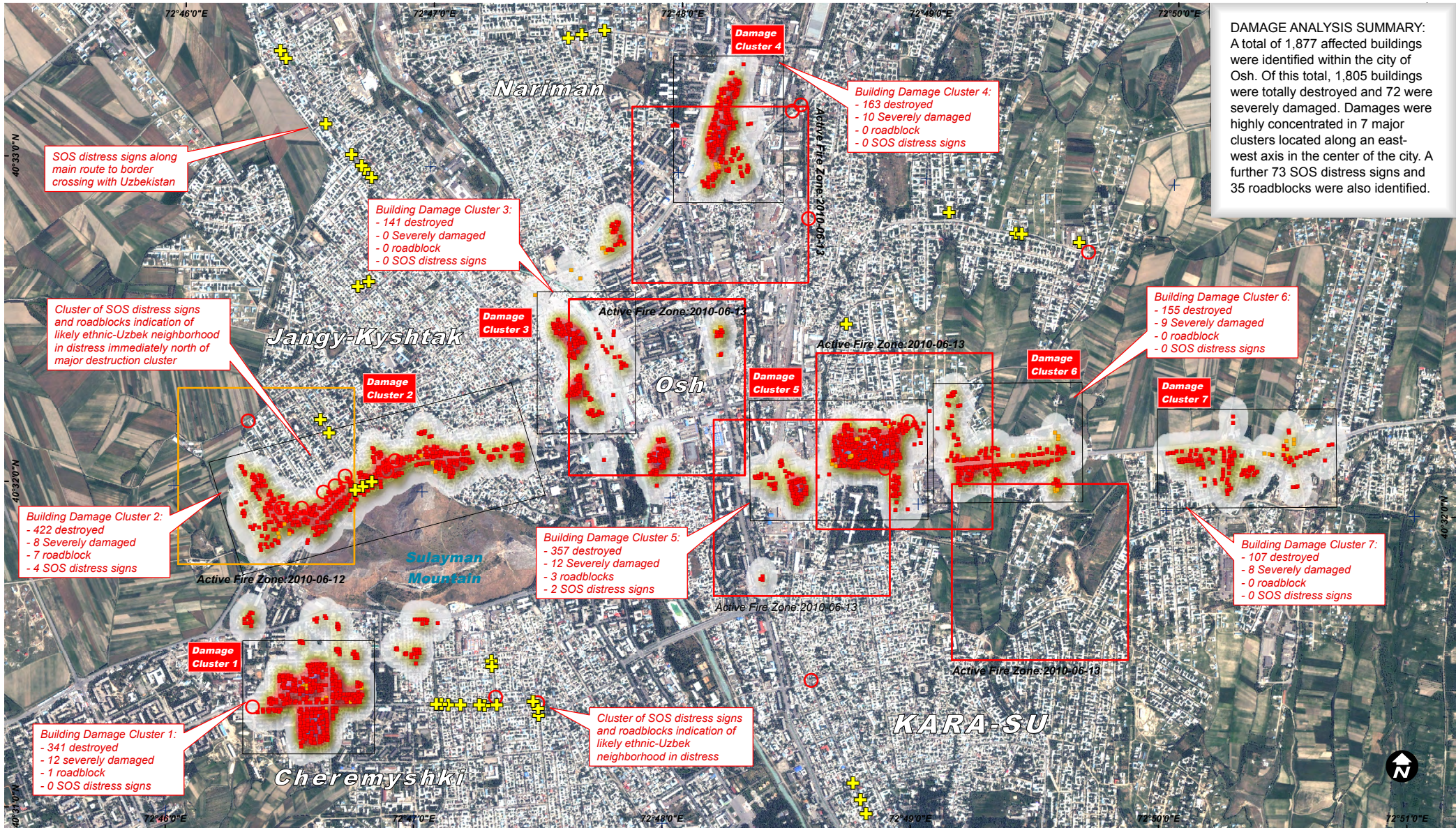
- 1) **Damage Cluster 1:** A total of 353 affected buildings were identified (341 destroyed and 12 severely damaged) south of Sulayman mountain in Cheremyski. One roadblock was also identified. A cluster of SOS distress signs and roadblocks half a kilometer east is an indication of a probable ethnic-Uzbek neighborhood in distress.
- 2) **Damage Cluster 2:** A total of 430 affected buildings were identified in this cluster (422 destroyed and 8 severely damaged) making this the largest cluster of building damages within city. A further 7 roadblock and 4 SOS distress signs were identified. A cluster of SOS signs and roadblocks immediately north of these damaged buildings is a likely indication of an ethnic-Uzbek neighborhood in distress.
- 3) **Damage Cluster 3:** A total of 141 affected buildings were identified in this cluster (141 destroyed and 0 severely damaged).
- 4) **Damage Cluster 4:** A total of 173 affected buildings were identified in this cluster (163 destroyed and 10 severely damaged).
- 5) **Damage Cluster 5:** A total of 369 affected buildings were identified in this cluster (357 destroyed and 12 severely damaged). A further 3 roadblock and 2 SOS distress signs were identified.
- 6) **Damage Cluster 6:** A total of 164 affected buildings were identified in this cluster (155 destroyed and 9 severely damaged).
- 7) **Damage Cluster 7:** A total of 115 affected buildings were identified in this cluster (107 destroyed and 8 severely damaged).

