

A Java-based Data Presentation System for RWIS Data and Forecasts

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ABSTRACT

Road weather information systems (RWIS) must handle a lot of different data sets placed on several servers. The user of these data wants to have full access to all information wherever he / she may stay. The system should be extendable in order to provide for possible changes in the future. This is the reason for developing a new complex system for presentation of road weather data.

Keywords: complex system for data presentation

1. INTRODUCTION

The German RWIS is a project under the leadership of the Federal Ministry of Transport, Building and Urban Development. The task of the Laender is to co-ordinate the winter maintenance services and to maintain RWIS stations that are equipped with sensors for road and weather conditions while the Deutsche Wetterdienst (DWD) in its role as supreme federal authority collects and saves the data sets and produces forecasts.

Various companies are also taking part in the RWIS project each of which has its own software for data set presentation. Some of the Laender use more than one system. The road maintenance authorities also wish to receive information on the road conditions in the neighbouring areas. All this gave rise to the need for a presentation system that is independent from firmware.

At the end of the 1990s the DWD had developed a Java-based test version of the new NinJo presentation system which was called JavaMAP (from **J**ava-based **M**eteorological **A**pplication and **P**resentation (MAP) System). This JavaMAP was updated to JavaMAP-RWIS which can be used on the one hand for the presentation of weather data and, on the other hand, for road weather data and forecasts. The server was connected with the DWD's MAP server. With the general change from MAP to NinJo in 2005 / 2006, the server structure was also changed and the JavaMAP was deprived of its data base.

The new system now is NinJo which has own different servers. All of its components are Java-based. The system provides an enormous building kit, which, as a matter of self-evidence, should be used for the development of a new JavaMAP, the JavaMAP 3.

2. THE SYSTEM

The JavaMAP 3 is a complete Java based client-server structure and constitutes an independent platform.

With the help of AFD (Automatic File Distribution, based on ftp) the decoding machine "GloBUS" retrieves the point data (blue). "GloBUS" is a part of the same server as NinJo for the preparation of the point data sets (green). The additional data like charts and forecasts or RADAR images (yellow) are sent directly to the JavaMAP server.

It is not necessary to operate all servers at the same place. Some Laender have the complete structure, some only have the JavaMAP3 server while others use the DWD server structure. It goes without saying that there are also firewalls between the components on the Internet watching the special ports.

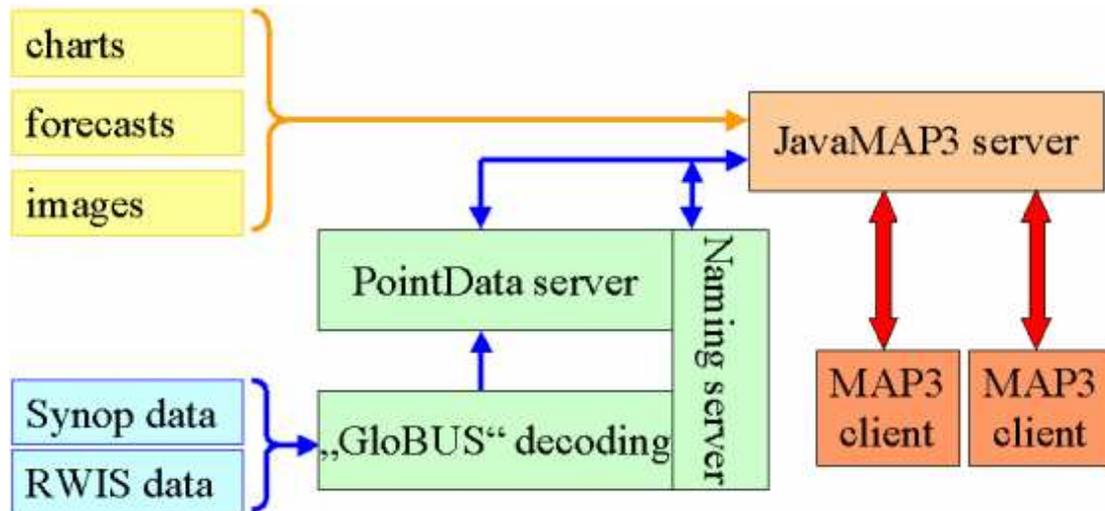


Fig. 1. JavaMAP 3 data flow

Just like the former JavaMAP, the new JavaMAP 3 was developed for more than one application. In climatology, the system is even used for the production of standard weather forecasts outside the DWD offices, i.e. by disaster management divisions. For this reason several different user interfaces (GUIs) were designed. This is possible thanks to the module technology and a large number of configuration files. Configuration is very easy and not a problem for laymen. The system provides a layer structure which means that every theme is screened in its own layer and information can be mixed.

