

EU COMET course

“FIELD COURSE ON CHERNOBYL FALLOUT IN THE ENVIRONMENT”

at

**National University of Life and Environmental Sciences of Ukraine
(NUBiP of Ukraine)**

**Ukrainian Institute of Agricultural Radiology
(UIAR)**

Kiev, Ukraine

5th – 8th September 2016

**Organised by Ukrainian Institute of Agricultural Radiology
(UIAR), National University of Life and Environmental Sciences of Ukraine
(NUBiP of Ukraine)**

and

**Centre for Environmental Radioactivity (CERAD), Norwegian University
of Life Sciences (NMBU)**

in cooperation with

**EU project: Coordination and implementation of a pan-
European instrument for radioecology, COMET**

Hosted by

**National University of Life and Environmental Sciences of Ukraine
(NUBiP of Ukraine),**

**Ukrainian Institute of Agricultural Radiology
(UIAR)**

**Mashinobudivnykiv Str. 7, Chabany, Kyiv-Svjatoshin distr., Kyiv reg., 08162
UKRAINE**

Background

On April 26, 1986, a sudden surge of power during a reactor systems test destroyed Unit 4 of the nuclear power station at Chernobyl, Ukraine, in the former Soviet Union. The accident and the fire that followed released massive amounts of radioactive material into the environment. The Chernobyl accident contaminated wide areas of Belarus, the Russian Federation and Ukraine and fallout were transported all the way throughout Europe. The Chernobyl disaster was the worst nuclear power plant accident in history in terms of cost and casualties. It is one of only two classified as a level 7 event (the maximum classification) on the International Nuclear Event Scale, the other being the Fukushima Daiichi nuclear disaster in 2011.

Scope and Objectives of the course

The training course focuses on most aspects of environmental radiation impact and risks associated with enhanced radioactivity released from different sources and accumulated in the environment but focusing on the Chernobyl accident fallout.

Application of appropriate methods for assessing the radiation impact and risk in the context of the complex suite of radionuclide fallout will be discussed. Key processes controlling the behavior of radionuclides in different ecosystems will be outlined, including basic concepts, variables/parameters and kinetics needed for modeling purposes. Sampling strategies and protocols will be presented, and training will include the use of state-of-the-art measurement techniques.

The intensive (4 days) course includes theory (lectures) and training in the lab (radiochemistry and radiation measurements) and one day in the field. The field exercise will take place in the Chernobyl Exclusion Zone (CEZ).

Learning Outcome: After the course, the students should have an overview over Chernobyl accident as a sources, the main radioecology of nuclides from such an event and be able to conduct measurements of some key radionuclides.

Course description

The course is given intensively over four days (September 5th – 8th) in Kiev, Ukraine. Lectures, fieldwork and laboratory exercises are given integrated within these four days.

Working language of the course will be English.

Fee

There will be no registration fee. The course is covered by the EU COMET project. Participants are expected to cover their own travel and subsistence costs.

Draft Course program

LECTURES IN SHORT CA 12 HOURS	LABORATORY EXERCISES, DEMONSTRATIONS, CA 10 HOURS
The Chernobyl accident Contamination of the 30 km zone, selection of study sites	Soil sampling, sample preparations
Speciation of radionuclides Water sampling and fractionation	Particle hunting
Mobility and transport of radionuclides in the environment Sequential extractions, mobility estimates	Sequential extractions
Sampling of plants/biota and animal products Sample preparations - measurements	Water sampling and fractionation
Source identification using isotope ratios and MS techniques	
Relevance of hot particles. Particle characterization	
Impact and risk estimates – overall uncertainties	+ one day in the field

ChEZ Field Visit (1 day)

Chernobyl (150 km from Kiev)

A one-day trip to the Chernobyl Exclusion Zone to see the Shelter, the city of Pripyat, various NUBiP experimental sites, etc., will be organized on Thursday, 8th September from 07:00 to 20:00. If you wish to join the trip, please contact the Meeting Coordinators (see above) by latest 1 June 2016, and send a scanned copy of the first page of your passport by email.