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

² Each cluster has a corresponding focus map within the report.

OVERVIEW OF DAMAGES IN OSH

Damage Analysis Based on QuickBird-02
Satellite Imagery Recorded on 18 June 2010



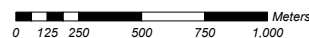
DAMAGE ANALYSIS SUMMARY:
A total of 1,877 affected buildings were identified within the city of Osh. Of this total, 1,805 buildings were totally destroyed and 72 were severely damaged. Damages were highly concentrated in 7 major clusters located along an east-west axis in the center of the city. A further 73 SOS distress signs and 35 roadblocks were also identified.

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 and the imagery can be turned off for screen display or printing - See PDF Layers Tab at Left

Map Scale for A4: 1:30,000



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DAMAGE SITE CLASSIFICATION

- Building: Destroyed
- Building: Severely Damaged
- ⊕ "SOS" Distress Signs
- Roadblocks

ACTIVE FIRES BY LOCATION

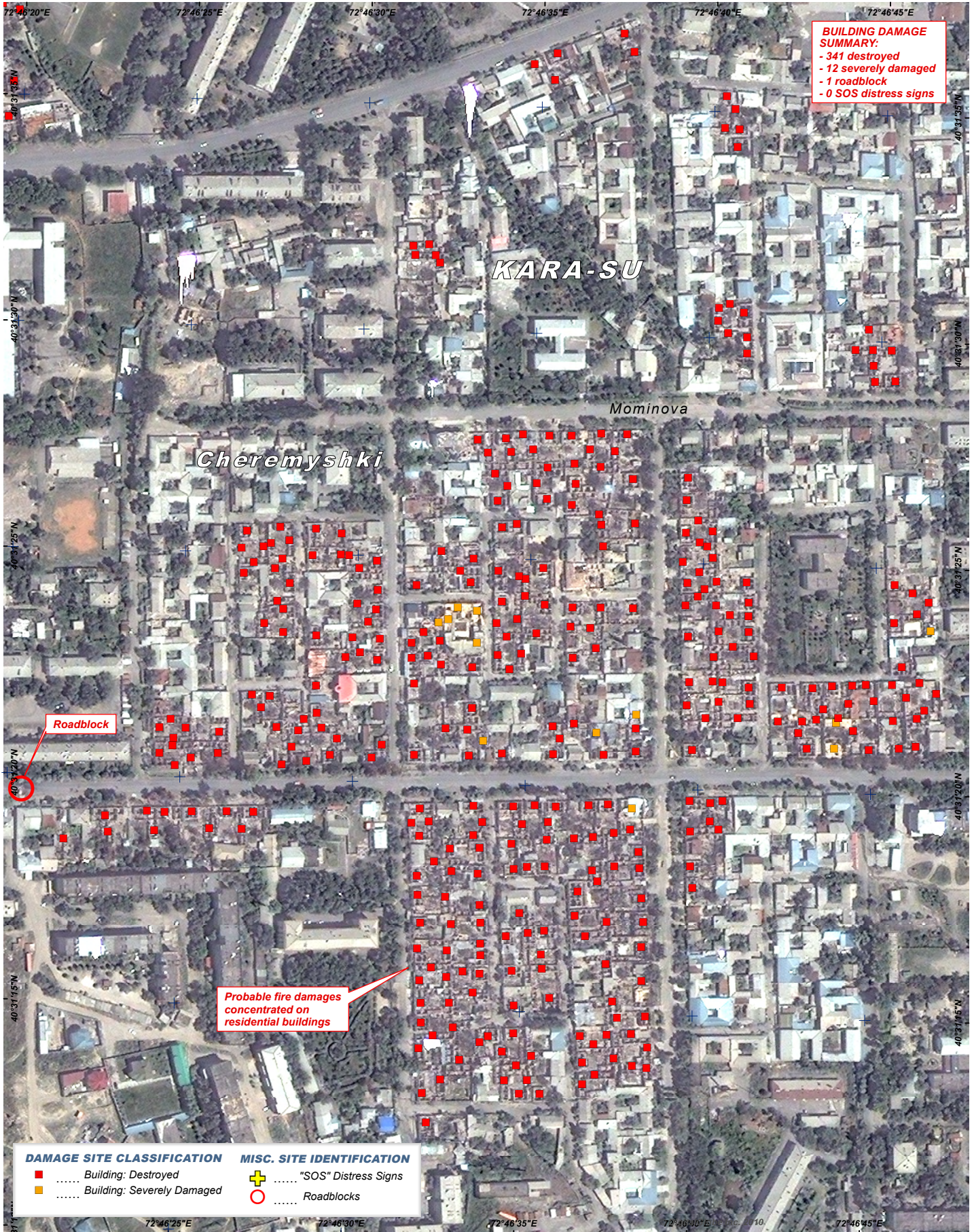
- Active fire detected within 1km² area of Modis satellite pixel
- 13 June 2010
 - 12 June 2010



