



Enabling Grids for E-science

Български Грид инициативи

*Емануил Атанасов,
Тодор Гюров,
Владимир Димитров,
Димитър Тодоров*

ИПОИ - БАН

www.eu-egee.org



- **BgGrid** консорциум. Цели:
 - Обмен на ресурси и експертиза в Грид технологиите
 - Разработка на Грид приложения
- Членове на BgGrid:
 - **Основатели:**
 - Институт за паралелна обработка на информацията (ИПОИ - БАН)
 - Институт за ядрени изследвания и ядрена енергия (ИЯИЯЕ - БАН)
 - **Членове:**
 - Институт по математика и информатика – БАН
 - Институт по механика – БАН
 - Институт по електрохимия - БАН
 - Институт по астрономия – БАН
 - Американски университет в България
 - Пловдивски университет (ФМИ)
 - Софийски университет (ФМИ)
 - Софийски университет (Факултет физика)
 - Минногеоложки университет
 - Институт по органична химия – БАН
 - Институт по геофизика - БАН

Site name	CPUs	Storage (TB)
BG01-IPP	60	1.79
BG02-IM	14	1.00
BG03-NGCC	200	8.00
BG04-ACAD	80	8.00
BG05-SUGrid	24	0.10
BG06-GPHI	44	0.10
BG07-EDU	8	0.10
BG08-MADARA	800	28.00
BG-INRNE	80	0.86
Total:	1310	48.00

Country	Number of CPU cores
France	19433
UK/Ireland	10174
Germany/Switzerland	7833
Italy	6941
Canada	4561
Serbia	1600
Bulgaria	1310
<i>CERN</i>	1024

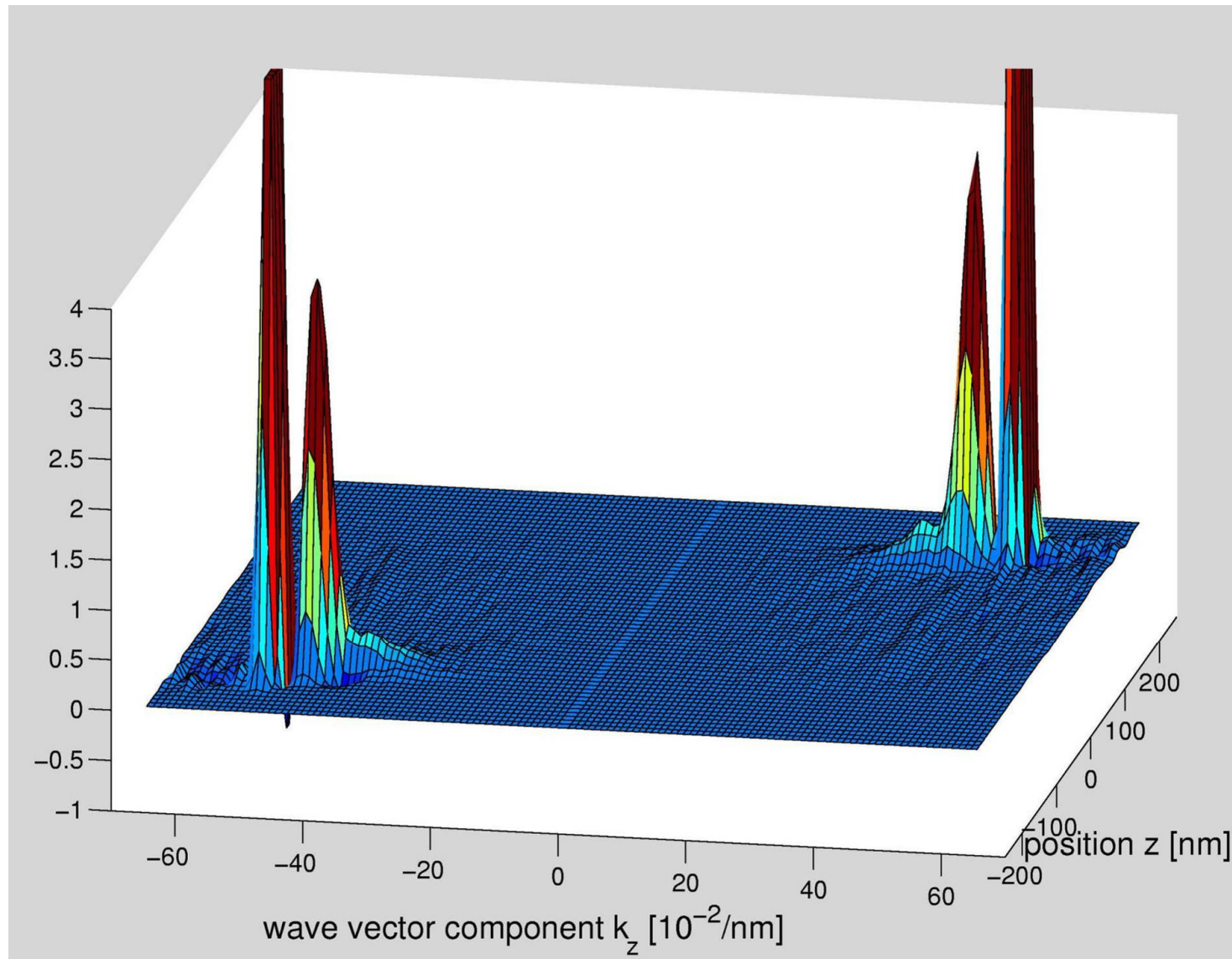
- За употреба от български потребители в ИПОИ се поддържат:
 - BDII (поддържа моментна информация за ресурсите) – bdii.ipp.acad.bg
 - WMS (разпределя задачите между клъстерите – нов стил) - wms.ipp.acad.bg
 - RB (разпределя задачите между клъстерите – стар стил) - rb001.ipp.acad.bg
 - P-GRADE портал – portal.ipp.acad.bg – достъп до Грида през web интерфейс