This system comprises also a comfortable vector geography including a detailed road system as well as one layer each for Synop data from the weather services, RWIS data, RADAR images including forecasts, satellite images including the nowcasting product called "satellite weather", charts of model fields, and GRIB. Of course, each layer can be defined separately.

Configuration XML files exist for:

- Basic Configuration
- Geography
- Favourites (also as favorites_&USER or favorites_\$_runlevel)
- point data sets (like SYNOP and RWIS)
- Meteograms
- Satellite and RADAR images
- Charts
- GRIB
- Colour Tables
- RWIS Forecasts
- Pictograms

All configurations can be done easily by means of XML files. Here are some examples from the Basic Configuration:

```
....
<!-- determine the start mode with the possibilities "Standard" "RWIS" "WESTE" "Museum" -->
  <runlevel>
    <key runlevel="RWIS"/>
    <key fullscreen="false"/>
  </runlevel>
.....
<!-- determine the animation, number of frames, etc. -->
  <animation>
    <key manFramesWithoutWarnings="20"/>
    <key maxFramesAllowed="-1"/>      <!-- -1 stands for 'no limit' -->
    <key minFramesPerSecond="1"/>
```

```
<key maxFramesPerSecond="5"/>
<key defaultNumberOfFrames="12"/>
</animation>
```

.....

Point data definition in StationLayer.xml

.....

```
<parameterGroups>
<parameterGroup name="temperatures/extrem-airtemperatures (2m)">
  <parameter name="TXTX" x="0" y="7"
    painthandler="TextPainthandler"
    colourtable="temperatures"
    legendText="Maxtemp"/>
  <parameter name="TNTN" x="0" y="-7"
    painthandler="TextPainthandler"
    colourtable="temperatures"
    legendText="Mintemp"/>
</parameterGroup>
```

.....

The colour tables describe the colour set for the most elements, e.g. red for high and blue for low temperatures or red for visibility less than 200 meters.