OSH FOCUS MAP: DAMAGE CLUSTER 1

Note: Damage building symbols and imagery 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

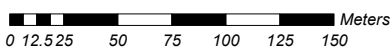


Satellite Imagery : QuickBird 02
Resolution : 60cm
Imagery Date : 18 June 2010
Source : Eurimage S.p.A.
Copyright : DigitalGlobe 2010

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



Map Scale for A4: 1:3,500



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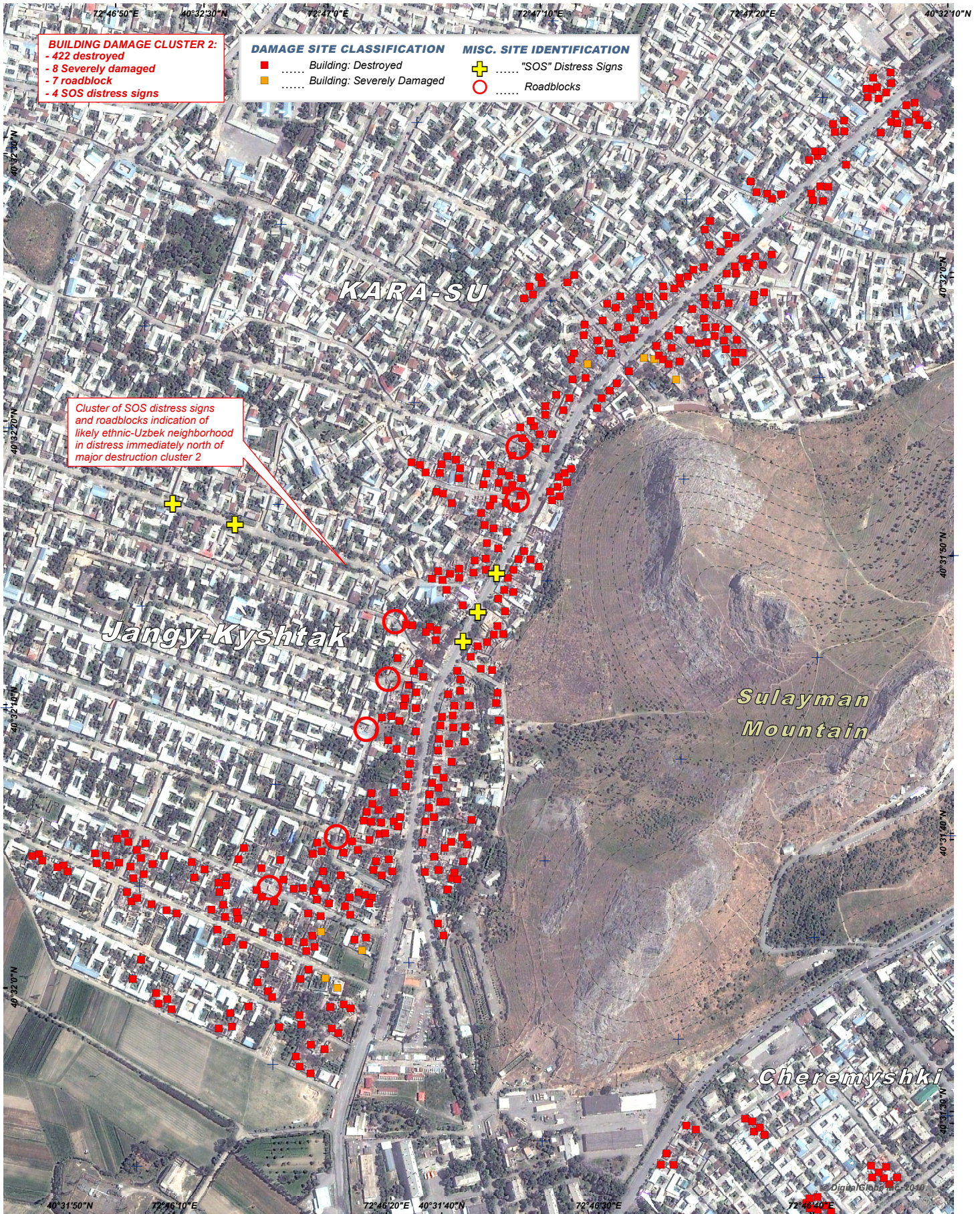
Contact Information: unosat@unitar.org 24/7 Hotline: +41 76 487 4998 www.unosat.org