- ИПОИ поддържа още следните core сървъри:
 - R-GMA (разпределена релационна база от данни, accounting) – gserv1.ipp.acad.bg
 - FTS (гарантиран бърз трансфер на данни) – fts001.ipp.acad.bg
 - AMGA (каталог с metadata информация за файловете) е в процес на тестване в Института по астрономия и може да се ползва – astrogrid.astro.bas.bg

- ✓ Физика на високите енергии
- ✓ Биоинформатика и биомедицина
- ✓ Екология
- ✓ Метеорология
- ✓ Астрономия
- ✓ Сеизмология
- ✓ Нови енергийни източници
- ✓ Историческо наследство

- **SALUTE (Stochastic ALgorithms for Ultra-fast Transport in sEmiconductors)** is a Grid application developed for computer simulation of ultra-fast semiconductor carrier transport and it
 - solves computationally intensive problems in quantum transport
 - consists of a bunch of Monte Carlo algorithms for solving **quantum kinetic equations** which describe the considered model.
- **The quantum kinetic model:**
 - a femtosecond relaxation process of optically excited carriers in one-band semiconductors or quantum wires.
 - The **electron-phonon interaction** is switched on after a laser pulse creates an initial electron distribution.
 - Two cases are considered – with and without applied electric field.
- Using SALUTE innovative results for different materials can be obtained.

