A short description of the

SC-JMS GraTaSim
Quality-of-Life-Recorder

A convenient system for
computer-based assessment of Quality of Life

© Software and documentation 1990, 1991, 1992, 1993, 1994, 1995
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Revision date: 05.07.1995

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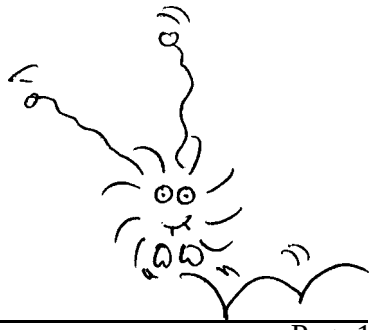

About this documentation

This documentation describes the Quality-of-Life-Recorder, a system for computer-based assessment of Quality of Life using the GraTaSim-software. It lines out the principles of its function and informs about further possibilities.

Computer-based assessment of Quality of Life

The Quality-of-Life-Recorder allows computer-based assessment of patients´ Quality of Life. Patients answer all questions themselves by slightly pressing an electronic stylus on answering-fields located next to the questions.

During development, the following points received our special attention:

- **extremly simple handling**
- **use of standard hardware**
- **use of validated questionnaires**

The prototype has been tested by patients in advance. Own observations and patients´ suggestions lead to a system that can be used without difficulties by people who don´t have any computer experience at all. Experiences with more than 2500 patients (including 1800 patients at the University clinic Ulm) have shown that elder patients do not have any difficulties either. The opposite seems to be true - they even enjoy it. Moreover, the system reduces requirements for data acquisition personnel to a minimum.

The computer system

The simplest computer system that can be used is an IBM-PC/AT compatible with a floppy-disk-drive. All compononents of the system can be located on top of or underneath a small table on castors.

Alternatively, a notebook-computer can be used. It makes the whole system portable and independent from the mains power supply.

Adapted questionnaires - standardized data format

Until now we have adapted the Quality of Life questionnaires SF-36, EORTC QLQ-C30 and C30 (+3). Additional modules are currently being prepared. International versions of the QLQ-C30 are available.

For each test a graphical template to be put on the tablet and definition files for GraTaSim and for AnyQuest, the data acquisition software, exist.

AnyQuest - among other tasks - stores answers and calculated results from all questionnaires a patient worked on in a single session. These data are available for further processing immediately after they have been recorded. The standardized data format is a basis for documentation and international exchange of Quality of life measurement data. Data can be transferred to and processed on virtually any computer system.

GraTaSim, AnyQuest and the data format used readily support newly developed or user-specific questionnaires.

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How does it work? *(see figure 2)*

The tablet digitizer as an input device

As an input device, GraTaSim replaces the computer´s keyboard by a tablet digitizer. This consists of a flat working area and an electronic stylus - quite alike an ordinary ballpen - with a little pressure sensitive switch in its tip. The position of the stylus and the switch status are coded and the resulting data are transferred to the PC.

We prefer a certain digitizer with an active area of about 18" x 12" that is itself as flat as a common blotting-pad. The template with the fields printed on it can be fixed under a thin transparent plastic cover.

The GraTaSim software

The GraTaSim-software converts stylus-actions into simulated keyboard entries. Thus, an IBM-compatible PC can be controlled by totally untrained people just by pressing the stylus onto fields on a graphically designed template.

Tablet templates of unlimited complexity can be designed. A template may consist of several modules or pages. Corresponding field definitions are stored in definition files.

The optionally available program GraTaGen supports easy digitizing of user-designed tablet templates. Thus, the QL-Recorder can be used already during the development of new questionnaires or together with user-specific questionnaires.

AnyQuest, the data acquisition software

AnyQuest, the data acquisition software, receives a patient´s entries. It shows all answers on the screen and offers easy possibilities for correction.

As soon as the patient hits the field "Finished", all answers are checked for completeness, missing answers are complained about, results are calculated and stored on a data storage device. Moreover, a printout with bar graphs can be generated.

AnyQuest supports the filling in of multiple questionnaires or modules in a single session.

Descriptions of questionnaires or modules for AnyQuest can be coded easily. This ensures that a program for standardised data acquisition and storage is available for questionnaires or modules which may be developed in the future or by the users themselves.