Target Audience

The target audience are researchers/scientists and PhD/MSc students in radioecology who wants to develop their knowledge on the Chernobyl accident and the sampling strategy when fallout is uneven distributed.

Condition for participation

In order to apply for admission to join the course through the EU COMET project contact Valeryia Morozova, mvs@uiar.kiev.ua (Phone +38044 5267445) to obtain a registration form. Application deadline is June 1st, 2016. There will be limitations to number of students – maximum 20 students.

Date and Venue

The course will take place from 5th to 8th September 2016 at the Ukrainian Institute of Agricultural Radiology (UIAR) of NUBiP of Ukraine, Mashinobudivnykiv Str. 7, Chabany, Kyiv-Svjatoshin distr., Kyiv reg., 08162 UKRAINE.

Important dates:

Pre-Registration/Intention to participate deadline:

June 1st, 2016

Request for accommodation:

June 1st, 2016

Training course:

September 5th-8th, 2016

Contact & Information

Scientific co-ordination and registration	For accommodation and travel information
Valery Kashparov vak@uiar.kiev.ua Tel: +380 (44) 526-1246 Fax: +380 (44) 526-0790 Mobile: +380 505772785	Valeryia Morozova mvs@uiar.kiev.ua +38044 5267445

Recommended background reading

1. Environmental consequences of the Chernobyl accident and their remediation: twenty years of experience //Report of the Chernobyl Forum Expert Group 'Environment', Ed. Anspaugh, L. and Balonov, M., Radiological assessment reports series, IAEA, STI/PUB/1239, 2006, 166p. ([Web-site](#))
2. Handbook of Radioactivity Analysis. Third Edition. Edited by Michael F.L' Annunziata, Elsevier, 2012, 1379 p.
3. Khomutinin Y.V., Kashparov V.A., Zhebrovska K.I. Sampling optimisation when radioecological monitoring. Kiev: VIPOL, (2001) 160p. (Russ –[Web-site](#)) (Eng-[Web-site](#))
4. IAEA 2004. Soil sampling for environmental contaminants. International Atomic Energy Agency IAEA-TECDOC-1415, Vienna.
5. ICRU 2006. Sampling for radionuclides in the environment. International Commission on Radiation Units and Measurements Report #75. Journal of the ICRU Volume 6 No 1 2006.
6. ISO 2007. International Standard Reference Number: 18589-2. Measurement of radioactivity in the environment – soil. Part 2: Guidance for the selection of the sampling strategy, sampling and pre-treatment of the samples.
7. Kashparov V., Yoschenko V.I., Levchuk S.E., Tschiersch J., Wagenpfeil F. Application of the method of repeated mixing to non-uniformly contaminated bulky samples // *Journal of Radioanalytical and Nuclear Chemistry*, v. 246, No. 1, 2000. P. 165-172 .
8. Kashparov V.A., Lundin S.M., Zvarich S.I., Yoschenko V.I., Levchuk S.E., Khomutinin Yu.V., Maloshtan I.N., Protsak V.P. Territory contamination with the radionuclides representing the fuel component of Chernobyl fallout // *The Science of The Total Environment*, vol.317, Issues 1-3, 2003, pp. 105-119. ([Web-site](#))
9. Kashparov V.A., Lundin S.M., Khomutinin Yu.V., Kaminsky S.P., Levchuk S.E., .Protsak V.P., Kadygrib A.M., Zvarich S.I., Yoschenko V.I., Tschiersch J. Soil contamination with

