DIAS Project
Web Demonstrator Requirements

Rel.1.2

Summary

Introduction

Scenario

Within the European e-Content plan, the goal of DIAS project is to create a network that makes available and usable to the users a batch of information and added value services regarding the study of the ionosphere.

The network will make available the multi-channel re-edited data, via Internet; the data will be provided by all following operating European Research Institutes' ionosondes:

- Istituto Nazionale di Geofisica e Vulcanologia (INGV)
- National Observatory of Athens (NOA)
- Rutherford Appleton Laboratory (RAL)
- The Leibniz-Institute of Atmospheric Physics (IAP)
- Swedish Institute of Space Physics (IRF)
- Space Research Centre, Polish Academy of Sciences (SRC)
- Ebro Observatory (Ebre)
- Institute of Atmospheric Physics, Czech Republic (UFA)

A central server will work as a collector and data processor. All data will be available to the users as diagrams, maps (nowcast, short term and long term forecast) and data.

Web Demo

In this scenario, the Web Demonstrator (Work Package 6) has to be developed as a "static version[1]" of what the final DIAS Web site will be.

Since it has to be delivered in the month of November 2005 also in a CD version, the Web Demonstrator will share its main characteristics with the Server Prototype (Work Package 4), that prefigure in this moment the final DIAS Server.

The purpose of this document is to define the features to be developed in the Web Demo.

Some details have been discussed during the 4th technical meeting in Kiruna (September 12-14). For this reason, this document is given to all the members of the consortium interested in as overview.

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[1] "Static version" means that all data retrieved by users are referred to a fixed period (from the 5th of September at 00:00 UT to the 14th of September at 15:00 UT).
In the selected period:
- All ionospheric station have to provide their data to the DIAS server;
- All programs to generate every kind of DIAS service (foF2/M(3000)F2/MUF/electron-density maps…nowcasts, long and short term forecasts...) have to be working;
- The DIAS server has to store all this data in order to put them in the Web Demo.

Web Demonstrator: the functionalities

Based on what has been established during the DIAS technical meetings of Athens Rome and Kiruna, some functionalities that the Presentation layer (and then the Web Demonstrator) will have to support have been defined.

Generally, it has been prefigured the following sections:

1. An *Introduction* page;
2. An *Information* section;
3. A section containing the *direct information* of the measure points;
4. An *Elaborated information* section, containing:
   - plots of some ionospheric parameters;
   - isolines foF2 maps and M(3000)F2 maps ;
   - MUF maps ;
   - electron density maps calculated in various heights;
5. A *glossary* section;
6. An *alerts* section.

In every sections, the user will have the possibility to point diagrams, maps, data report... in a rapid and intuitive way and by using an opportune degree of interactivity.

Sections' details

Introduction page

It will be the first page shown to the user when the Web Demo is opened (in both CD version and Online version).

The text will explain to the user exactly what the Web Demo is, and it will give information about the selected fixed time.

The proposed sentence is:

"Welcome to the DIAS system simulation performance!

This Demo gives you the opportunity to explore the DIAS products and services for a pre-selected period. For this off line experience, please keep in mind that:

- *For "nowcasting" products and services, the 14th of September, 15:00 UT is considered as the current date and time.*
- *The "historical data" set in terms of text files, graphs and plots is limited to the period from 5th (00:00 UT) to 14th of September 2005 (15:00 UT).*
- *The time resolution for all products and services is 1 hour while in the on line DIAS system they will be provided in 15 minutes time resolution.*

The selected period is characterized by intense geomagnetic activity and, for this reason, is considered as a very interesting one for the demonstration of DIAS system potentiality.

You are welcome to explore the functionality of the DIAS system in real time through the DIAS prototype. To obtain free access to all DIAS services please fill in the questionnaire about DIAS products and services. The questionnaire as well as the detailed overview of DIAS project, is available in the DIAS web site: http://www.iono.noa.gr/DIAS/.

Your comments are most welcome!"

<u>Informative Section:</u>

It collects a series of useful information to the project DIAS's presentation (the same existing today in DIAS Prototype), as well as the understanding of the contents of the following sections.

If the Web Demonstrator will be shown inside of the DIAS website, which has already an informative section, it will be good to verify if the presence of a such section will be useful and, in the positive case, if it will not be an overlap of information.

The Informative Section will be rather useful in the CD version!!.

<u>Direct information section:</u>

It will collect the coming data from the ionosondes of European institutes which takes part to the project.

It will be possible the formulation of the following research parameters from an appropriate menu:

- requested ionospheric station (among the institutes which will have provided their data in time). The selection of the ionospheric station will happen through a combo box;
- type of survey (previous historical done/file survey).

The outputs will be:
- one or more ionograms (diagram Frequency - Height);
- the connected tables of detected values.

It will be given the possibility of viewing on the same page the ionograms' preview of all the ionospheric stations at the same time; the ionograms will be aligned to the requested data/hour (that the user can insert). By clicking on the thumbnail of a single ionogram, it will be enlarged to all the page.

It will be given the possibility of viewing in the same page the preview of 8 consecutive ionograms, which have been detected from the same station, by starting from a requested data/hour (that the user can insert). By clicking on the thumbnail of a single ionogram , it will be enlarged to all the page.

If an image is not available, it will be replaced by an uniform background picture where it is written "not available".

<u>Elaborated information section:</u>

It will contain a series of information (in terms of maps, diagrams and data report) made by DIAS server, based on the information which are given by the ionosondes of the various points of measure.

It will be possible to select from the menu the type of elaborated and searched information (plot, map foF2...) and the characteristics of this elaboration (ionospheric station, last produced elaboration, historical files, production of a map according to a determinated locality...).

The outputs will be:

- **plots of foF2, foF2$_{SIRM}$, f$_{min}$, M(3000)F2, M(3000)F2$_{SIRM}$ and R$_{eff}$.**
  The research parameters of these diagrams will be:
    - ionospheric station (among the ones which will have provided their data in time);
    - Type of plot for each station:
        - foF2 observed values
        - foF2 long-term predicted values (foF2$_{SIRM}$)
        - foF2 short-term predicted values
        - f$_{min}$ observed values
        - M(3000)F2 observed values
        - M(3000)F2 long-term predicted values [M(3000)F2$_{SIRM}$]
        - R$_{eff}$, effective Sun Spot Number (SSN) (over Europe)

  It will be given the possibility of viewing in the same page the preview of the current plot of all the ionospheric stations. By clicking on the thumbnail of a single plot, this will be enlarged to all the page.

  At the same time, It will be given the possibility of viewing in the same page the preview of the last consecutive 8 diagrams, produced by the same station (one per day). By clicking on the thumbnail of a diagram, this will be enlarged to all the page.

  If an image is not available, it will be replaced with a uniform background picture where it is written "not available".

- **Isolines foF2 maps, M(3000)F2 maps and MUF maps**, which are produced to cover the European region.

  The research's parameters for these diagrams will be:
    - type of own ionospheric survey among the following three ways:
        - ionosphere "quiet"/long term forecast: each month 24 maps, that is one per every hour of the day, valid every day of the

month, which are calculated on the value of medium monthly R12. The 24 maps are shown in the same page, and the requested map will be enlarged to all the page through the selection;

- o nowcasting: maps calculated on the value of effective R12 (one single map is shown in the page);
- o short term forecasting: maps regarding the next 24 hours (only for foF2 maps).

Regarding MUF maps (nowcasting and long term prediction), since they are drawn according to the transmission point, it will need to give to the user the possibility to insert an input in terms of:

- Selection of a series of defined location (in Web Demo only Athens, Madrid and Stockholm);
- Selection of the type of map between nowcast and long term forecast.

- **Electron density maps** (isolines maps and graph height/density):
  - *electron-density nowcasting maps*, calculated at various heights (Up to 400 km, every 50 km, starting at 100 Km), which are produced to cover the European region.
    The research parameters for these diagrams will be the height which it needs to draw the isoline map at (selection by clicking on a sort of sliding bar);
  - o *electron-density profile over each station*.
    The research parameters for these diagrams will be the ionospheric station over which graph of height/density has to be drawn;

If an image is not available, it will be replaced with a uniform background picture where it is written "not available".

Glossary section:

Il will contain a glossary about the terms used in the Web Demonstrator (and in the final DIAS Web), the same as in the DIAS Prototype.

Alerts section:

It will contain:

the following alerts indices:

1) $AI(foF2)^{real\ time}=100*(foF2^{autoscaled}-foF2^{med})/foF2^{med}$
and
$AI(foF2)^{forecast}=100*(foF2^{forecast}-foF2^{med})/foF2^{med}$

visualized as a text in a proper way for each single station;

2) AI plots (-24 AI real, +24 AI predicted)

Web Demonstrator: the layout

The used language to build the website is the English one.

The look and fill will be as the DIAS Prototype's one.