3. PRACTICAL RWIS APPLICATIONS

general and geography
buttons and menus

content buttons
and menus

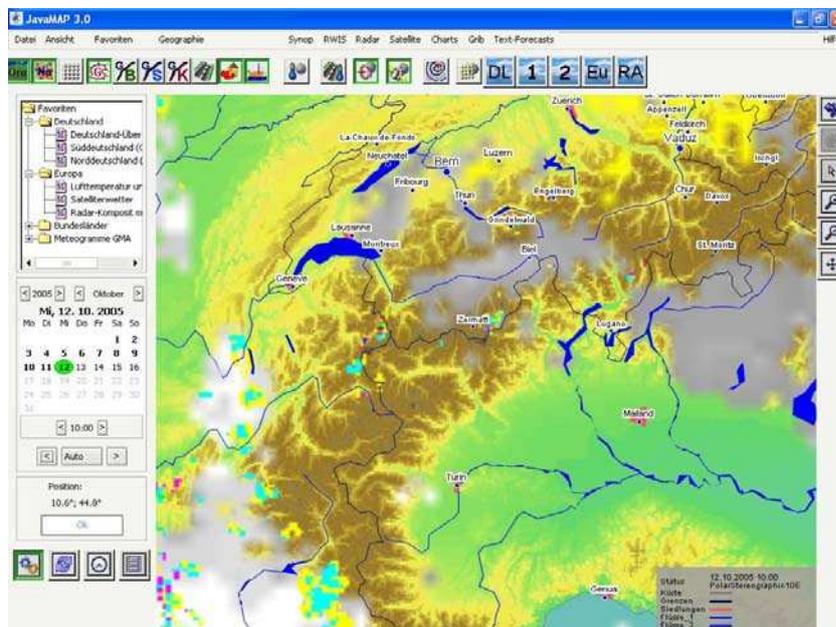
fixed favourite
buttons

help
button

favourites
list

date, time
buttons

auto update,
refreshing,
animation



mouse
function

legend

Fig. 2. SWIS user interface with active radar and satellite images