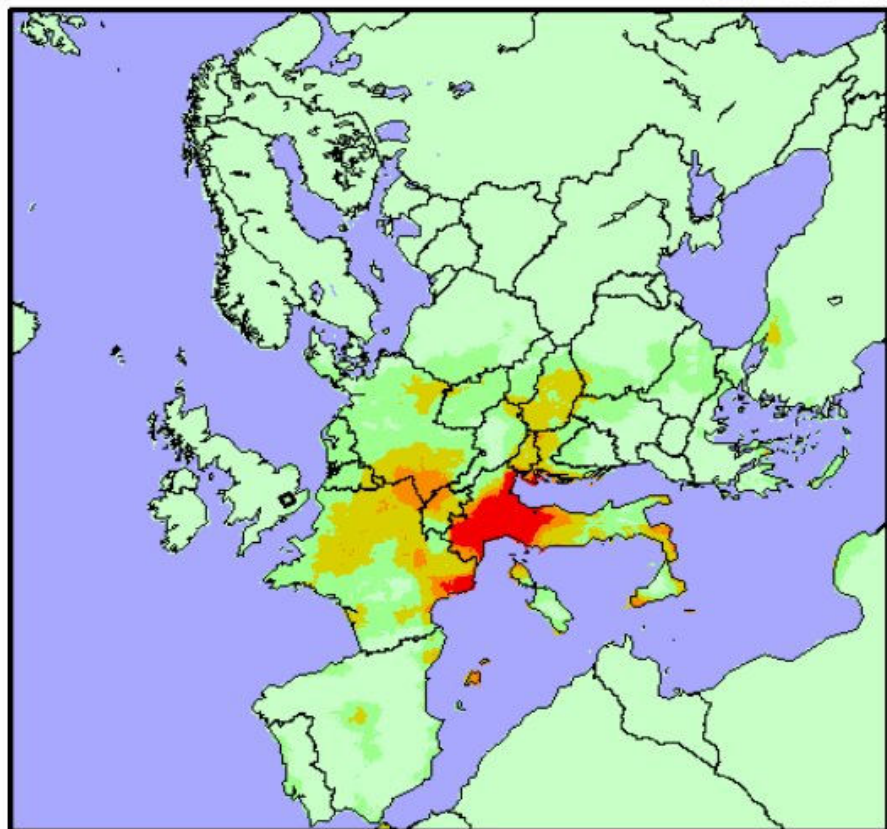
- 800 x 260 points
- $t=175$ fs



The period is April–September, 1997.

Maximum value in the domain: 74

Minimal value in the domain: 0



The period is April–September, 1997.