Here it follows the graphic description of Web Demo interfaces.

It's important to understand that, since the Web Demo simulate the DIAS Server in a fixed period:

the system is frozen at a selected date/time (14th of September, at 15:00), as described above; <u>all nowcasts are referred to the selected date/time, and the same is for all historical data, short and long term forecasts</u>.

The following pictures are just an example, and the dates in combo box could not match with the period selected by DIAS members for the Web Demo.

Intro Page

Welcome to the DIAS system simulation performance!

This Demo gives you the opportunity to explore the DIAS products and services for a pre-selected period. For this off line experience, please keep in mind that:

- For "nowcasting" products and services, the 14th of September, 15:00 UT is considered as the current date and time.
- The "historical data" set in terms of text files, graphs and plots is limited to the period from 5th (00:00 UT) to 14th of September 2005 (15:00 UT).
- The time resolution for all products and services is 1 hour while in the on line DIAS system they will be provided in 15 minutes time resolution.

The selected period is characterized by intense geomagnetic activity and, for this reason, is considered as a very interesting one for the demonstration of DIAS system potentiality.

You are welcome to explore the functionality of the DIAS system in real time through the DIAS prototype. To obtain free access to all DIAS services please fill in the questionnaire about DIAS products and services. The questionnaire as well as the detailed overview of DIAS project, is available in the DIAS web site: http://www.iono.noa.gr/DIAS/.

Your comments are most welcome!

Continue

- The page appear automatically after inserting the Web Demo CD into the PC;

- The text in the page explain to the user what the Web Demo is;

- By clicking the "*Continue*" button, it's possible to enter in the Web Demo.

Home Page
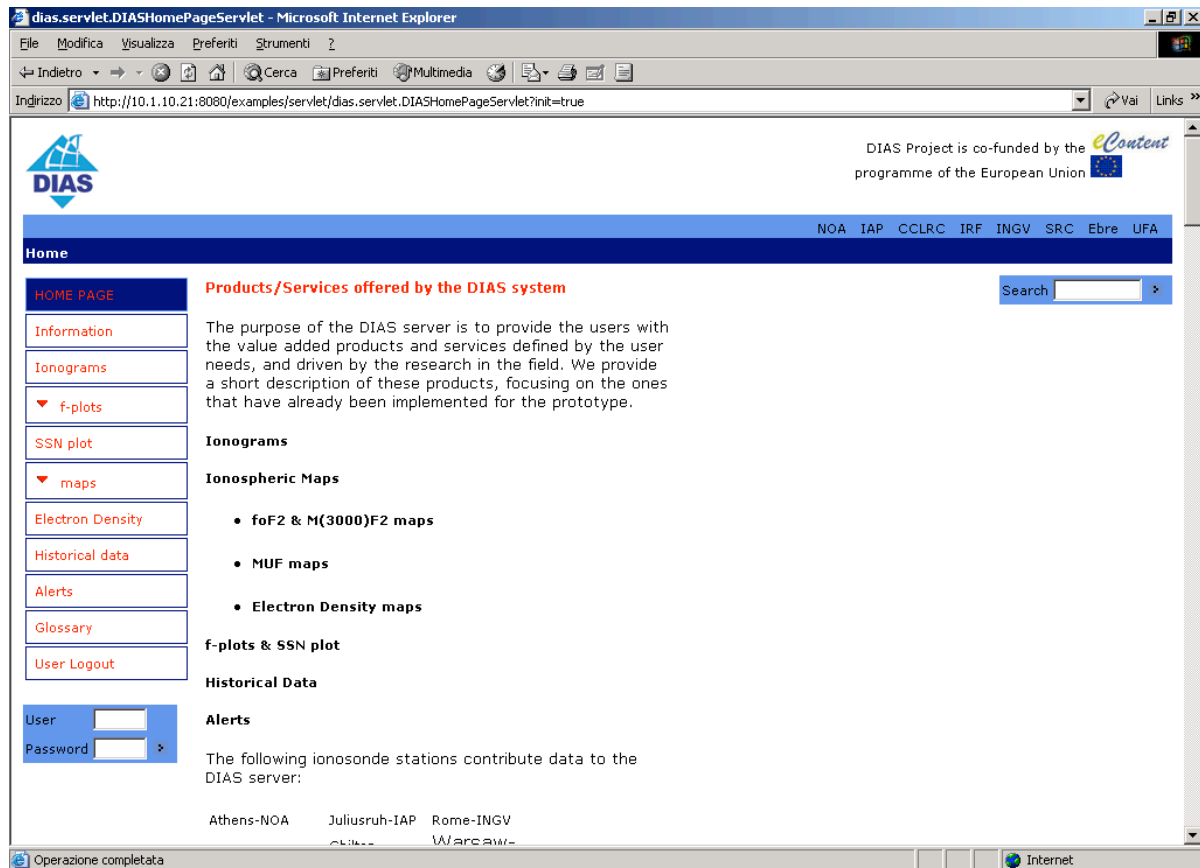
- The Home Page will describe the DIAS Server.

- The Menu Bar is always on the left side

- On the right side, in the upper blue bar, there are the links to the consortium members web-site (always present)

- The Search engine is not working

- The User and Password form is not working in Web Demo.

Information Page

- The text provides to the users some information about DIAS System (the same information already existing in DIAS Prototype)
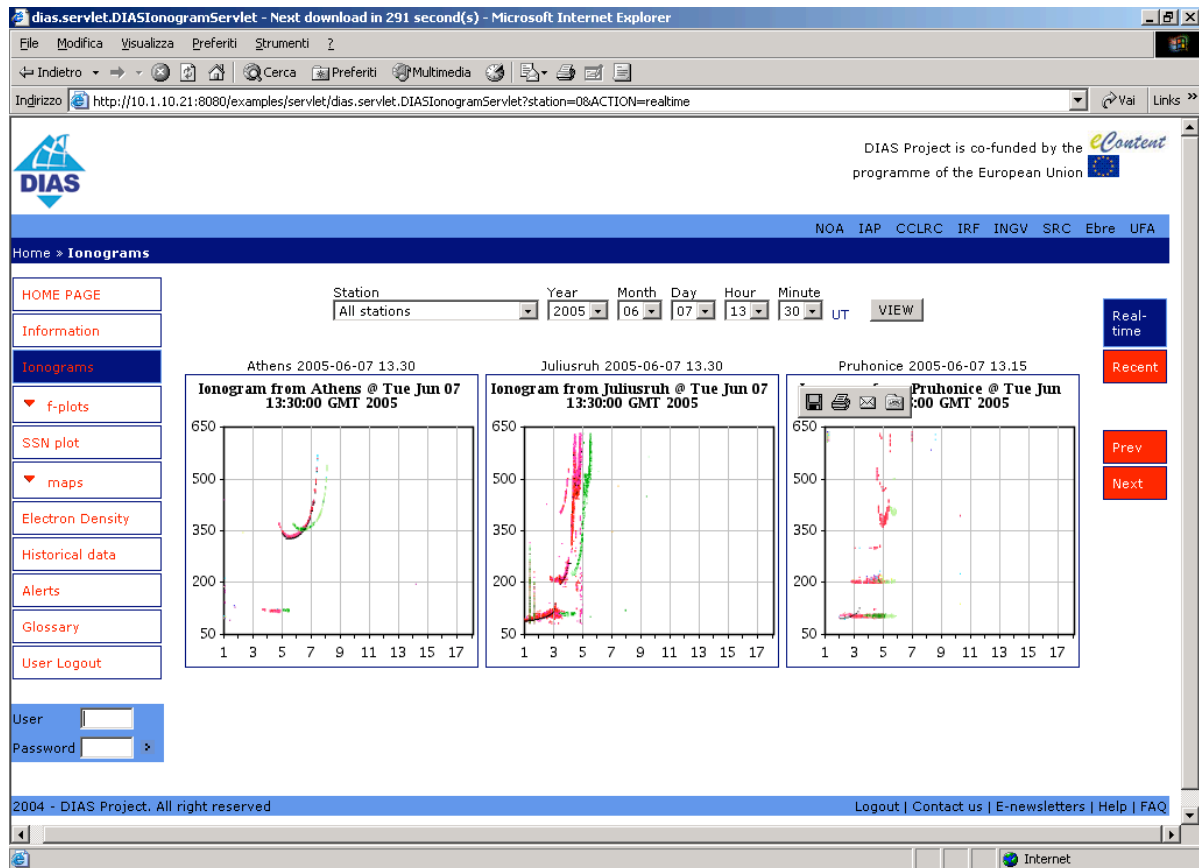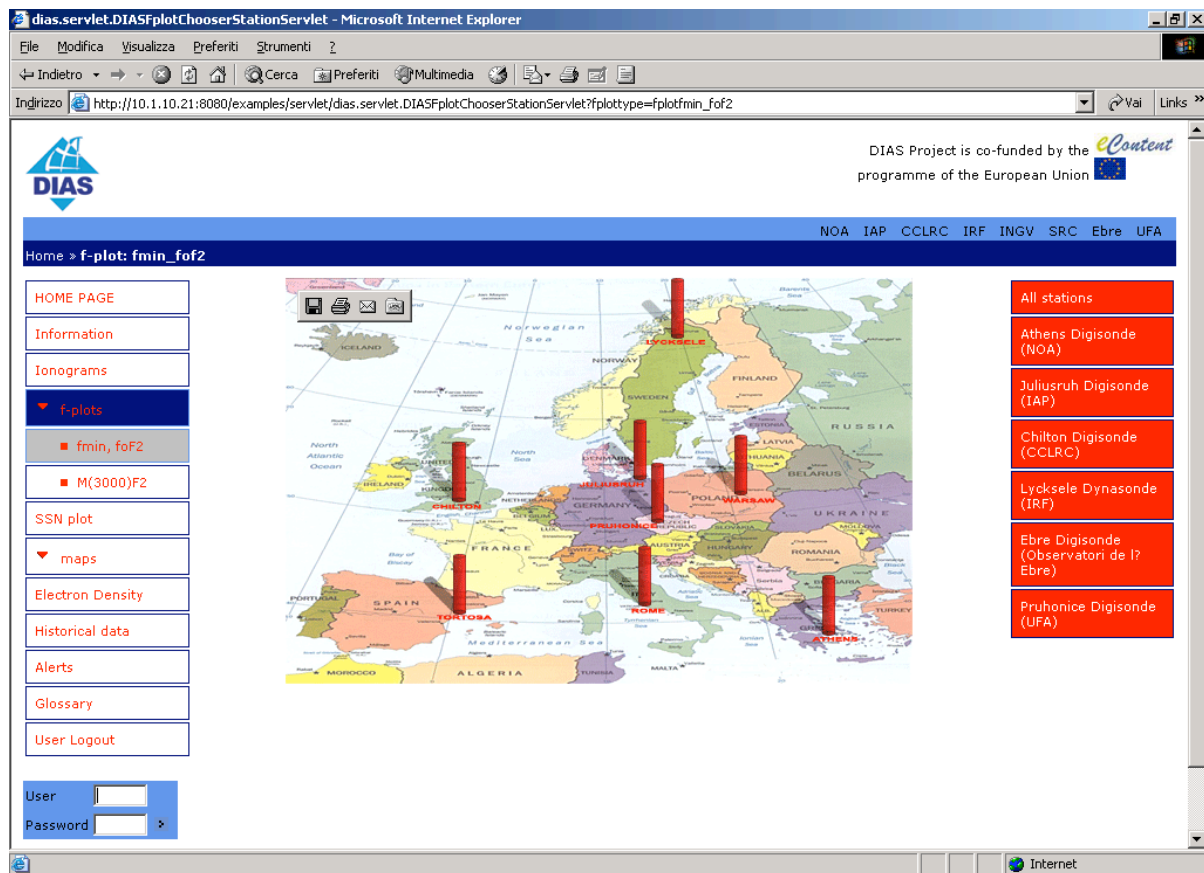
Ionograms Main Page