OSH FOCUS MAP: DAMAGE CLUSTER 2

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

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: 1:7,000

Map frame rotated 40 degrees from north



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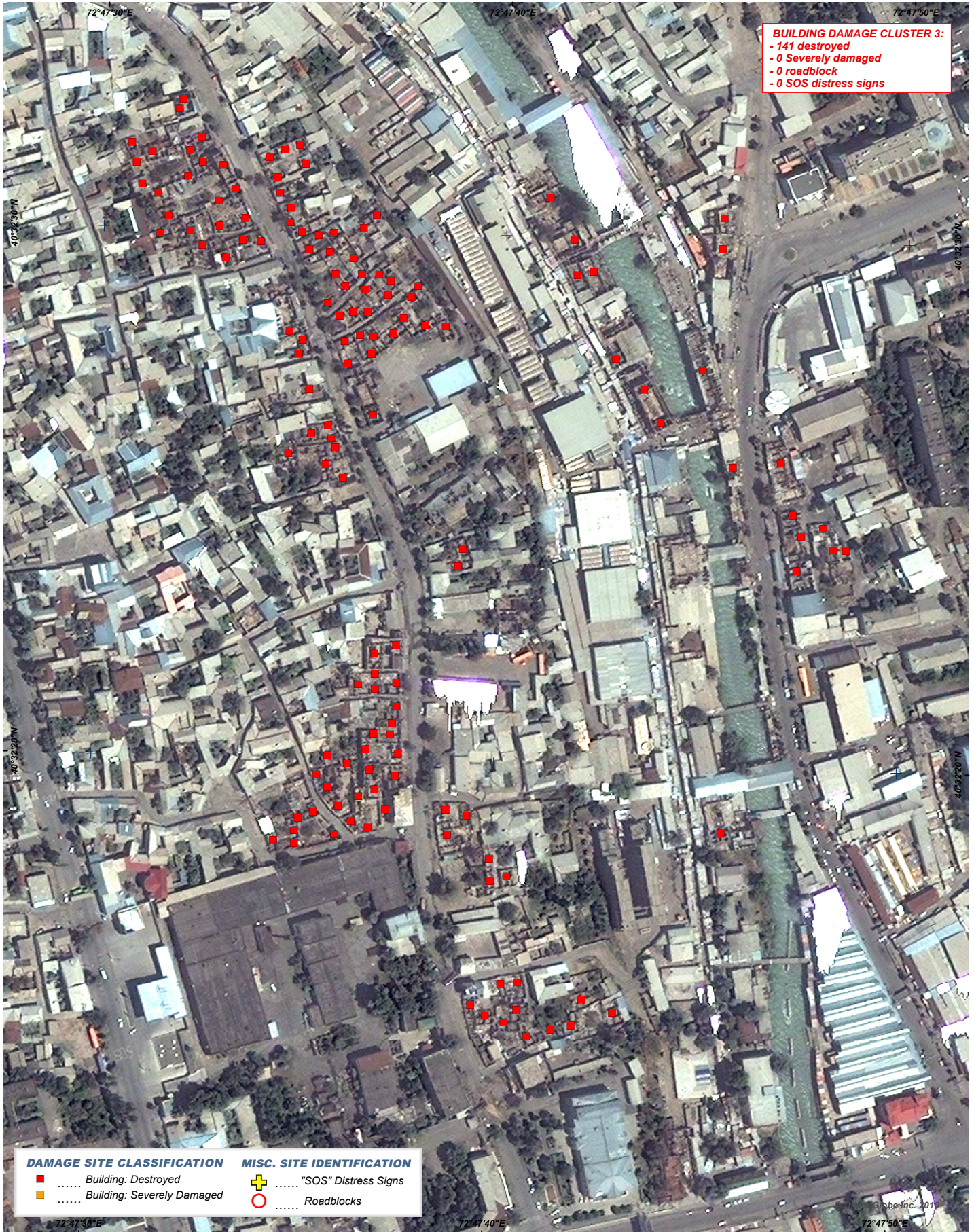
Contact Information: unosat@unitar.org 24/7 Hotline: +41 76 487 4998 www.unosat.org