- ⁹⁰Sr in the near zone of the Chernobyl accident // *Journal of Environment Radioactivity*, v.56, № 3, 2001, pp.285-298. ([Web-site](#))
10. Kuriny V.D., Ivanov Yu.A., Kashparov V.A., Loshchilov N.A., Protsak V.P., Yudin E.B., Zhyrba M.A., Parshakov A.E. Particle-associated Chernobyl fall-out in the local and intermediate zones // *Annals of Nuclear Energy*, vol.20, N.6, p.415-420, 1993. ([Web-site](#))
 11. Salbu B., Krekling T., Oughton D.H., Ostby G., Kashparov V.A., Brand T.L., Day J.P. Hot Particles in Accidental Releases From Chernobyl and Windscale Nuclear Installations // *Analyst*, January 1994, Vol.119(1), p.125-130. ([Web-site](#))
 12. Kashparov V.A., Ivanov Yu.A., Zvarich S.I., Protsak V.P., Khomutinin Yu.V., Kurepin A.D., Pazukhin E.M. Formation of Hot Particles During the Chernobyl Nuclear Power Plant Accident. // *Nuclear Technology*. – 1996.- v.114, N1.- pp.246-253. ([Web-site](#))
 13. Kashparov V.A., Oughton D.H., Zvarich S.I., Protsak V.P., Levchuk S.E. Kinetics of fuel particle weathering and ⁹⁰Sr mobility in the Chernobyl 30-km exclusion zone // *Health Physics*.- 1999.- vol.76, N.3.- pp.251-259. ([Web-site](#))
 14. Salbu B., Krekling T., Lind D.H., Oughton D.H., Drakopoulos M., Simionovichi A., Snigireva I., Snigirev A., Weitkamp T., Adams F., Janssens K., Kashparov V. High energy X-ray microscopy for characterization of fuel particles // *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, Volumes 467-468, Part 2, 21 July 2001, p.1249-1252. ([Web-site](#))
 15. Kennedy V. H., Sanchez A. L., Oughton D. H., Rowland A. P. Use of Single and Sequential Chemical Extractants to Assess Radionuclide and Heavy Metal Availability From Soils for Root Uptake // *Analyst*, 1997,122, P. 89R-100R. ([Web-site](#)).
 16. Tessier A., Campbell P.G.C., Bisson M. Sequential Extraction Procedure for the Speciation of Particulate Trace Metals // *Anal. Chem.*, 51 (1979), p. 844-851([Web-site](#)).
 17. Rauret G. Extraction procedures for the determination of heavy metals in contaminated soil and sediment // *Talanta*, 46 (1998), p. 449–455([Web-site](#)).
 18. Kashparov V.A., Ahamdach N., Zvarich S.I., Yoschenko V.I., Maloshtan I.N., Dewiere L. Kinetics of dissolution of Chernobyl fuel particles in soil in natural conditions. // *Journal of Environmental Radioactivity*, v.72, Issue 3, 2004, p.335-353. ([Web-site](#))

Practical information

Host Institution: Ukrainian Institute of Agricultural Radiology (UIAR) Websites: www.uiar.org.ua of the National University of Life and Environmental Sciences of Ukraine (NUBiP of Ukraine), Website: <http://nubip.edu.ua/en/>

Ukrainian Visa: Participants from European countries, USA, Canada, Japan and CIS countries do not need a visa to enter the Ukraine. Should you require an additional invitation letter for visa application purposes, please contact the EU COMET course Coordinators (see above).

Security and Travel Advisory: It is very important that you do not take a taxi proposed to you by people in the airport or at the railway station. You can make arrangements the necessary arrangements before your arrival (<http://kbp.aero/en/transport/sky-taxi/>) or call the taxi to wait for you near the airport terminal or railway station where you are arriving. Furthermore, it is advisable to in advance for the amount you will have to pay.

Should you require any assistance with arranging a taxi, please provide us with the date, time and number of flight you arrive, and the hotel you have booked.

Should you encounter any problems please contact the EU COMET course Coordinators (see above).

Transportation airport (train station) – hotel / meeting venue

Meeting participants will need to make their own way from the airport (or from the train station for those who arrive by train) to the meeting venue/hotel and back. The distances from the meeting venue/ recommended hotels are as follows:

- Boryspil International Airport 40–50 km;
- Zhulyany (Kyiv) Airport 10–15 km;
- Kiev Passajirskij Railway Station 5–15 km.