Maximum value in the domain: 74

Minimal value in the domain: 0

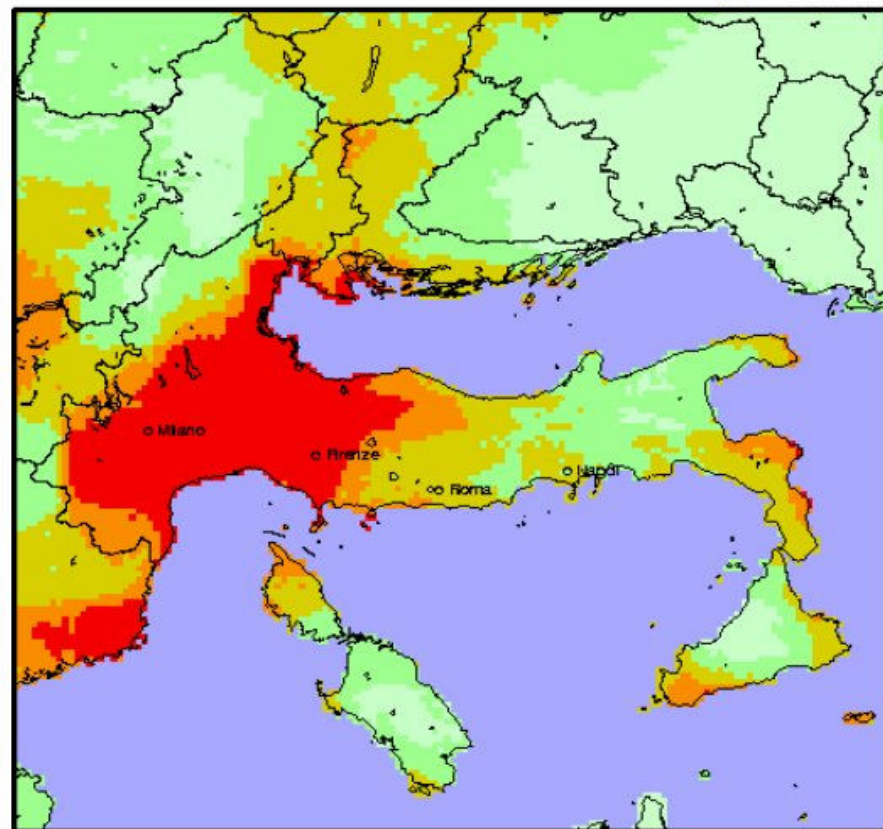
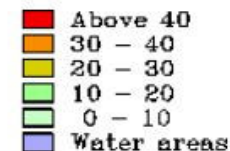
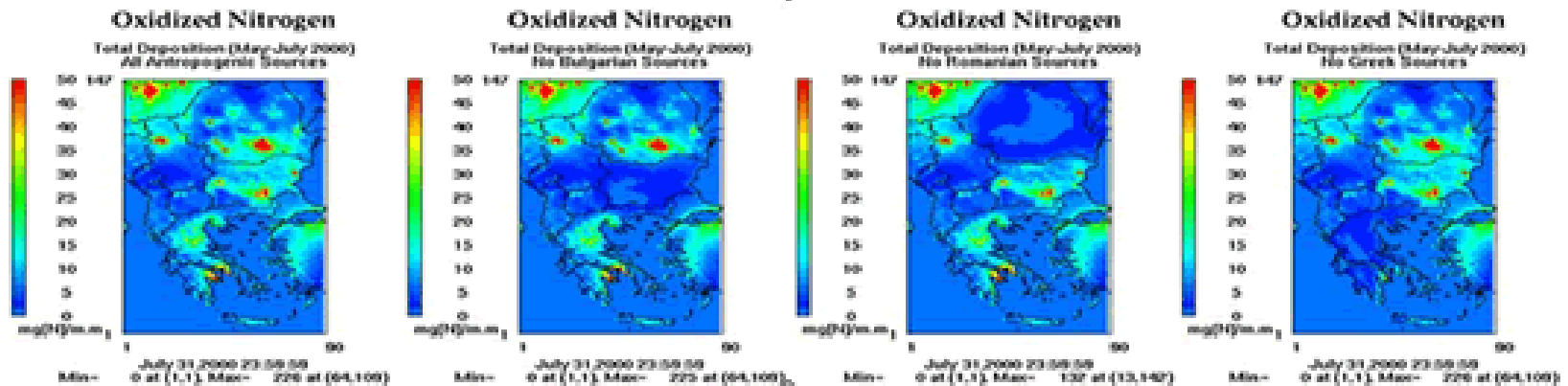


Fig.2: Number of days with an 8-hour average ozone concentration more than the critical value (60 ppb.) in 1997.

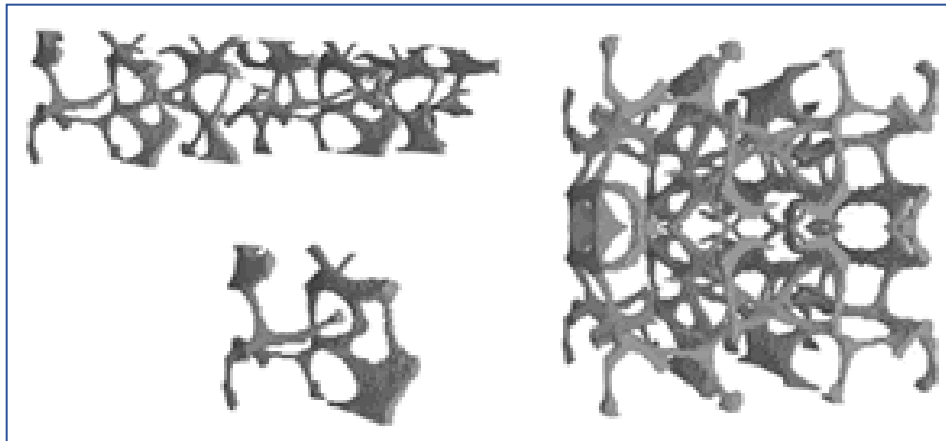
SERRTSA: Modeling System for Emergency Response to the Release of Toxic Substances in the Atmosphere