Analysis and further processing of recorded data

Data are available for further processing immediately after recording. An extraction program is capable to extract all relevant data of all assessed patients. Totally controlled by the user, it prepares data for import into any statistical or data base software package.

Alternatively, data files generated by AnyQuest may be imported by user-specific software, for example tumor documentation systems.

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Further possibilities

The implementations of the Quality-of-Life-Recorder remains far from GraTaSim´s limits:

GraTaSim allows the definition of arbitrary fields with nearly any keystroke sequences assigned to them including function-keys, cursor-control-keys and so on.

Touching certain fields with the stylus might start or control programs. A simple field can represent up to 80 keystrokes and one template definition may contain several hundred fields. Fields may overlap - thus, one stylus-touch may trigger more than one field.

Up to 16 definition-files can be active at the same time. This allows splitting up large templates into several modules. Fields may contain commands that load definition-files from disk. Thus the complexity of a template definition is de facto unlimited.

The concept of switching between different modules supports the creation of templates with more than one page. Another existing example is a drawing of a human being with switchable field definitions for anatomic regions, arteries, veins, nerves, bones and joints. By placing the stylus onto a certain part of the drawing, the name of the corresponding structure is inserted into a text-document.

Switching to a completely different template can easily be accomplished by just loading the matching template definition-files.

Fields can be defined to lock the tablet.

GraTaGen, an additional software product, allows comfortable definition and editing of own template definition-files. All functions are controlled through an easily learnable graphical user-interface.

With GraTaGen and the easily programmable data acquisition program AnyQuest, own questionnaires can easily be ported to the Quality-of-Life-Recorder. As far as data storage and further data processing are concerned, these will be supported exactly the way all available instruments are.

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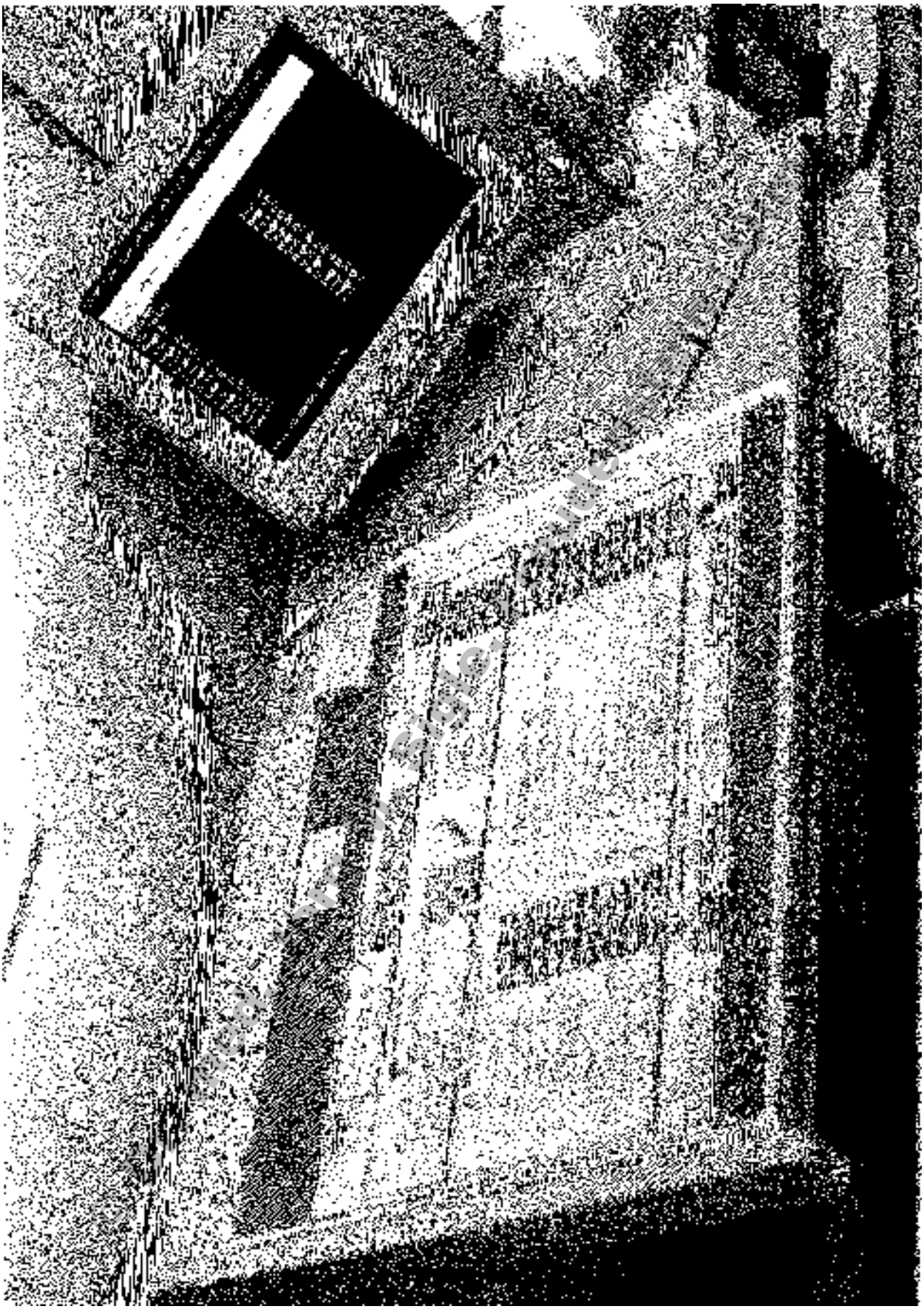