- By clicking on *All Stations* button (on the right side), it is possible to display the current ionograms (thumbnails) produced by all DIAS stations (see All Stations ionogram Page);

- By clicking on one of the other buttons below the *All Stations* one, it is possible to view the ionogram provided by a single DIAS station (see Single Station ionogram Page).

All Stations ionograms Page

- By clicking on a thumbnail it's possible to zoom it in another window;

- By selecting the values *Station*, *Year*, *Month*, *Day*, *Hour* and *Minute* in the combo-boxes, it's possible to change ionogram's station and/or date (it will be possible to retrieve only ionograms from 1st September 2005 at 00:00 UT to the "simulated" real time);

- By clicking on buttons on the right side, it's possible to:
  - navigate into *Previous* and *Next* ionograms in multi-frame form (showing all-stations ionograms);
  - show the *Real-Time* ionograms in multi-frame form (showing all-stations ionograms).

Single Station ionogram Page
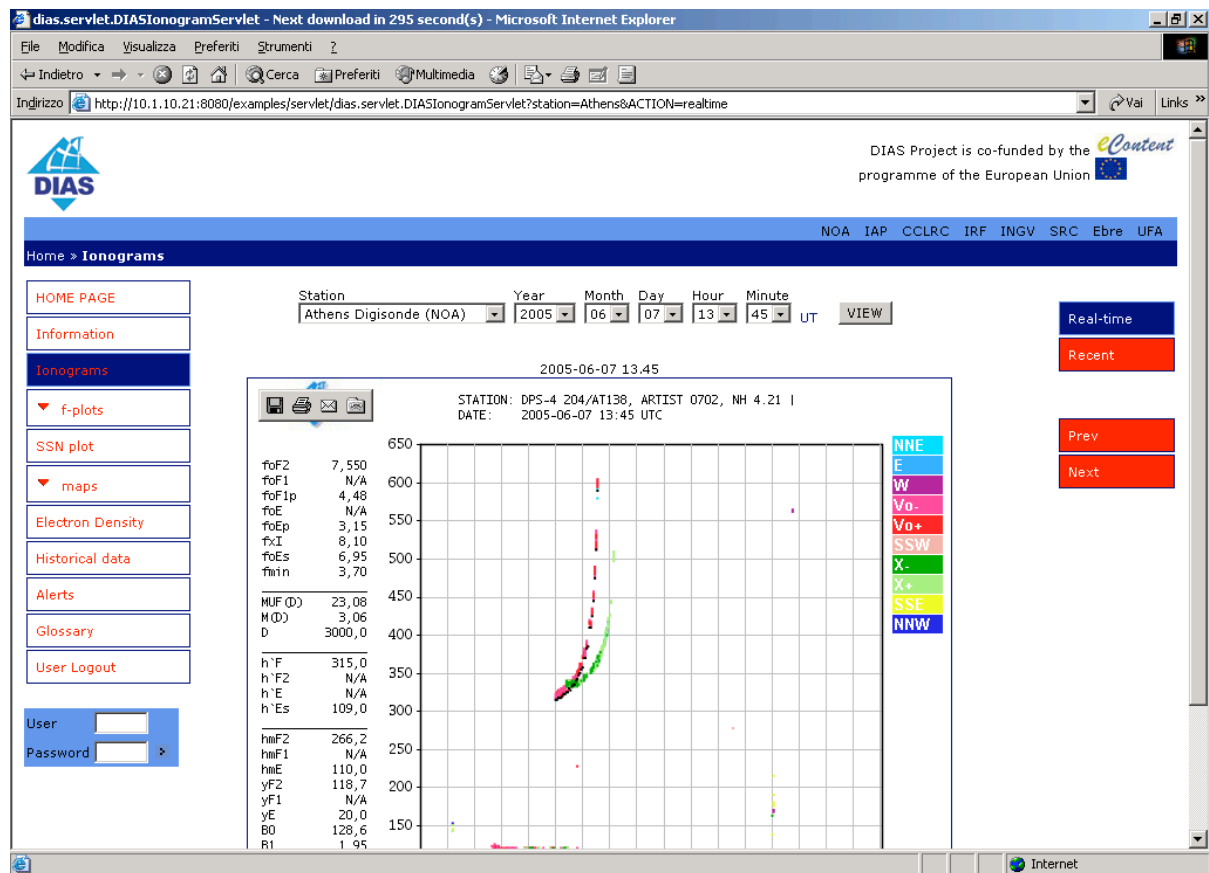
- By selecting the values *Station*, *Year*, *Month*, *Day*, *Hour* and *Minute* in the combo-boxes it's possible to change ionogram's station and/or date;

- By clicking on buttons on the right side, it's possible to:
    - navigate into *Previous* and *Next* ionograms;
    - show the *Real-Time* ionogram again;
    - show the 8 most recent ionograms produced by the selected station.

- By clicking on *ASCII* button (not in picture), it will be possible to view the ASCII data.

Plots Main Page

- f_{min}, *foF2* and *M(3000)F2* plots page are almost similar[2], so the print screen in the document regards only the f_{min}, *foF2*.

- By clicking on *All Stations* button (on the right side) it is possible to display the current plots (thumbnails) produced by all DIAS stations (see All Stations plot Page);

- By clicking on one of the other buttons below the *All Stations* one, it is possible to view the plots provided by a single DIAS station (see Single Station plot Page).