The system is targeted at the Balkan region. This system will provide operational response to accidental releases of harmful gases in the atmosphere, whether as a result of terrorist attack or industrial accident. The system must be able to perform highly accurate and reliable risk analysis and assessment for selected "hot spots" and provide short-term regional scale forecast of the propagation of harmful gases.



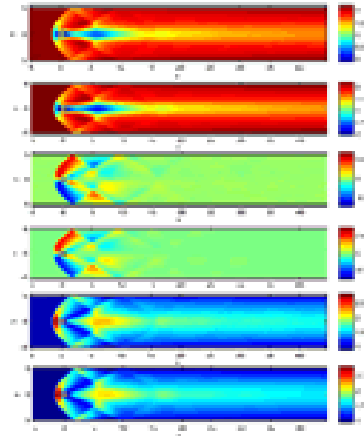
Developers: Dr. Kostadin Ganey, Prof. Dimiter Syrakov, Dr. Reneta Dimitrova GeoPhi-BAS

- **VMHBS: Voxel models of human bone structure**
- The application is integrated part of a new generation computer aided environment for diagnostics and pre-operative planning of orthopedics trauma and joint replacement surgery. The goal is to equip the full-length 3D image with patient-specific biomechanically relevant parameters allowing for a real-time computer simulation of the stressed-strained state of the loaded bone. The micro Finite Element/Finite Volume (FE/FV) analysis is applied.



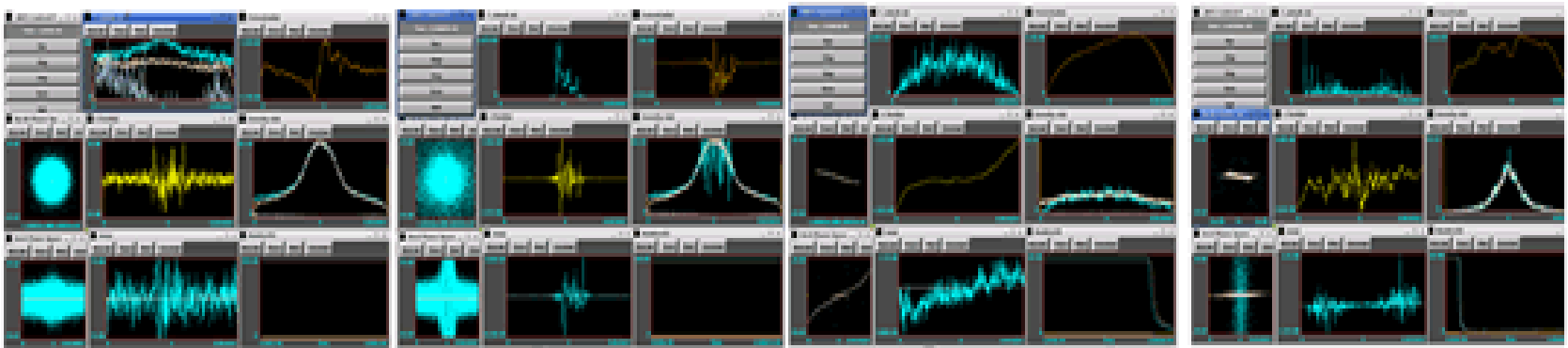
- Developers: Svetozar Margenov and Yavor Vutov, IPP-BAS, Sofia, Peter Arbenz, ETH, Zurich, Maya Neytcheva, Uppsala University

- **CSCGF: Computer Simulation of Complex Gas Flows in Micro-sized Channels and Domains**
- 2D supersonic flow at Mach number $M = 2.4261$ around a confined square cylinder in a microchannel. The problem is investigated numerically by using two methods: direct simulation Monte Carlo (DSMC) method (molecular approach) and finite-volume method (FVM). The algorithms are partially parallelized, and the application uses high amount of CPU time.