OSH FOCUS MAP: DAMAGE CLUSTER 3

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

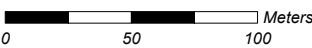
DAMAGE ANALYSIS BASED ON QUICKBIRD02 SATELLITE IMAGERY RECORDED ON 18 JUNE 2010



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: 1:3,000



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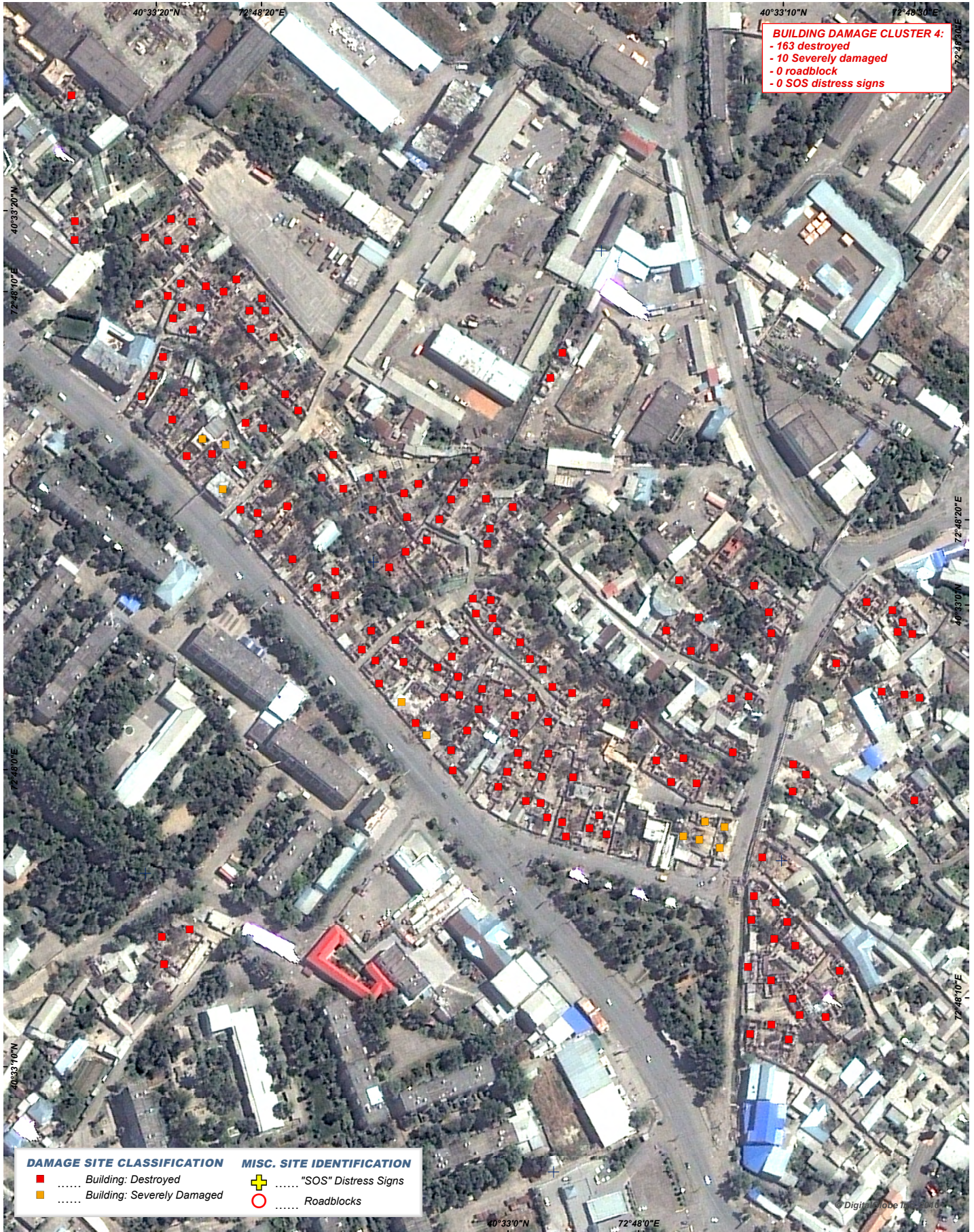
Contact Information: unosat@unitar.org 24/7 Hotline: +41 76 487 4998 www.unosat.org