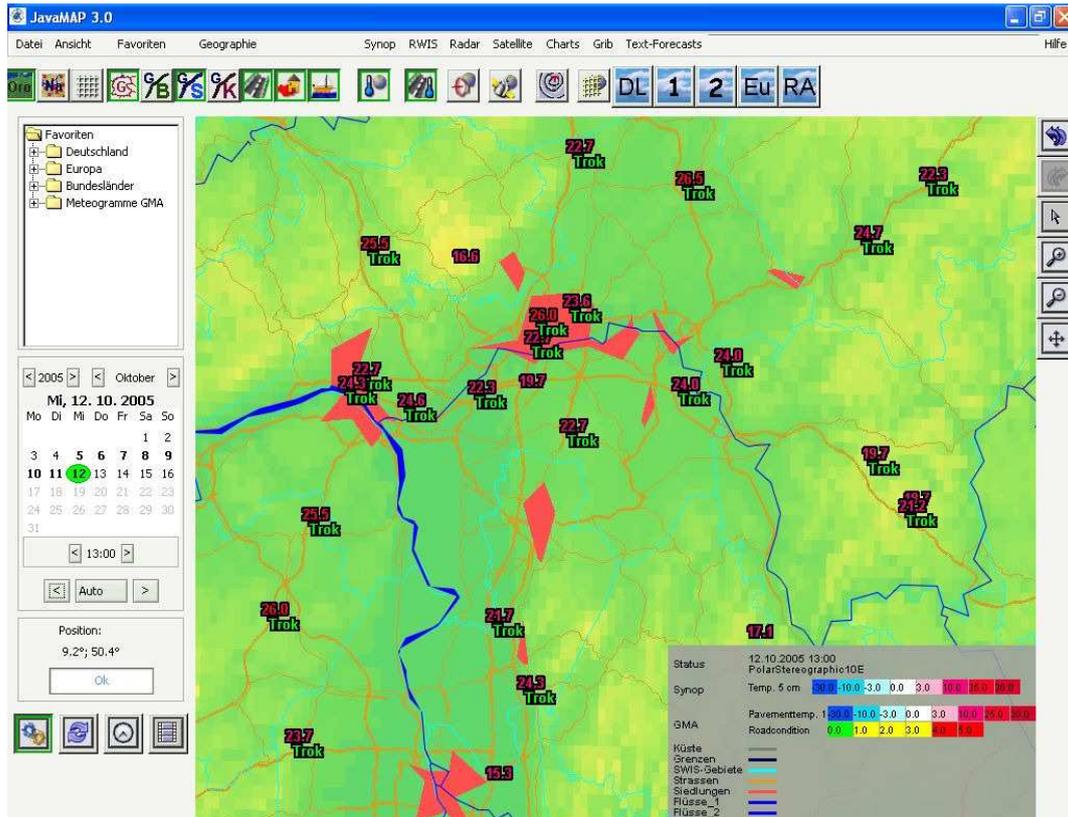


Fig. 3. Frankfurt / Main area with pavement temperature and road condition

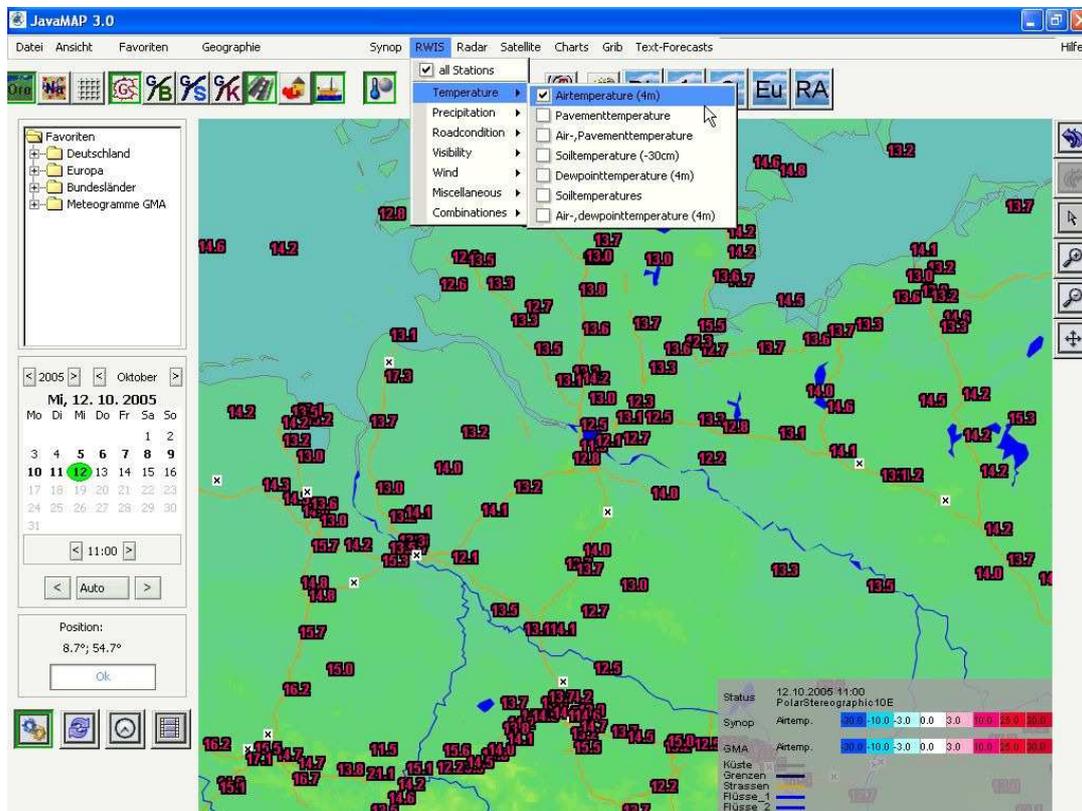


Fig. 4. Northwest of Germany with air temperature

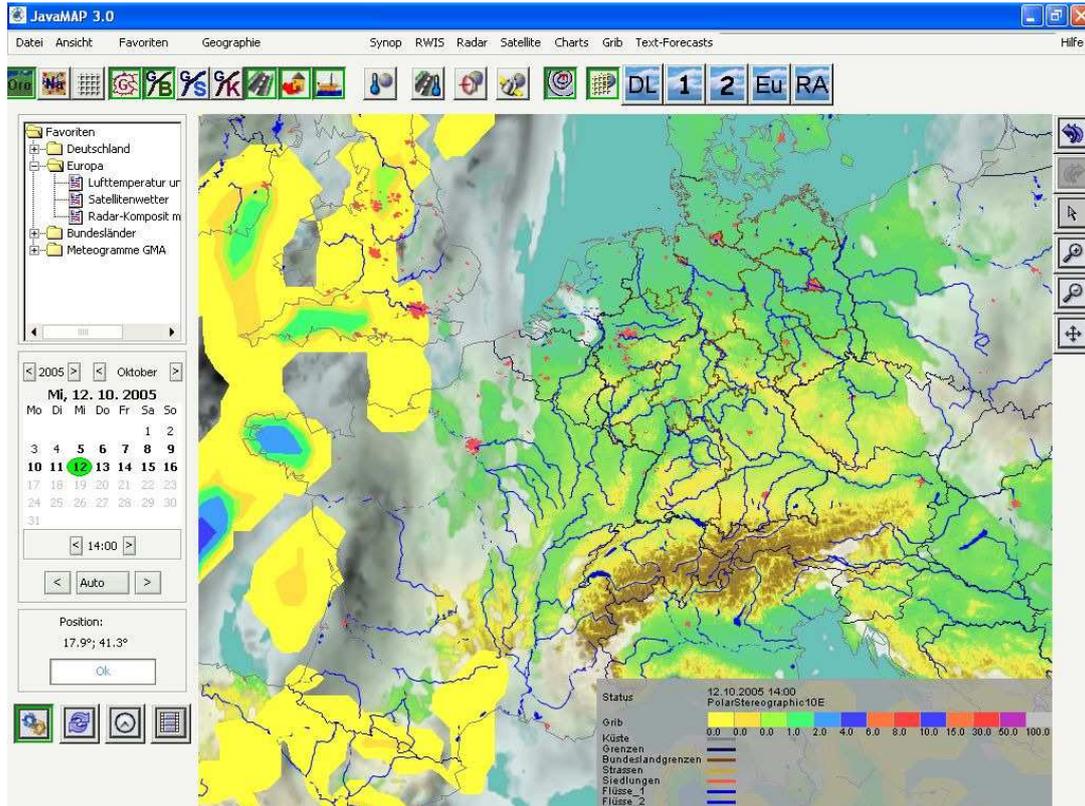


Fig. 5. Central Europe with LME precipitation forecast and GME GRIB cloud coverage