Figure 1: This mobile system is used in the University Clinic at Ulm. If an answering-field is touched with the stylus, GraTaSim simulates the corresponding keystrokes and an acoustic signal sounds. All answers appear on the screen which is also used to - together with acoustic signals - indicate successful completion of the questionnaire or missing questions and other irregularities.

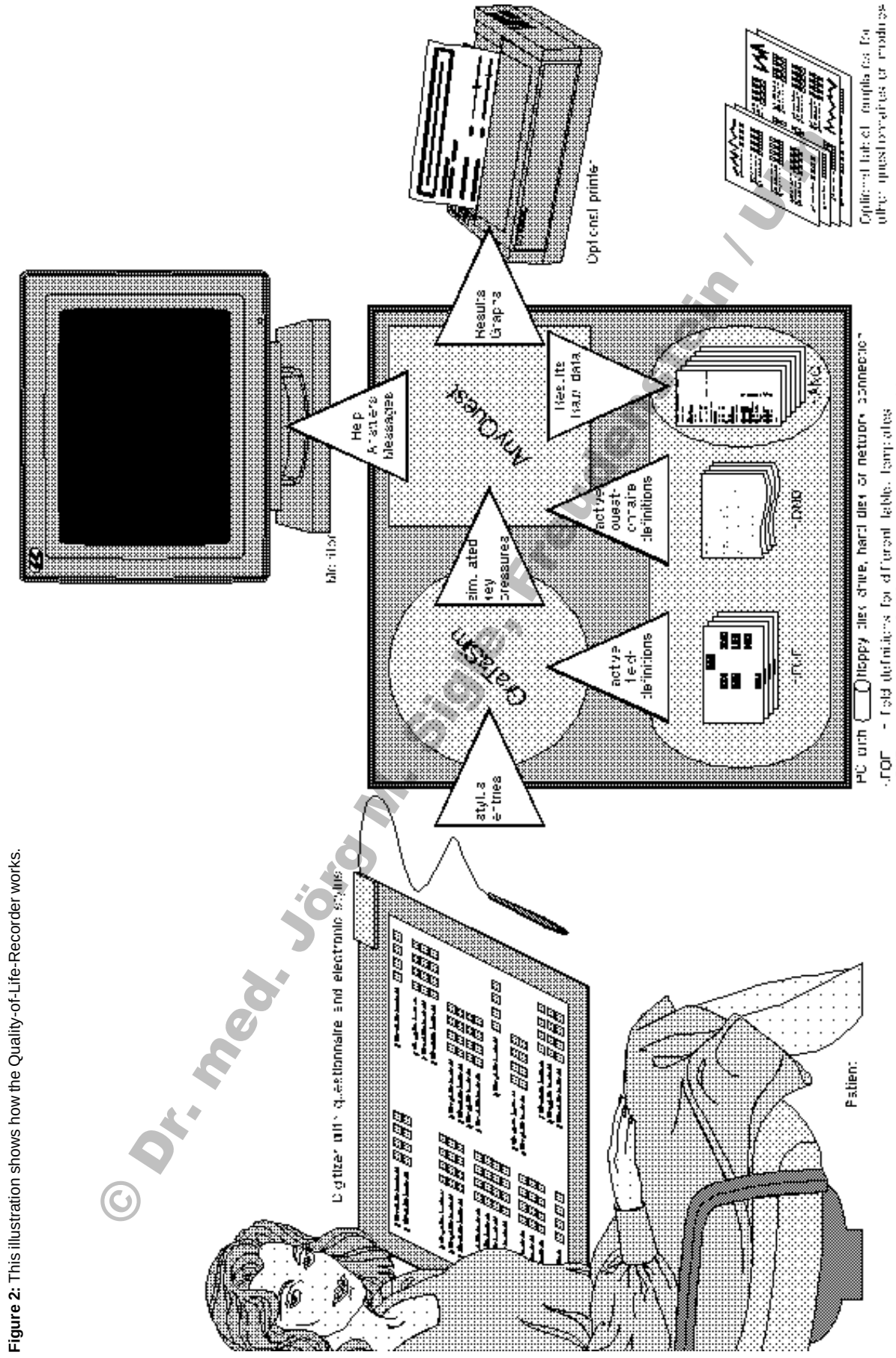

Figure 2: This illustration shows how the Quality-of-Life-Recorder works.

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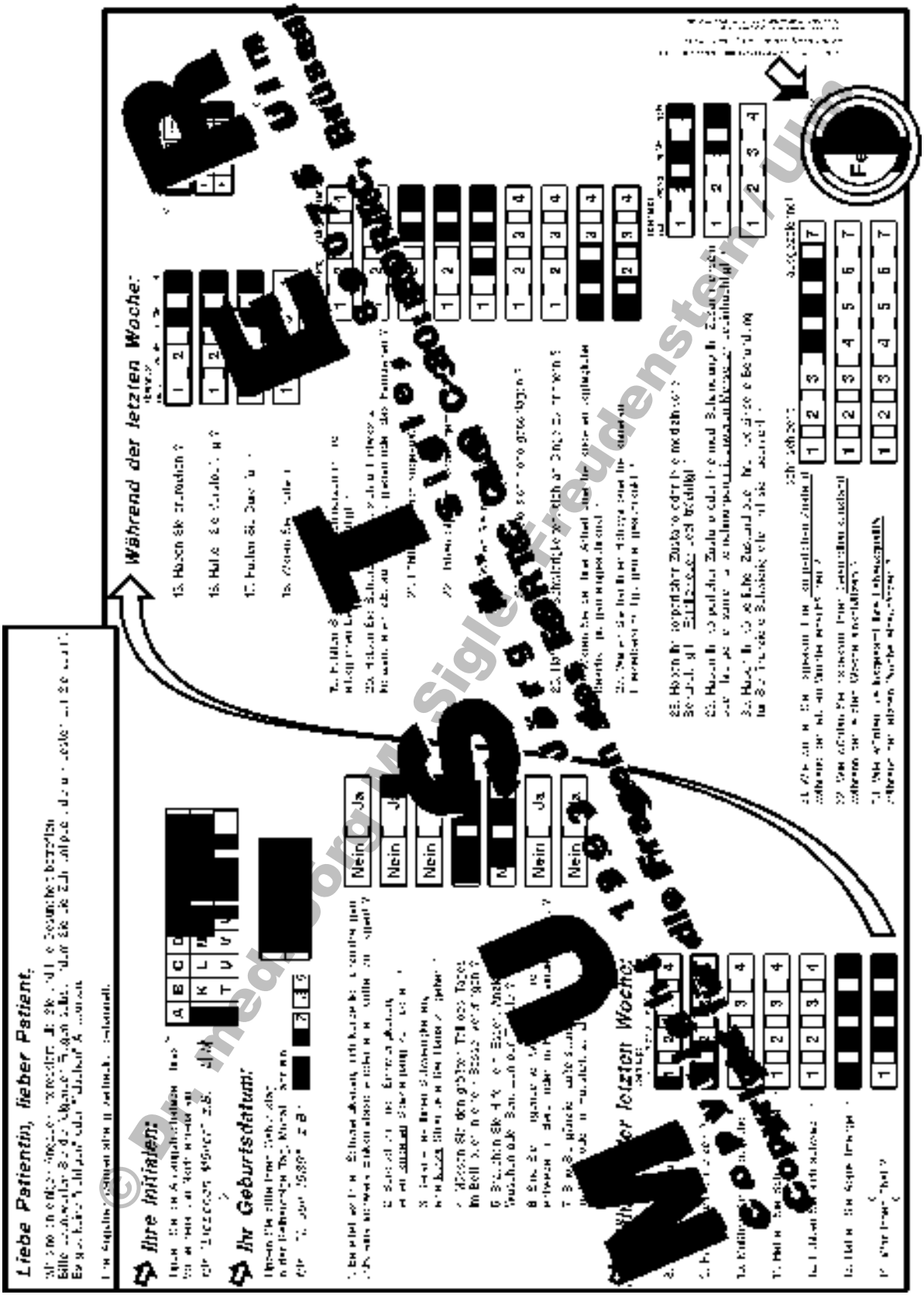