OSH FOCUS MAP: DAMAGE CLUSTER 4

Note: Damage building symbols and imagery 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: 1:3,135

Map frame rotated 55 degrees from north

0 50 100 Meters

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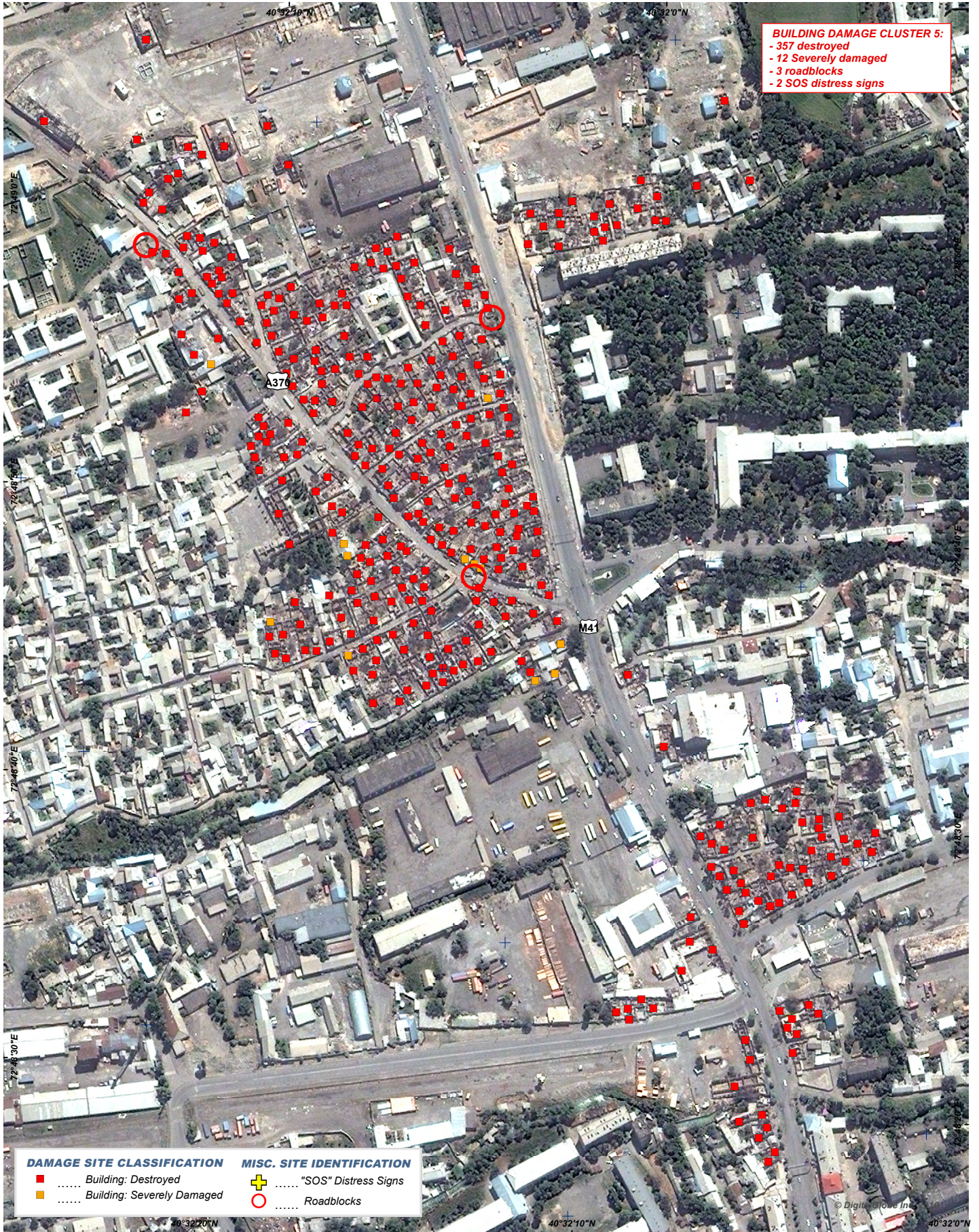
Contact Information: unosat@unitar.org 24/7 Hotline: +41 76 487 4998 www.unosat.org



OSH FOCUS MAP: DAMAGE CLUSTER 5

Note: Damage building symbols and imagery 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

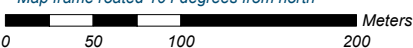


Satellite Imagery : QuickBird 02
Resolution : 60cm
Imagery Date : 18 June 2010
Source : Eurimage S.p.A.
Copyright : DigitalGlobe 2010