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[2] The only difference is that there is not a *Short-term prediction* section for the parameter M(3000)F2

All Stations plot Page
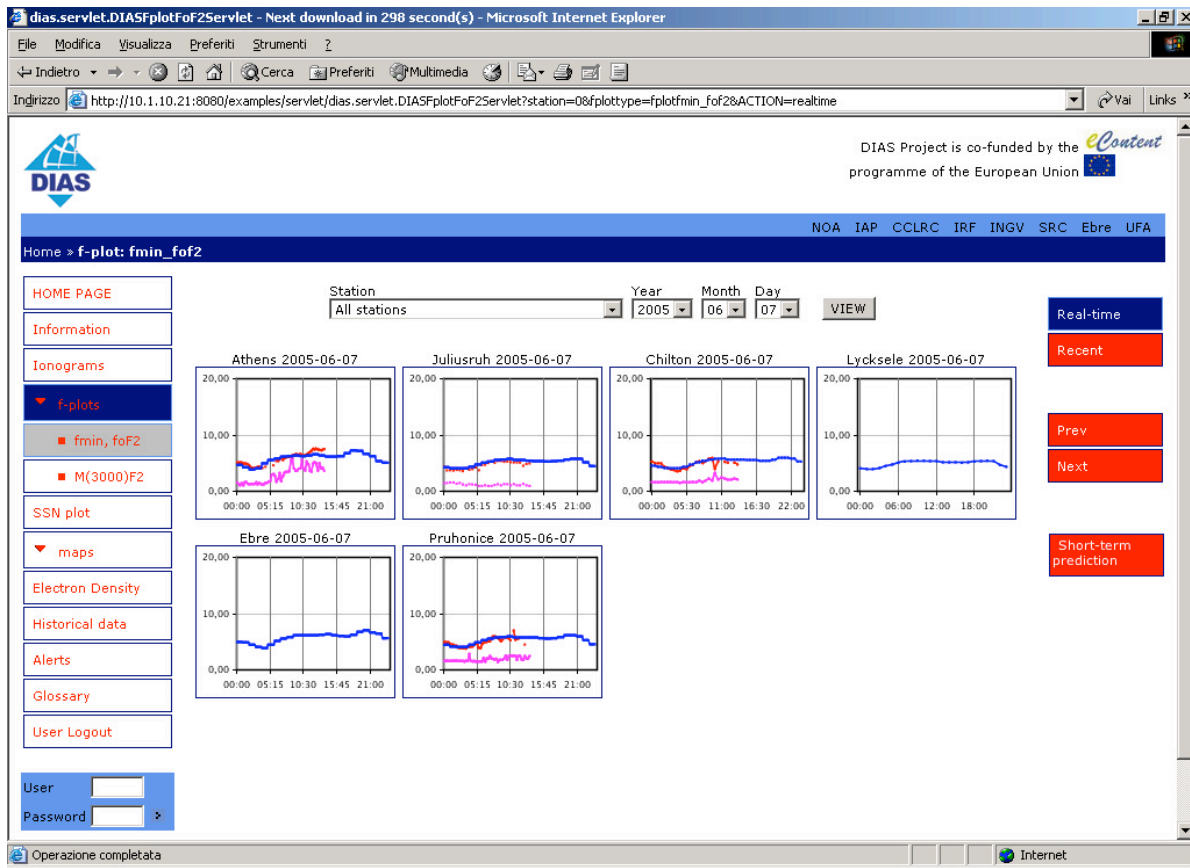
- By clicking on a thumbnail it's possible to zoom it in another window;

- By selecting the values *Station*, *Year*, *Month* and *Day* in the combo-boxes it's possible to change plot's station and/or date;

- By clicking on buttons on the right side, it's possible to:
    - navigate into *Previous* and *Next* plots in multi-frame form (showing all-stations plots);
    - view the *Real-Time* plots in multi-frame form (showing all-stations plots)
    - view the *Short-term Prediction* plots in multi-frame form (showing all-stations plots).

Single Station plot Page
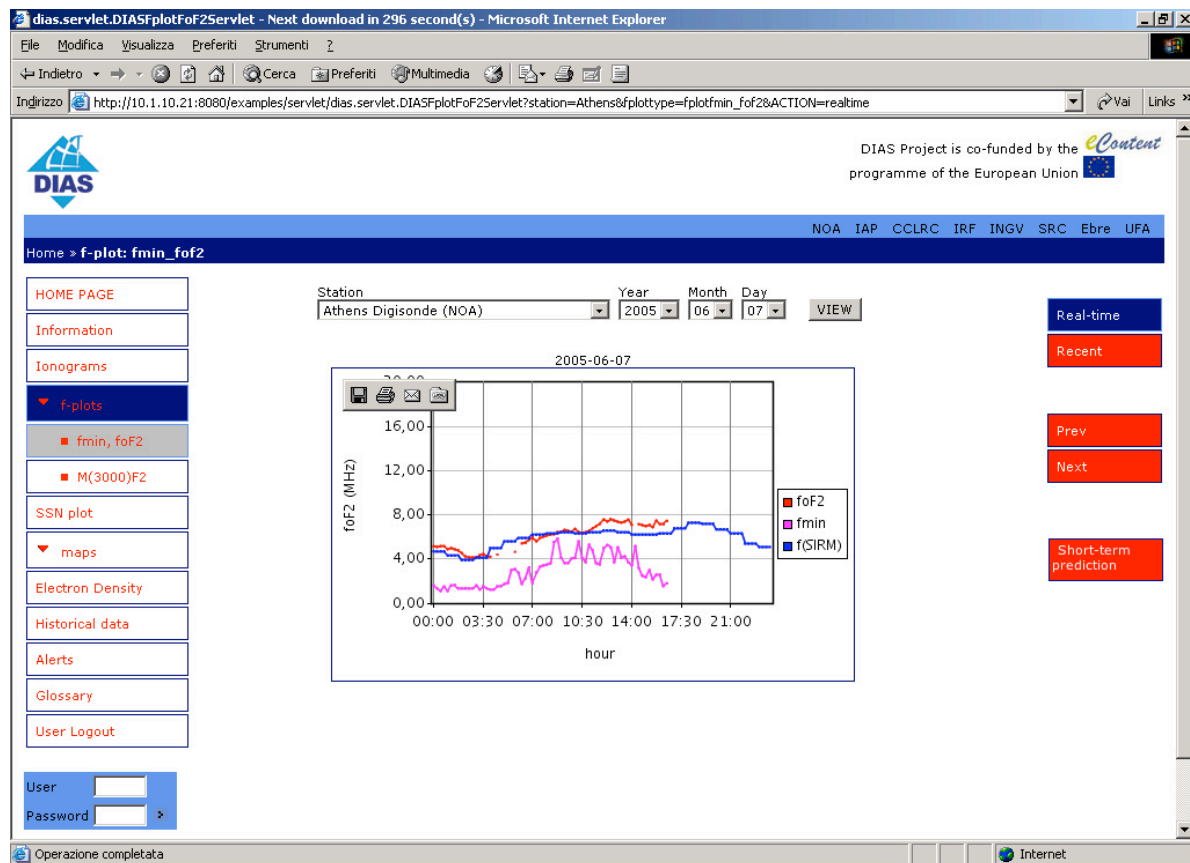
- By selecting the values *Station*, *Year*, *Month* and *Day* in the combo-boxes, it's possible to change plot's station and/or date;

- By clicking on buttons on the right side, it's possible to:
  - navigate into *Previous* and *Next* plots;
  - view the *Real-Time* plot again;
  - view the 8 most recent plots produced by the selected station;
  - view the *Short-term prediction* plot .

- By clicking on *ASCII* button (not in picture), it will be possible to view the ASCII data.