From Boryspil International Airport to the city:

Shuttle bus – metro (shuttle bus ticket price is UAH 50 (~USD 3); goes every 20 minutes; the schedule can be found on the airport website <http://kbp.aero/en/transport/sky-bus/>). Take the shuttle bus to the subway (metro) station Kharkivska on the green line (see attached Metro Map).

The price for a single journey on the subway is UAH 4 (~USD 0.25). Tokens for travel can be purchased at any metro station.

The regular price for taxi from the railway station would be around UAH 100–200 (~USD 5-10).

By car / taxi: Regular price for taxi from Boryspil Airport (<http://kbp.aero/en/transport/sky-taxi/>) is around UAH 300–500 (~USD 25)

How to get to the main building of NUBiP of Ukraine:

During the meeting arrangements will be made to transport of participants from the subway (metro) station “Holosiivs`ka” (Hotel “Mir” and “Park Hotel Golosievo” are located near this station) to the main building of NUBiP of Ukraine and back.

Alternatively, the participants can reach the main building by walking:

10 minute walk from the subway stations “Holosiivs`ka” or “Vystavkovyi Centre”. Time to the city centre by metro is 10 minutes.

By bus/trolley bus (ticket price UAH 4–5):

From subway station “Lybidska”:

Trolley bus № 2, 4, 11, 12 till the trolley bus stop “Hotel Holosiivskyi” or
Bus № 212 till the bus stop (on demand) “Korpus № 3”

From subway station “Vystavkovyi Centre”:

Bus № 212 (direction city centre) till the bus stop (on demand) “Korpus № 3”
Trolley bus № 2, 4, 11, 12 till the trolley bus stop “Hotel Holosiivskyi”

Emergency telephone numbers/addresses:

UN House Reception: +380 (44) 253-9363

First aid / ambulance: 103

Police: 102

Medical Clinic BORYS: +380 (44) 238-0000

The national currency of Ukraine is Hryvnia (UAH): Approximate Exchange rates: USD 1 =
~ UAH 23 / EUR 1 = ~ UAH 26 / 1 Russian Ruble = ~ UAH 0.33

Meals: The meeting organizers/hosts will arrange for coffee breaks for participants during the meeting.

Hotels in close vicinity of meeting venue

Participants are required to make their own hotel reservations and any costs incurred in relation thereto are the participant’s sole responsibility. Participants are welcome to choose hotels other than those suggested below, depending on their preferences. Please contact the Meeting Coordinators should you require any additional advice or assistance in choosing a hotel and making your reservations.

The following hotels are those recommended by the Meeting Coordinators (see also the map below) or try <http://www.booking.com/> for alternatives in the city centre:

The main building of NUBiP of Ukraine

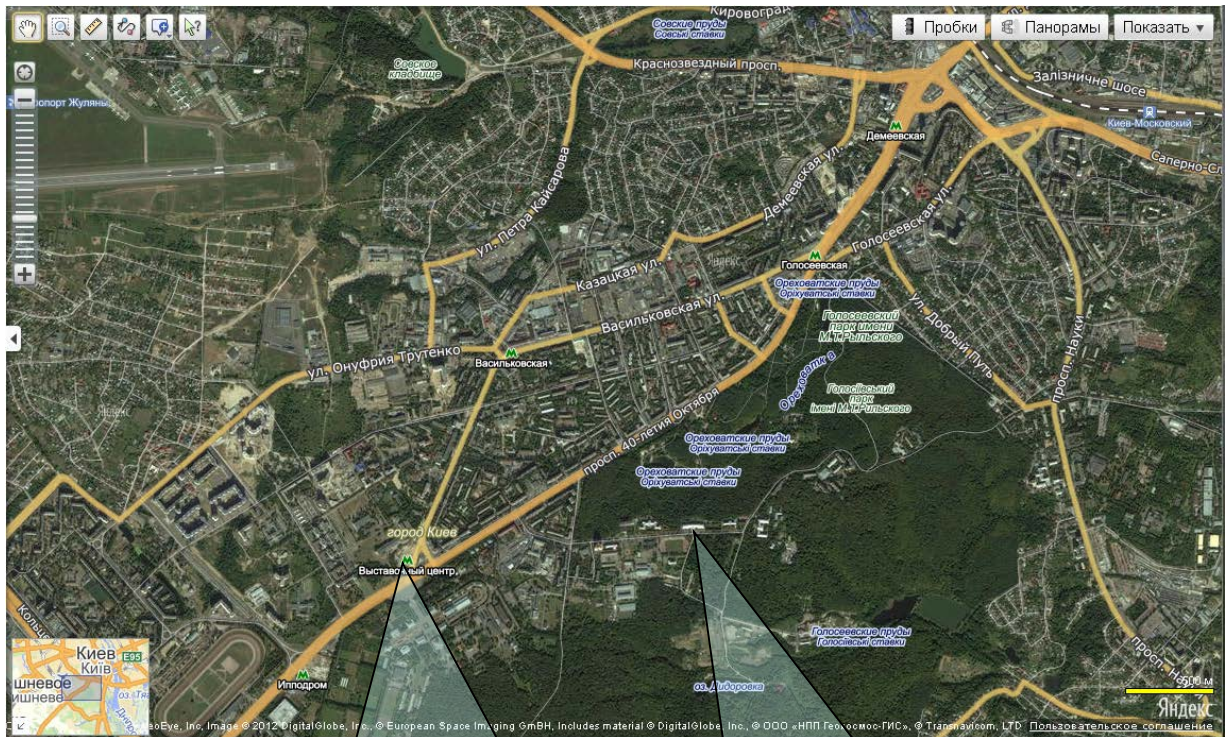
University dormitories

Park Hotel Goloseevo in Kyiv (about 60-100\$)
<http://www.hotelgolosievo.com/park-hotel-golosievo-in-kyiv/>
 300-500 m from subway stations “Hosiivsk`ka”,
 10 minutes to the city centre by metro

Hotel "Mir" (about 30-50\$)
<http://www.hotelmir.kiev.ua/en/>
 100 m from subway stations
 “Hosiivsk`ka”, 10 minutes to the city
 centre by metro

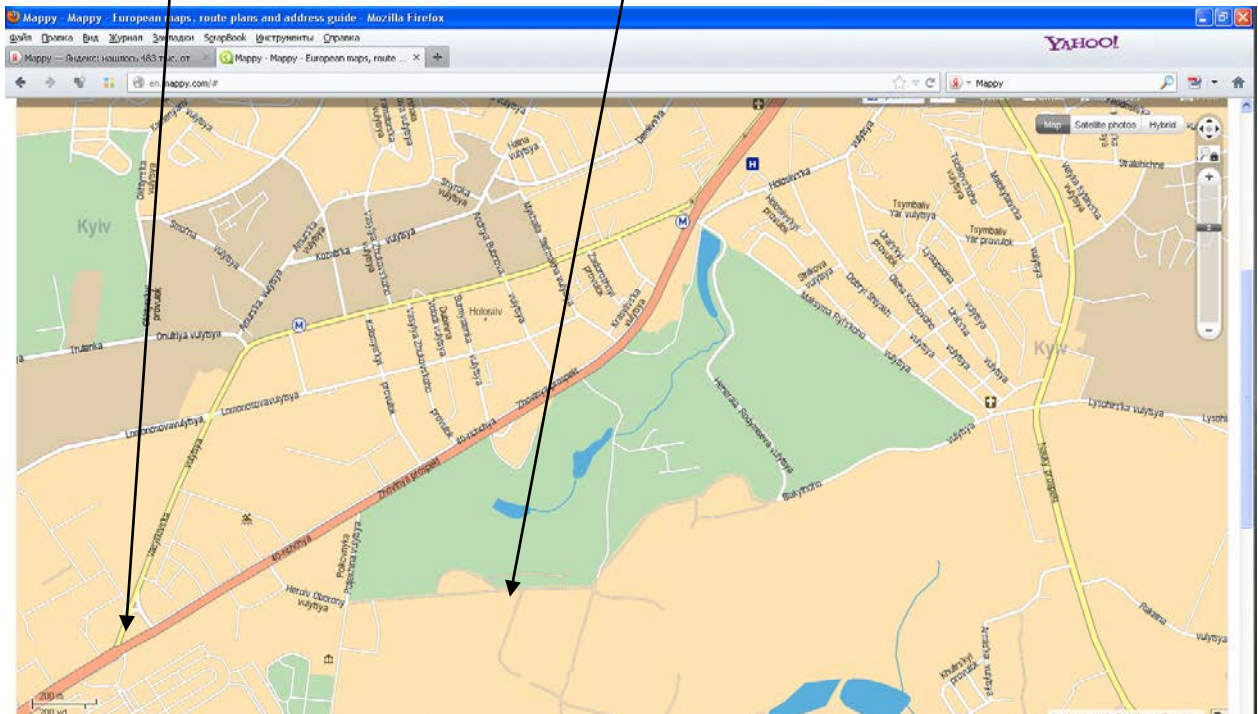
Hotel Hosiivskyi in Kyiv (about 20-40\$)
<http://hotelgolos.com/-anglijskij-razdel-.html>
 850 m from subway station “Vystavkovyi
 Centre”
 2500 m from subway stations “Hosiivsk`ka”,
 10 minutes to the city centre by metro