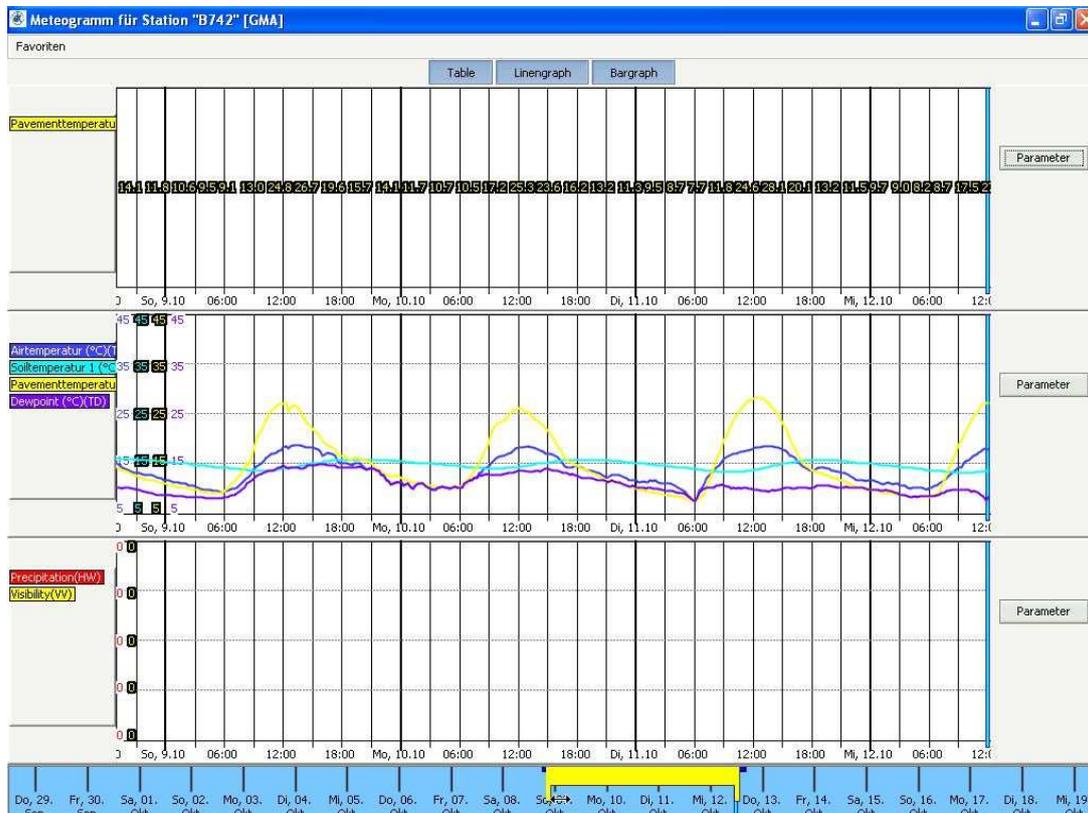


Fig. 6. Meteogram of the RWIS station B742 Listow (Highway A19).
The time scale of the meteograms can be moved and stretched.

The data presentation system is topped off by including RWIS forecasts.

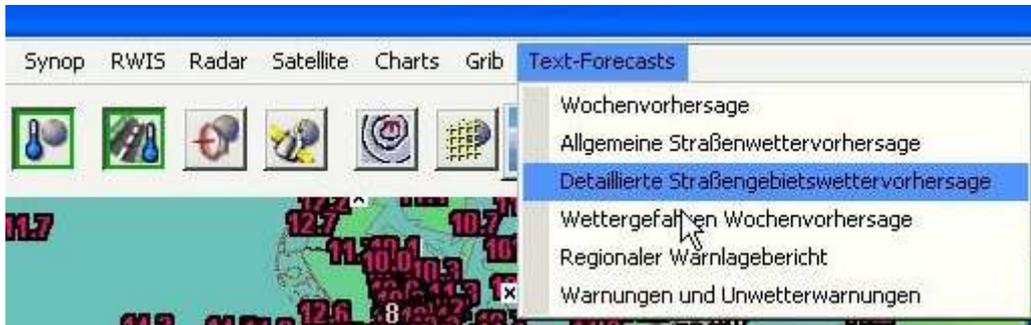


Figure 7: Forecast selection via pull-down menu

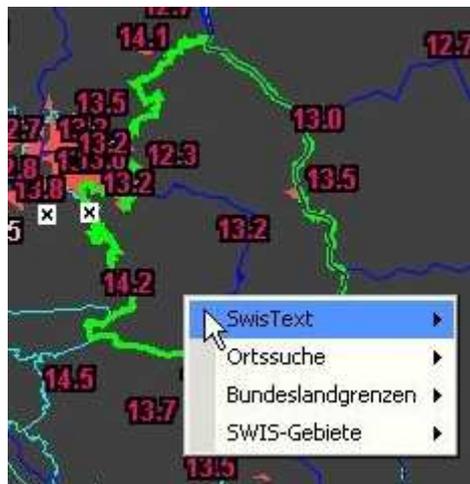


Figure 8: Forecast selection with the context menu for an active RWIS area

4. SUMMARY

The JavaMAP 3 is a useful presentation system, not only for RWIS. The structure makes it possible to react to new requests and developments. Handling and administration are easy and comfortable.

5. REFERENCES

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