SSN Plot Page
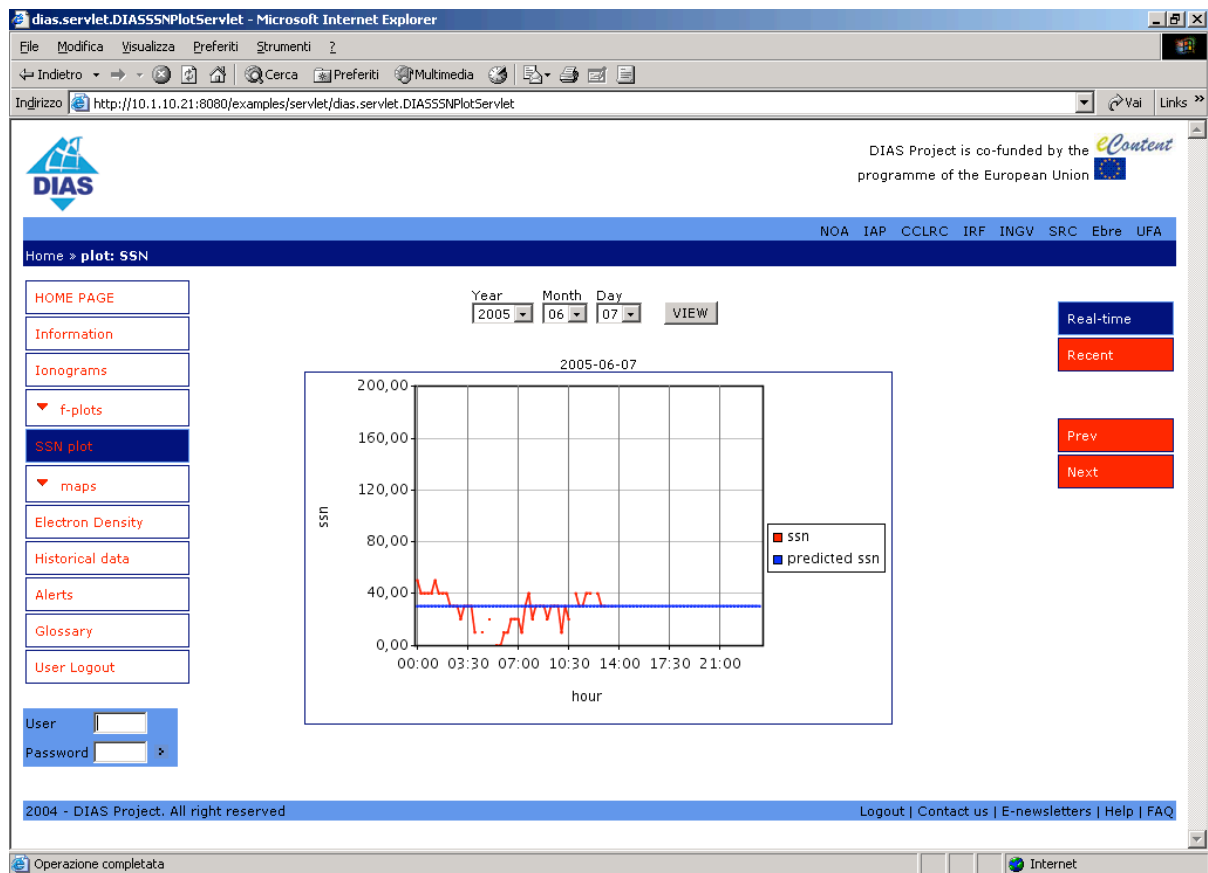
- By selecting the values *Year*, *Month* and *Day* in the combo-boxes, it's possible to change SSN plot's station and/or date;

- By clicking on buttons on the right side, it's possible to:
    - navigate into *Previous* and *Next* SSN plots;
    - show the *Real-Time* SSN plot again;
    - show the 8 most recent SSN plots produced by the selected station.

- By clicking on *ASCII* button (not in picture), it will be possible to view the ASCII data.

foF2 maps Page
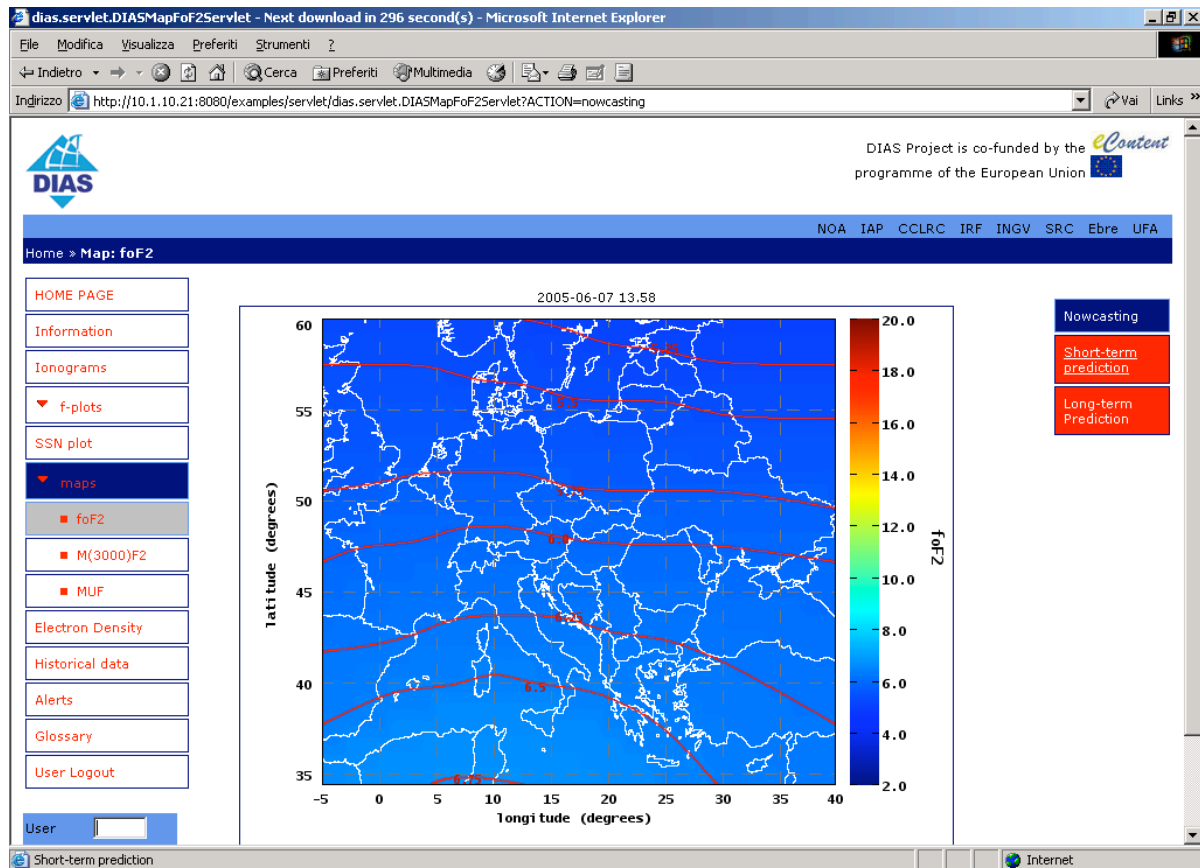
- The above map, which comes up when the foF2 Map page is selected by the main menu, is a nowcasting map;

- By clicking on buttons on the right side, it's possible to:
    - navigate into *Short term prediction* maps (opened as 24 thumbnails);
    - open the *Long term prediction* maps (opened as 24 thumbnails);

- By clicking on *ASCII* button (not in picture), it will be possible to view the ASCII data.

foF2 long term prediction maps Page
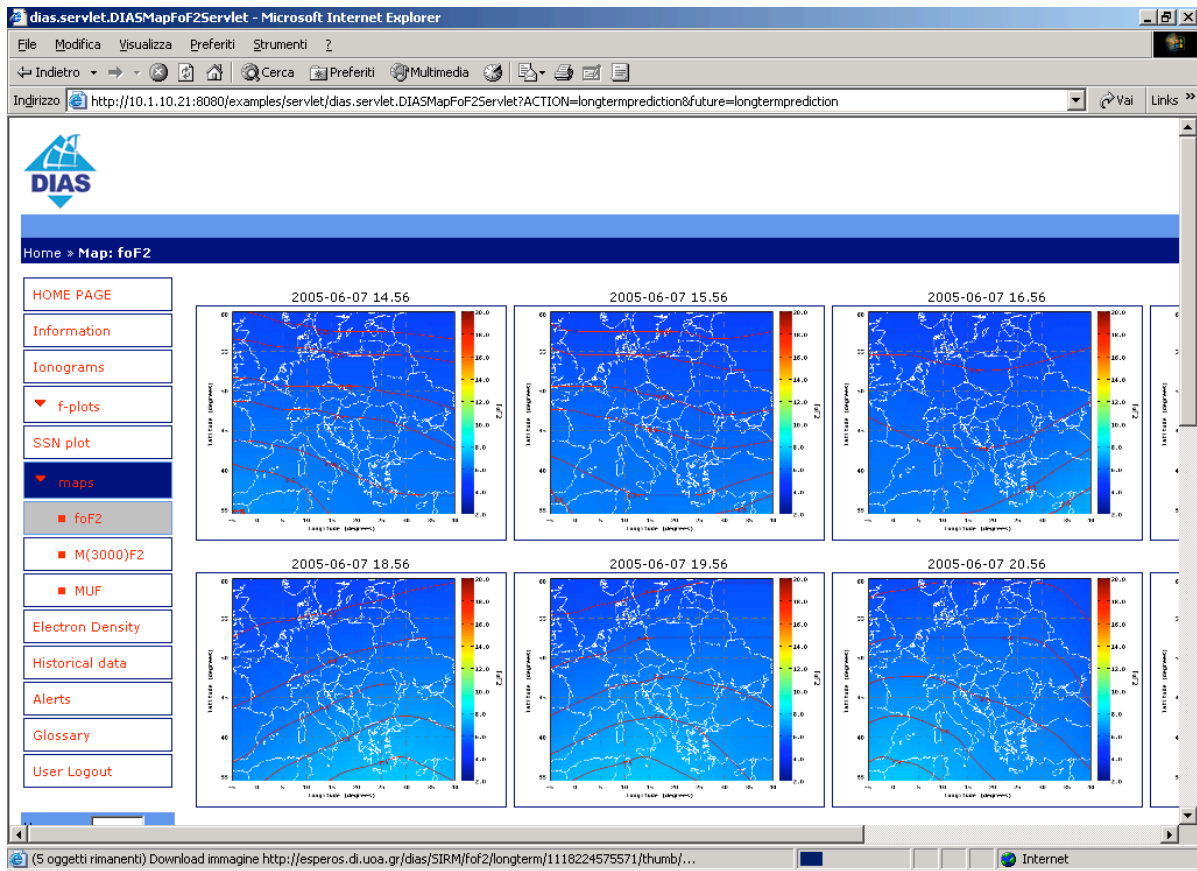
- By clicking on a thumbnail it's possible to zoom it in another window (and then, by clicking on *ASCII* button, it will be possible to view the ASCII data);

- By clicking on buttons on the right side (not visualized in the picture), it's possible to:
    - navigate into *Short term prediction* maps (opened as thumbnails);
    - open the *nowcasting* map.