Hotel of NUBiP of Ukraine (about 10-20\$)
Contact via Meeting Coordinators
 In order to live here you must type
 “Yes” in the field of the registration
 form, where accommodation is
 required



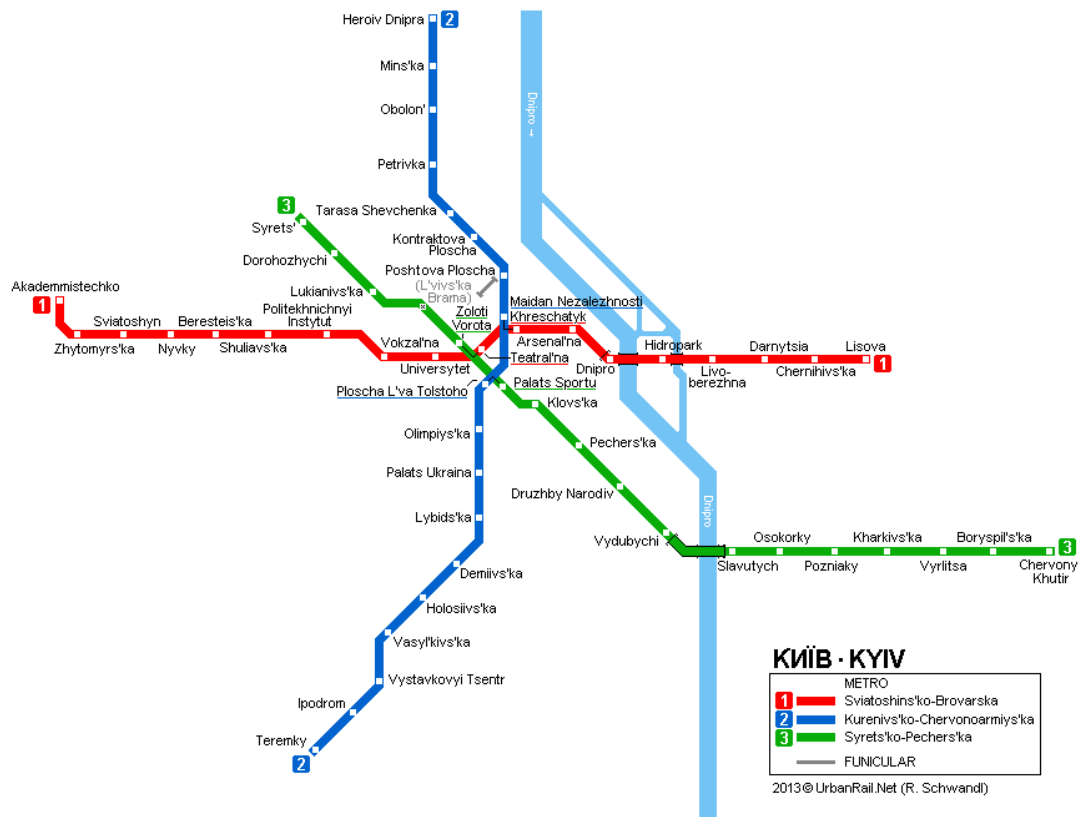
Subway station “Vystavkovyi Centre”