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



Map Scale for A4: 1:4,309
Map frame roated 104 degrees from north



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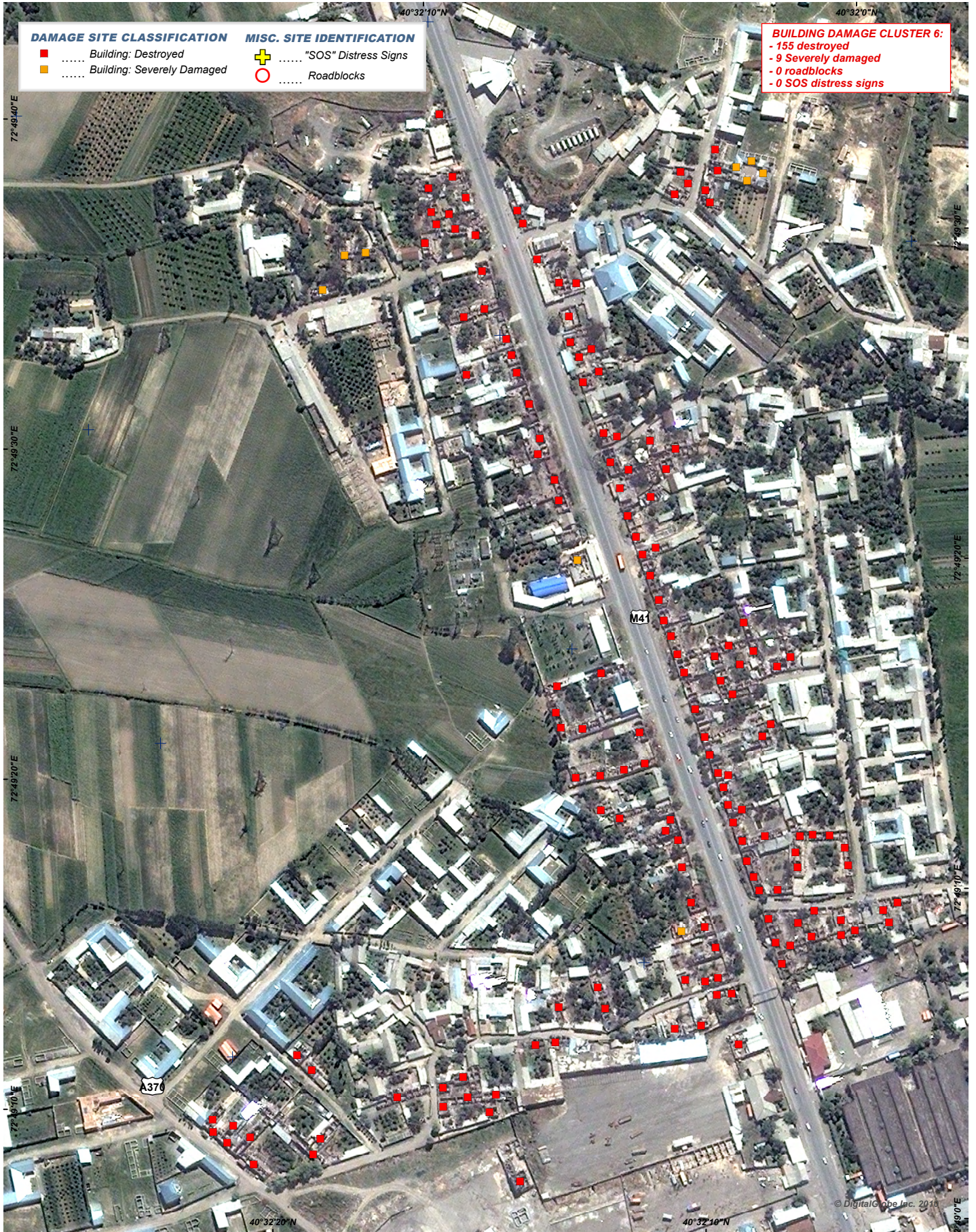
Contact Information: unosat@unitar.org 24/7 Hotline: +41 76 487 4998 www.unosat.org



OSH FOCUS MAP: DAMAGE CLUSTER 6

Note: Damage building symbols and imagery 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



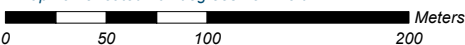
Satellite Imagery : QuickBird 02
Resolution : 60cm
Imagery Date : 18 June 2010
Source : Eurimage S.p.A.
Copyright : DigitalGlobe 2010