M(3000)F2 maps Page
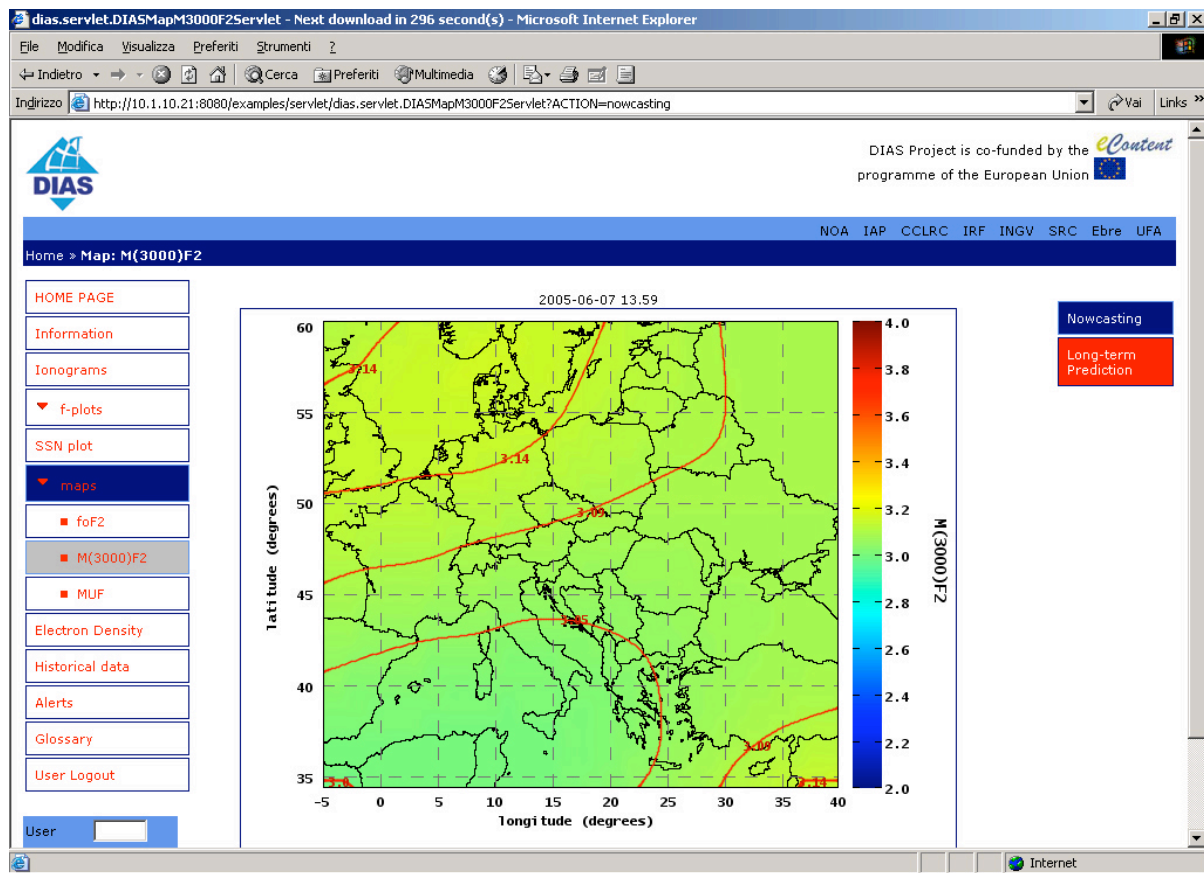
- The above map, which comes up when the M(3000)F2 Map page is selected by the main menu, is a nowcasting map;

- By clicking on buttons on the right side, it's possible to:
  - o open the into *Long term prediction* maps (opened as 24 thumbnails);

- By clicking on *ASCII* button (not in picture), it will be possible to view the ASCII data.

M(3000)F2 long term prediction maps Page
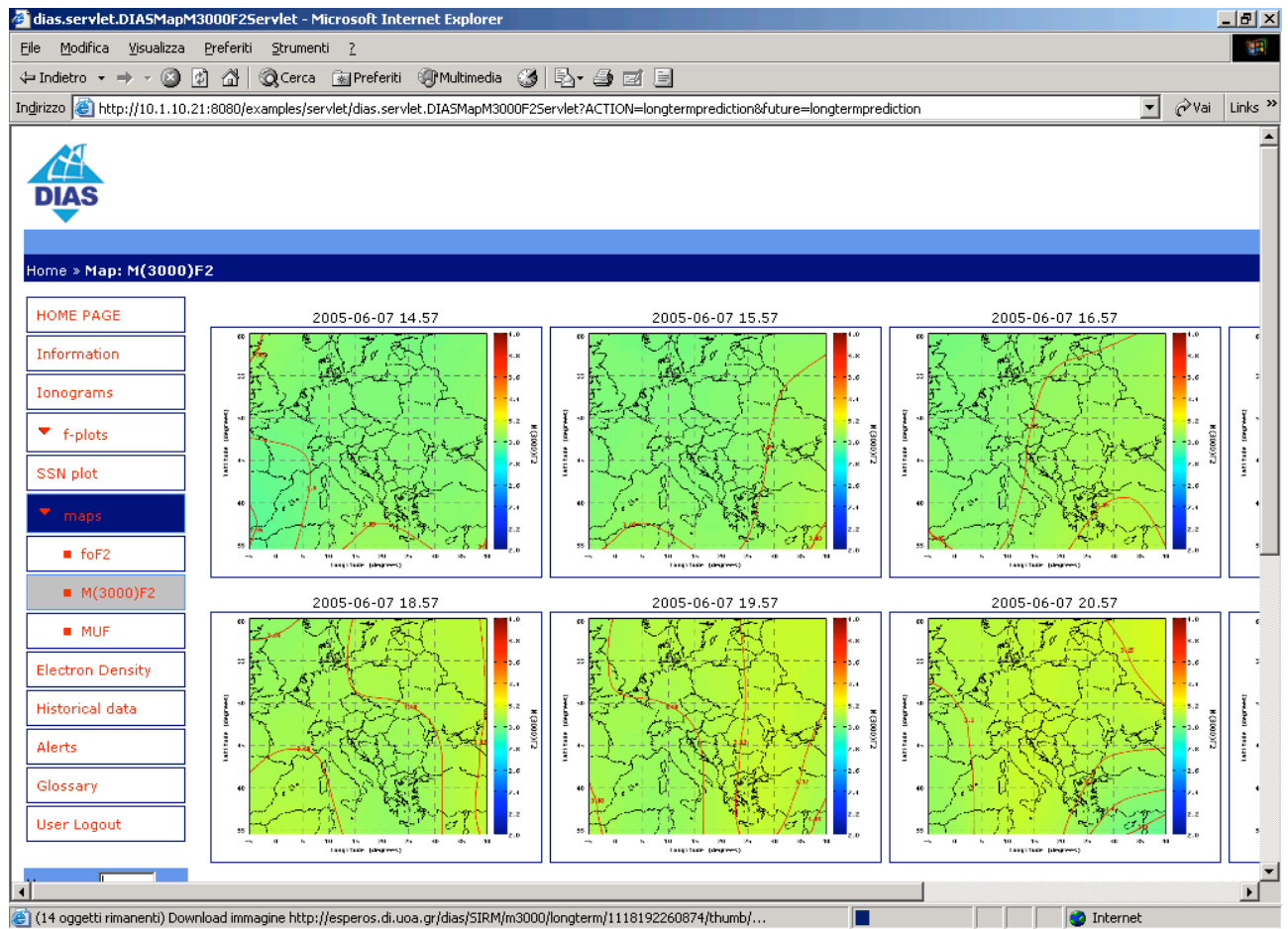
- By clicking on a thumbnail it's possible to zoom it in another window (and then, by clicking on *ASCII* button, it will be possible to view the ASCII data);

- By clicking on buttons on the right side (not visualized in the picture), it's possible to:
  - open the *nowcasting* map.