Liebe Patientin, lieber Patient,
Ihre Initialen:
Ihr Geburtsdatum:
Während der letzten Woche:
Während der letzten Woche:
Während der letzten Woche

Availability and Literature reference

Should you be interested in using GraTaSim, you can receive further information as well as all hard- and software from:

Jörg M. Sigle
Kunstvolle EDV & Elektronik
Kelternweg 40
89075 Ulm, Germany
Tel. & Fax: +049-731-59185

To use one of the mentioned Quality of Life questionnaires, the copyright owner´s permission is required. Further information is available from:

Prof. Dr. Franz Porzsolt
Tumorzentrum der Universität
Universitätsklinikum Ulm
89081 Ulm, Germany
Fax: +049-731-502-4626

A survey of the concern of measurement of patients´ Quality of Life together with basic knowledge and practical advice is contained in the following book:

David Osoba: Effect of cancer on quality of life - CRC Press, Inc., 1991 - ISBN 0-8493-6977-0

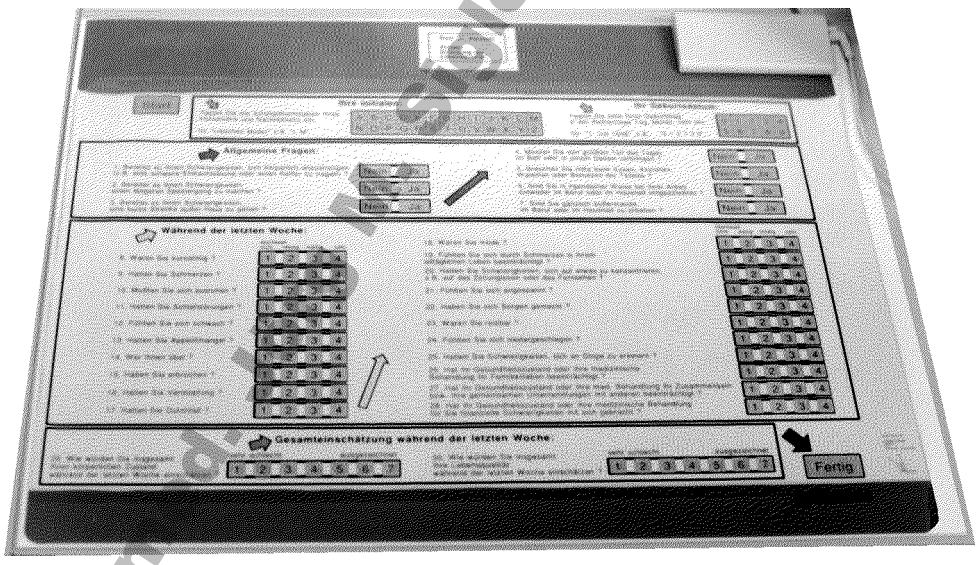
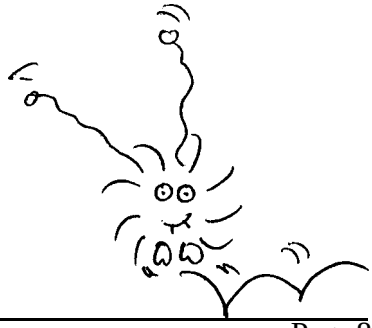


Figure 4: The flexible digitizer with the template for EORTC QLQ C-30 lies on a white plastic board measuring 55,5 cm x 42 cm x 0,5 cm. So it can be used without a table: together with a laptop PC this makes a system that can be used virtually anywhere for convenient assessment of Quality of Life.

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