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



Map Scale for A4: 1:3,750

Map frame roated 104 degrees from north



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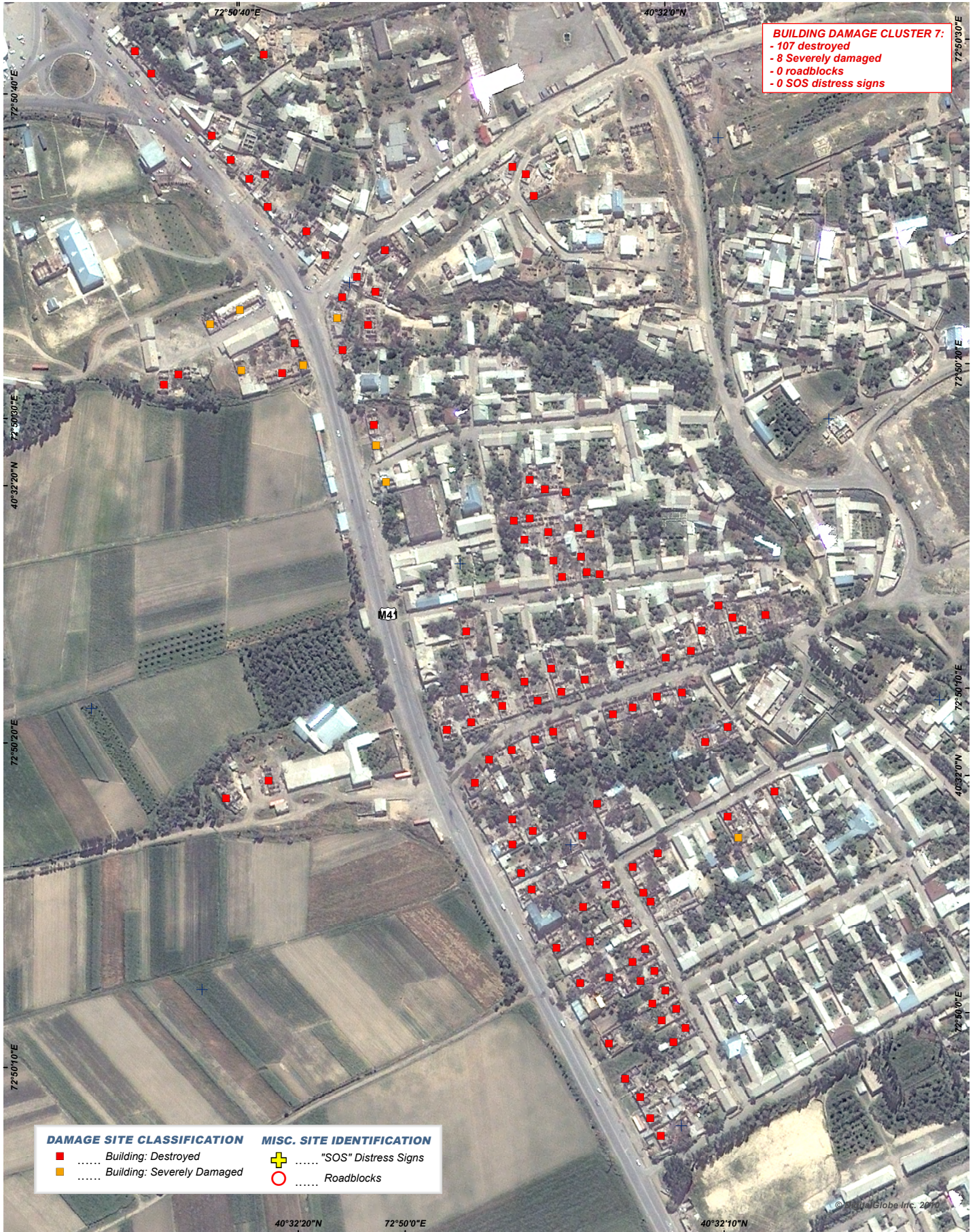
Contact Information: unosat@unitar.org 24/7 Hotline: +41 76 487 4998 www.unosat.org



OSH FOCUS MAP: DAMAGE CLUSTER 7

Note: Damage building symbols and imagery 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



BUILDING DAMAGE CLUSTER 7:
 - 107 destroyed
 - 8 Severely damaged
 - 0 roadblocks
 - 0 SOS distress signs

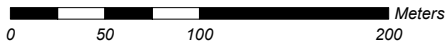
DAMAGE SITE CLASSIFICATION	MISC. SITE IDENTIFICATION
■ Building: Destroyed	+ "SOS" Distress Signs
■ Building: Severely Damaged	○ Roadblocks

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: 1:4,000
 Map frame roated 114 degrees from north



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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