MUF Maps Main Page

- By selecting one starting point from the combo box (possible choices: Athens, Stockholm and Madrid[3]) it is possible to display the nowcasting MUF map generated on the starting point (see *MUF nowcasting maps Page*).

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[3] In the picture instead of Stockholm and Madrid, Warsaw and Rome are shown

MUF nowcasting maps Page

- By clicking on buttons on the right side it's possible to:
  - o open the *long term prediction* maps.

- By clicking on *ASCII* button (not in picture), it will be possible to view the ASCII data.

MUF long term prediction Page
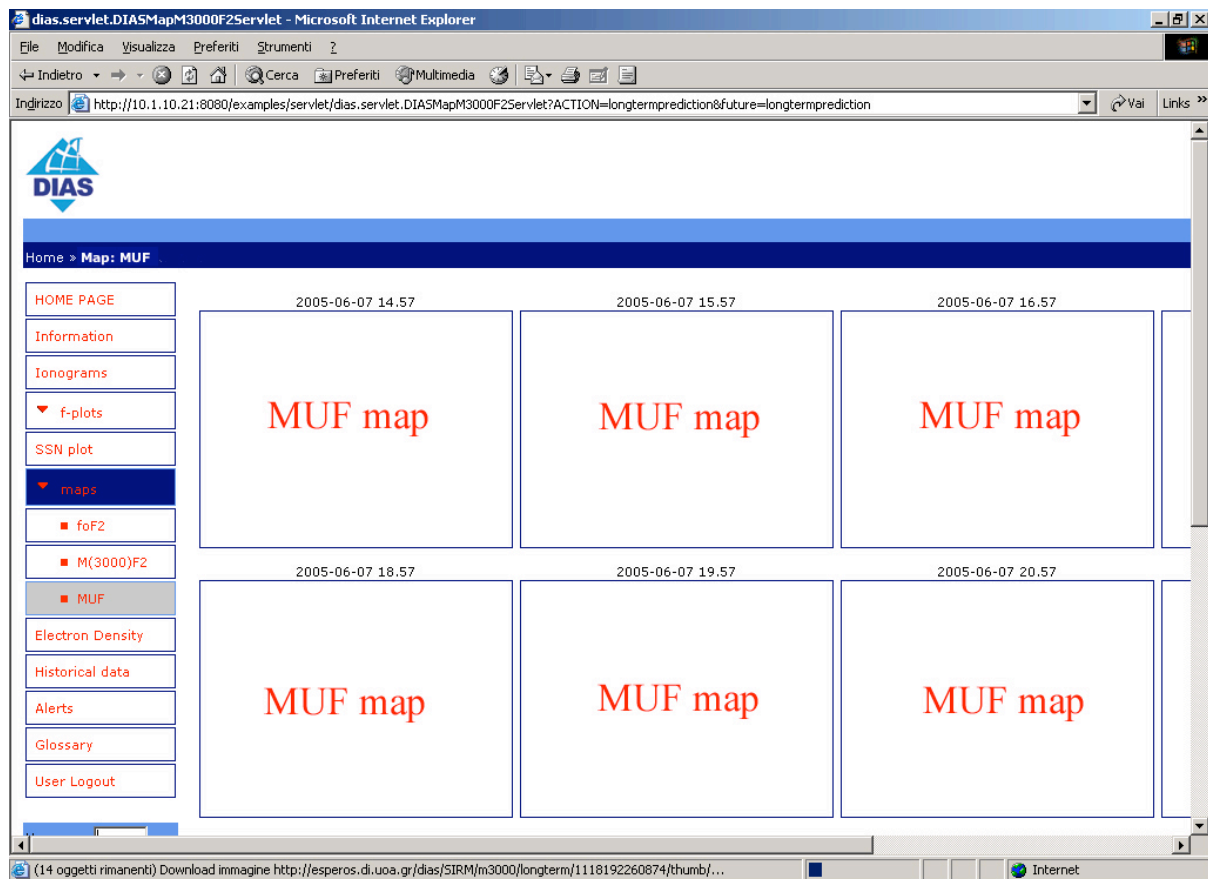
- By clicking on a thumbnail it's possible to zoom it in another window and then, by clicking on *ASCII* button, it will be possible to view the ASCII data;

- By clicking on buttons on the right side (not visualized in the picture), it's possible to:
  - open the *nowcasting* map.

Electron Density nowcasting maps

- By clicking on the "Electron Density" button in the Menu Bar on the left side, it will be possible to choose (not in picture) between:
  - *electron-density nowcasting maps;*
  - *electron-density profile over each station.*

- In *electron-density nowcasting maps* (in picture), by clicking on the red numbers (height in km), it is possible to get the map with isolines drown at the selected height.

- By clicking on *ASCII* button (not in picture), it will be possible to view the ASCII data.

Electron density profile over each station

- By selecting the *electron-density nowcasting maps* and by clicking on one of the station buttons (in picture), it is possible to view the electron-density profile provided by a single DIAS station (next picture).

DIAS Project is co-funded by the *eContent* programme of the European Union
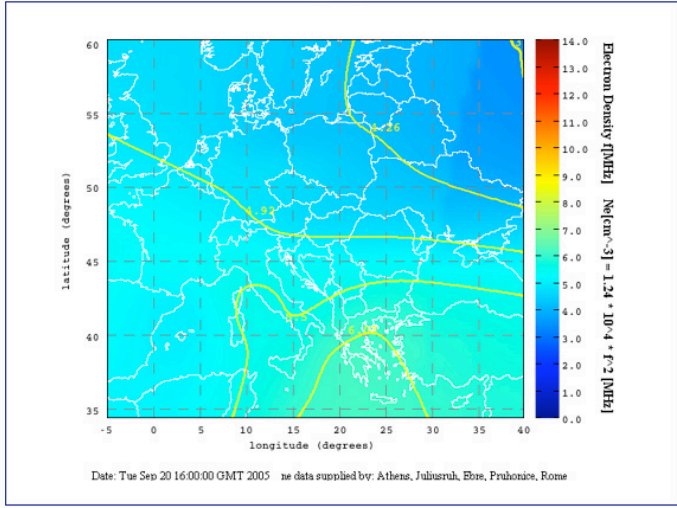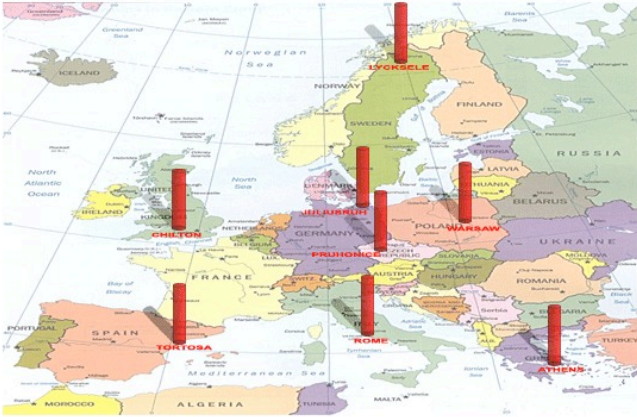
NOA IAP CCLRC IRF INGV SRC Ebre UFA

HOME PAGE

Information

Ionograms

▼ f-plots

SSN plot

▼ maps

Electron Density

Historical data

Alerts

Glossary

User Logout

User

Password ›

Year   Month   Day
2005   09   20   VIEW

Download

Where...
Where...
Athens
Rome
Warsaw

Prev

Next

IMAGE

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- o By clicking the values *Year*, *Month*, *Day* and *Hour* (Hour is not in picture) in the combo-boxes, it is possible to change electron-density's date (it will be possible to retrieve only maps from the 5st September at 00:00 to 14th of September at 15:00);

- o By clicking on *Previous* and *Next* buttons, it's possible to navigate into *Previous* and *Next* electron-density profile.

- o By clicking on *ASCII* button (not in picture), it will be possible to view the ASCII data.

Alerts Page

By clicking on *All Stations* button (on the right side), it is possible to display the current alerts (Real Time) about all DIAS stations (see All Stations alerts Page);

By clicking on one of the other buttons below the *All Stations* one, it is possible to view the alerts about a single DIAS station (see Single Station alerts Page).

A text (to be defined) should explain to users that the subscription to the service enables them to receive alerts automatically.

All Stations Real Time Alerts Page

- By selecting the values *Station* in the combo-box, it's possible to change alert's station.

- By clicking on the colored station box it's possible to enlarge it (see Single Station Real Time Alerts Page)

Single Station Real Time Alerts Page

- By selecting the values *Station* in the combo-box, it's possible to change alert's station/kind.