The main building of NUBiP of Ukraine



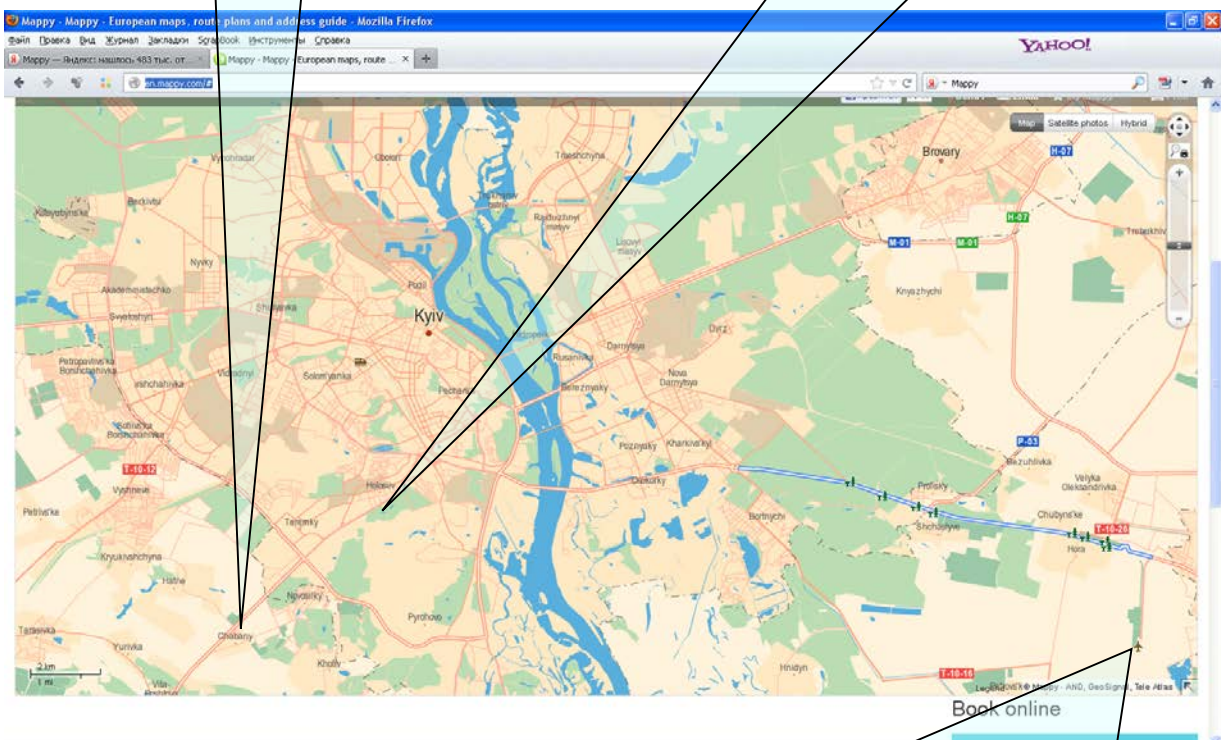
<http://en.mappy.com>

Kiev Subway (Metro) Map



UIAR of NUBiP of Ukraine

The main building of NUBiP of Ukraine



[Kyiv Boryspil international airport](http://kbp.aero/en/) <http://kbp.aero/en/>