- Developers: K. Shterev and S. Stefanov, IM-BAS

- **BIT1: Modules for Transport Codes and Discharge Evolution**
- The background is our experience performing balance of the contribution of key processes on plasma characteristics in several computer experiments. We have used our code version BIT1-S for self-consistent simulation of charged and neutral particle propagation in Scrap-off-Layer. For validation of the simulation results have been used appropriate experimental data.



- Developers: Lilia Popova and Pencho G. Marinov, IPP-BAS

- **SFS** - Supramolecular Functional Systems
- **SWCNN** – *Химически факултет, СУ*
- **ESMPILMC** - *Химически факултет, СУ*
- **MSACM** - Multi-scale atmospheric composition modelling. *Геофизика.*
- **SRA** - Seismic Risk Assessment. *Геофизика.*
- **MCSAES** - Monte Carlo Sensitivity Analysis for Environmental Systems.
ИПОИ-БАН.

...

За повече информация, на Българския Грид портал:

<http://www.grid.bas.bg/site/index.php?page=grid-applications>

1. Обучение
2. Получаване на Grid сертификат – след подписване на Memorandum of Agreement
3. Присъединяване към подходяща виртулна организация
4. Реална разработка
5. При срещане на проблеми се обръщате отново към екипа, който работи по дейност SA1 от проекта EGEE, като може да се използва и helpdesk.egee-see.org

- ✓ Построените Grid сайтове са отворени за потребители и приложения от българската научна общност
- ✓ Гридът създава богата среда за разработка на разнообразни приложения със сериозни изисквания към ресурсите
- ✓ Създадена е основа за изграждане и разширяване на българската е-инфраструктура, обхващаща в бъдеще не само e-Science, но впоследствие и e-Health, e-Government, e-Business ...
- ✓ Разработката на Грид приложения не изисква големи ресурси, а само достъп до Грид
- ✓ Гридът обединява малки и големи сайтове, като малките сайтове могат да се използват предимно за разработка и тестване на приложения.

- EGEE проект <http://www.eu-egee.org>
- SEE-GRID-SCI проект <http://www.see-grid-sci.eu>
- gLite middleware <http://www.glite.org>
- Globus toolkit <http://www.globus.org>
- LCG проект <http://lcg.web.cern.ch/LCG>
- EGEE приложения <http://egeena4.lal.in2p3.fr>
- GILDA – Grid demonstration and dissemination <https://gilda.ct.infn.it>



The screenshot shows the Bulgarian Grid Portal website. At the top left is a map of Bulgaria with the EGEE logo. The main header features the text "Bulgarian Grid Portal" in yellow. Below the header, there is a search bar with the text "Search: Enter Search..." and a "Submit" button. On the left side, there is a navigation menu with the following items: Home, Projects, NGI, GRID Applications, Events, Contacts, Archive, GTA Department, and IPP BAS. The main content area is titled "Welcome to Bulgarian Grid Portal" and contains a section titled "What is Grid ?" with a detailed paragraph about grid computing. At the bottom of the main content area, there is a "Next page: Projects" link and a "Top" link. On the left side, there is a "News" section with a date "01/21/2009", a title "Training", a category "General", and a post by "dimitrov". The news item is about "ENV VO Training" held from "29-30 January 2009" at "IPP BAS". There is a "[More]" link below the news item.

За контакти:

Кирил Боянов,
 Директор на ИПОИ-БАН
 boyanov@acad.bg

Емануил Атанасов,
 EGEE 3 team leader
 emanouil@parallel.bas.bg

Тодор Гюров,
 SEE-GRID-SCI team leader
 gurov@parallel.bas.bg

Анета Караиванова,
 BGGC contact person
 anet@parallel.bas.bg

<http://www.grid.bas.bg>