- By clicking on buttons on the right side, it's possible to:
  - o to view the *Short term prediction* Alerts as a text;
  - o to view the AI plot (-24 AI real, +24 AI predicted) (not in picture) and then, by clicking on *ASCII* button, it will be possible to view the corresponding ASCII data.

- **Glossary Page**
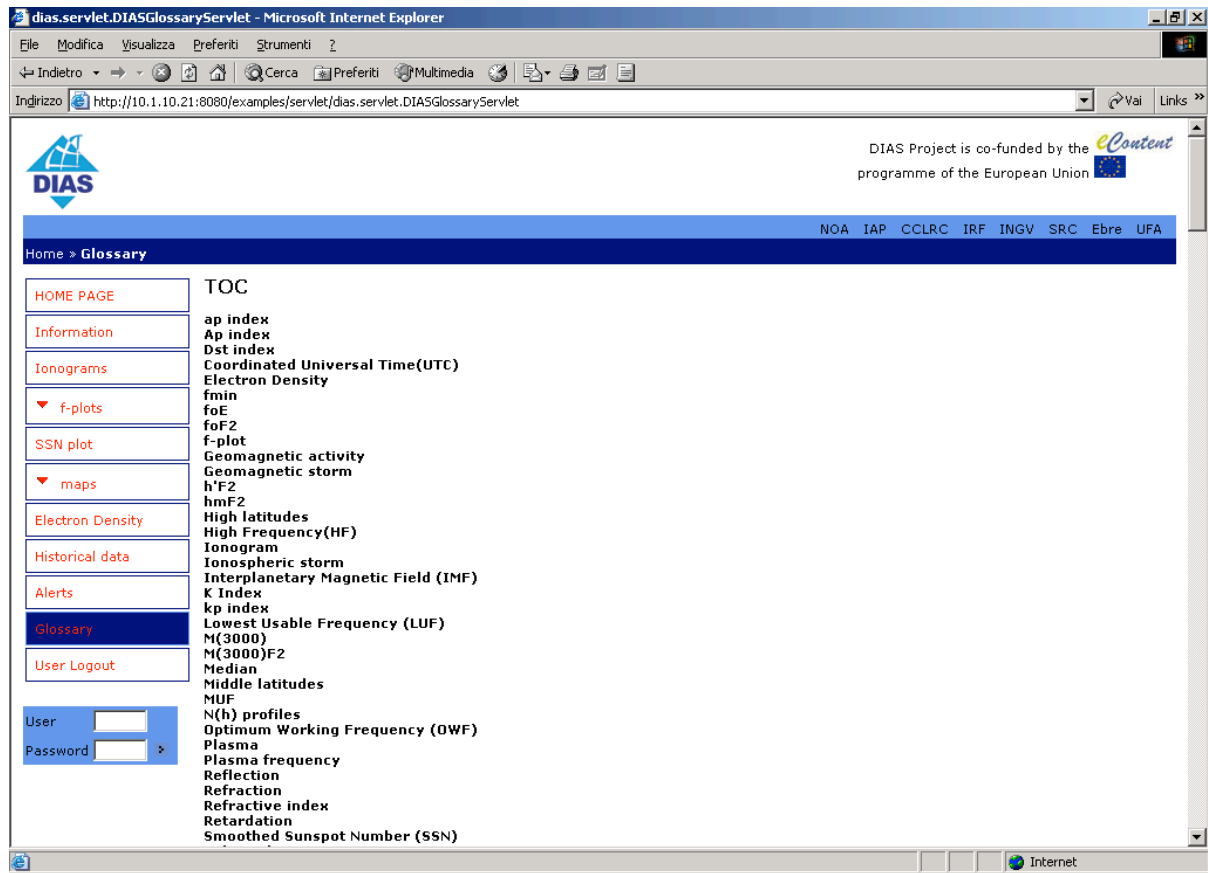
The glossary regards the most common terms used in the Web site (the same terms already existing in DIAS Prototype)

Dead Lines

In order to have all the above:

- the digisondes/dynasondes/ionosondes taking part to the DIAS network have to be on line and/or able to provide all the necessary info in terms of ionograms images and SAO files to the server of the University of Athens;
- all the applications have to be able to provide what in the Kiruna technical meeting has been decided[4].

The University of Athens will have to worry to save all the outputs of the DIAS prototype in terms of figures, maps, data, alerts and so on to make possible the realization of the static database on which the Web Demo will be based.

In order to have a Web Demo working on CD in November 2005:

- By September 30th this document must be agreed by the partners;
- By September 30th the static DB file system (file names only) should be provided to INGV by UOA.
- By October 15th all images, maps, data and alerts should be provided to INGV by UOA.

Images, maps, data and alerts necessary to create the static database on which the Web Demo will be based

Taking into account the 14th of September at 15:00, starting from 5th of September at 00:00 and considering a time resolution of 1 hour the files will be the following:

a) SAO files and ionogram images from 14th of September at 15:00 backward to the 5th of September at 00:00; the total number of files in this case will be 464 (232PNG + 232SAO) multiplied for each station able to provide such a data.

b) plot of foF2, fmin and foF2(SIRM) from 14th of September backward to the 5th of September at 00:00 with the plot of 14th of September having data for fmin and foF2 only till 15:00; the total number of files in this case will be 20 (10 PNG + 10 TXT) multiplied for each station able to provide such a data.

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[4] Raw data (SAO files) for all stations from the decided date and hour backward to the 1st of September 2005;
Ionograms (PNG files) for all stations from the decided date and hour backward to the 1st of September 2005;
foF2, foF2(SIRM), fmin, M(3000)F2, M(3000)F2(SIRM), predicted sunspot number and Reff plots + corresponding ascii data for all stations from the decided date and hour backward to the 1st of September 2005;
foF2 short-term forecasting plots for all stations;
foF2 and M(3000)F2 nowcasting and long terms maps + grids;
foF2 and M(3000)F2 long-term forecast maps + grids;
foF2 short-term forecasting maps + grids;
nowcasting electron density maps (100-400 Km) + grids;
MUF nowcasting and long term forecasting maps (transmitting locations: Athens, Madrid, Stockholm) + grids;
Alerts real time & forecasting (for all stations).

c) plot of M(3000)F2 and M(3000)F2(SIRM) from 14th of September backward to the 5th of September at 00:00 with the plot of 14th of September having data for M(3000)F2 only till 15:00; the total number of files in this case will be 20 (10 PNG + 10 TXT) multiplied for each station able to provide such a data.

d) foF2 short term plot image with data from 16:00 of 14th of September to 15:00 of 15th of September; the total number of files in this case will be 2 (1 PNG + 1 TXT) multiplied for each station able to provide such a data.

e) SSN plot of Reff and Rpredicted from 14th of September backward to the 5th of September at 00:00 with the plot of 14th of September having data for Reff only till 15:00; the total number of files in this case will be 20 (10 PNG + 10 TXT).

f) foF2 nowcasting map referring to 15:00 of 14th September; the total number of files in this case will be 2 (1 PNG + 1 TXT).

g) M(3000)F2 nowcasting map referring to 15:00 of 14th September; the total number of files in this case will be 2 (1 PNG + 1 TXT).

h) foF2 long term maps referring to the 24 hours of September; the total number of files in this case will be 48 (24 PNG + 24 TXT).

i) M(3000)F2 long term maps referring to the 24 hours of September; the total number of files in this case will be 48 (24 PNG + 24 TXT).

l) foF2 short term maps from 16:00 of 14th of September to 15:00 of 15th of September; the total number of files in this case will be 48 (24 PNG + 24 TXT).

m) MUF nowcasting maps referring to 15:00 of 14th September; the total number of files in this case will be 6 (1 PNG + 1 TXT for Madrid, 1 PNG + 1 TXT for Athens and 1 PNG + 1 TXT for Stockholm).

n) MUF long term maps referring to the 24 hours of September; the total number of files in this case will be 144 (24 PNG + 24 TXT for Madrid, 24 PNG + 24 TXT for Athens and 24 PNG + 24 TXT for Stockholm).

o) electron-density nowcasting maps referring to 15:00 of 14th September at different heights (100, 150, 200, 250, 300, 350, 400 km); the total number of files in this case will be 14 (7 PNG + 7 TXT).

p) electron-density profile (with data taken from SAO file) over each station from 14th of September at 15:00 backward to the 5th of September at 00:00; the total number of files in this case will be 464 (232 PNG + 232 TXT) multiplied for each station able to provide such a data.

q) AI real for 14th of September at 15:00; the total number of files in this case will be 1 (TXT) multiplied for each station able to provide such a data.

r) AI short term predictions from 14th of September at 16:00 to 15th of September at

15:00; the total number of files in this case will be 1 (TXT) multiplied for each station able to provide such a data.

s) AI plots (-24 AI real, +24 AI predicted) centered on 14th of September at 15:00; the total number of files in this case will be 2 (1 PNG + 1 TXT) multiplied for each station able to provide such a data.