

Department usually works well only if there is a competent organiser behind it. In this case the organiser is Lena Somogyi.

Choosing to do this work was at the same time choosing a lifestyle and a risk, having given freedom an higher priority than a fixed salary. There was no alternative to this choice, if I wanted to write the book with Gustaf and then this Thesis. I am therefore grateful to NUTEK (the Swedish National Board for Industrial and Technical Development) that has partially supported this work under contract STU-90-4882.

At the end of this work, the most important lesson was the one learned from practice: to judge the theoretical information found in academic papers from the point of view of their practical validity, and similarly to evaluate existing solutions according to their concordance (or not) with basic cognitive principles. I therefore hope that the major goal of this work - to present a frame for practical applications of cognitive concepts in human-computer interaction - has been reached and the reader will not be disappointed.

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Gianguido Piani

1992, I translated the book in German. In view of the new publication we took the opportunity to expand and revise the whole book, with particular attention to the chapter on human-computer interaction.

This *Teknisk Licentiat* Thesis is the evolution and the outcome of this work. This Thesis expands the current approach to the interface aspects of human-computer interaction by including aspects related to the *user* and the *task* to solve. The theory is considered here at the light of its practical implementations.

During the preparation of this work, I had the opportunity of meeting and exchanging ideas with several people, in particular Dr. Göran Olsson at the Centre for Man-Computer Studies of the University of Uppsala, who has provided constructive feedback on the whole manuscript. Bernd Holz-auf-der-Heide and Sybille Ortlieb of the Software-Ergonomy group at the Technical University in Munich gave assistance and support in many occasions. I also wish to thank here my former colleagues at DLR, at Satellite Operational Services GmbH, at Dornier Systems GmbH and at the Research and Technology Centre of the German DBP Telekom for establishing a work background that supports professionalism. In particular, Antimo Damiano of DBP Telekom has provided direct support with excellent information about satellite systems. A special thank goes to flight captain Wolfgang Dinges who took the patience to explain me the principles of aircraft navigation and discussed several aspects related to the workload of pilots, with and without computer support. Further information about flight systems has been kindly provided by the German airline pilot association "Cockpit" in Frankfurt.

Yet the person who most definitely bears credit for this work is Prof. Gustaf Olsson in Lund. He has succeeded in creating an unusually rich and stimulating work environment, so that people who aim at seriousness and quality find a natural second home at his Department. Gustaf doesn't know the meaning of the word "problem" (to him, it must always sound as "stimulating challenge"). He took therefore almost naturally what many others would have not even wanted to hear about, to support me under the time of this work despite the intrinsic difficulties of stretching an activity across different countries. He has also succeeded in organising and motivating the staff at the Department, where everybody shares competence with openness. And as everybody knows, a

# Preface

The history and the reason for this work began about seven years ago. In summer 1986, I moved to Munich to work at the German Air and Space Research Centre (*Deutsche Forschungsanstalt für Luft- und Raumfahrt*, **DLR**). The assignment was the definition of the user interface for a new ground station for satellite control. When I started working at the ground station project, I had no idea (and neither did my colleagues and bosses) that there was a formal discipline of Human-Computer Interaction. It was clear to everybody that the goals of this project called for a new approach, only it wasn't clear what the approach should be. Lacking a background in human factors for computer design, I had to develop new ideas basically on my own.

Sometime in late 1987, during one of the periodic browsings at a Munich bookstore (it must have been at *Hugendubel*), I discovered a copy of Ben Shneiderman's *Designing the User Interface*. This book was a revelation in several ways. Not only did it present human-computer interaction as a scientific field in its own right, it also openly took the side of the user.

The ground station project was at the time well under way, so the book had little practical impact on its design. On the other hand, I noticed with pleasure how other colleagues became interested in this book and asked to borrow it.

At the end of 1989 the project was completed and I took the opportunity to quit the workplace at DLR (but not Munich). More or less at the same time, Prof. Gustaf Olsson at the Department of Industrial Electrical Engineering and Automation at the Lund Institute of Technology proposed to write together a book about industrial automation. The book, *Computer Systems for Automation and Control*, was eventually published in 1992. While working on the book, I would also come to Lund and lecture on process control applications.

We decided early to write in the book a full chapter on user interfaces; the same topic was also included as standard part in the course *datorer i automation* (*computer applications in automation*). The book and the course gave us the opportunity to collect information and to reason about the subject. During late