



System I4Control®

**Contactless control
of personal computer**

WWW.I4CONTROL.EU



System overview

- ❑ Contactless control of PC using eye or head movements
- ❑ Intended mainly for motoric handicapped users
 - After injury (e.g. head injury, spinal cord injury originating paraplegia or quadriplegia, amputation of upper members...)
 - After diseases (ALS, cerebral palsy, multiple sclerosis, muscular dystrophy (MD), spinal muscular dystrophy...)
- ❑ Simple and intuitive manipulation
- ❑ Small and easily portable device, which does not limit the user
- ❑ Universal instrument with modular structure





System I4Control®

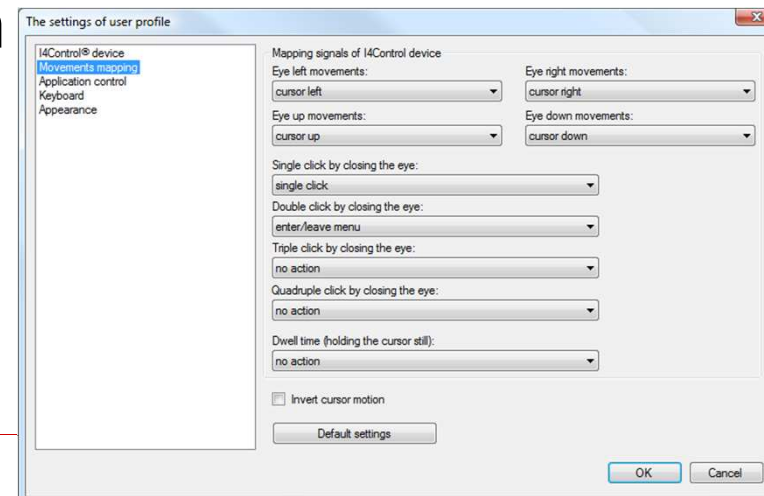
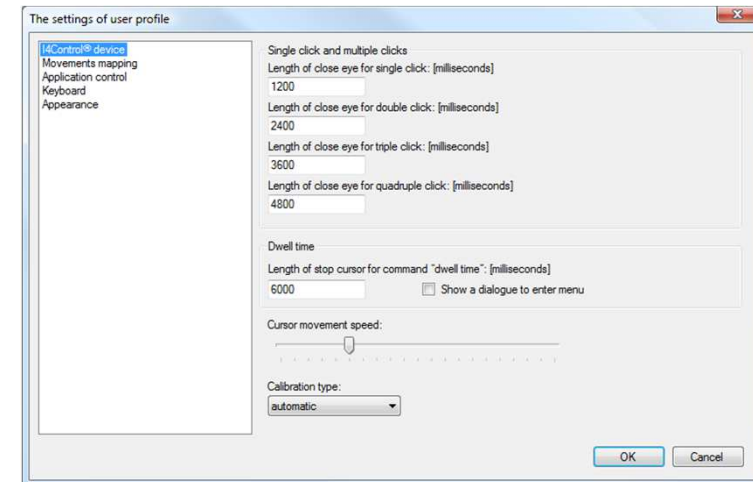


- Simple and small device for PC control
- Basic idea
 - Placement of a camera right on the person's head
 - Scanning of eye position independent of system of coordinates (deviations of equilibrium position)



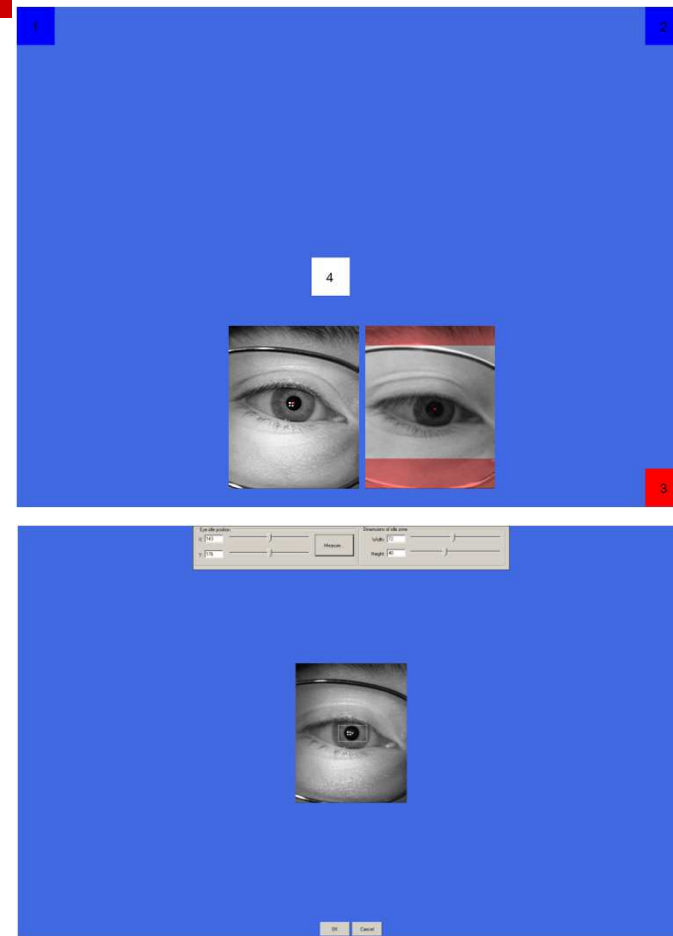
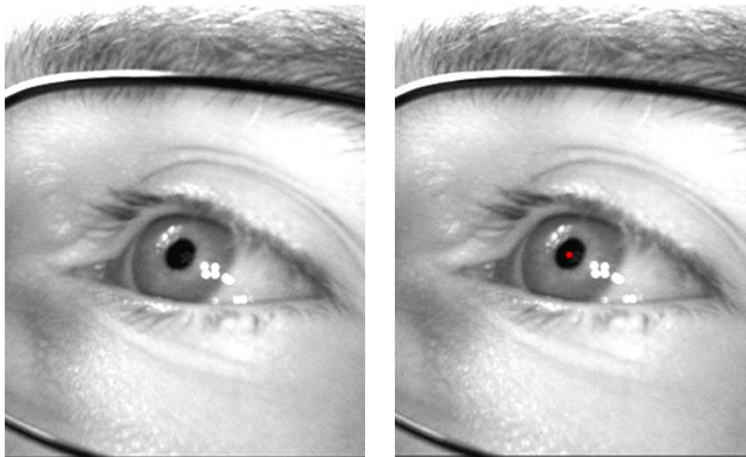
User profile

- ❑ Time responses
- ❑ Speed of cursor movement
- ❑ Calibration type
- ❑ Mapping of movements and actions
- ❑ Tools for simplification of application control
- ❑ Several types of keyboards
- ❑ Application look



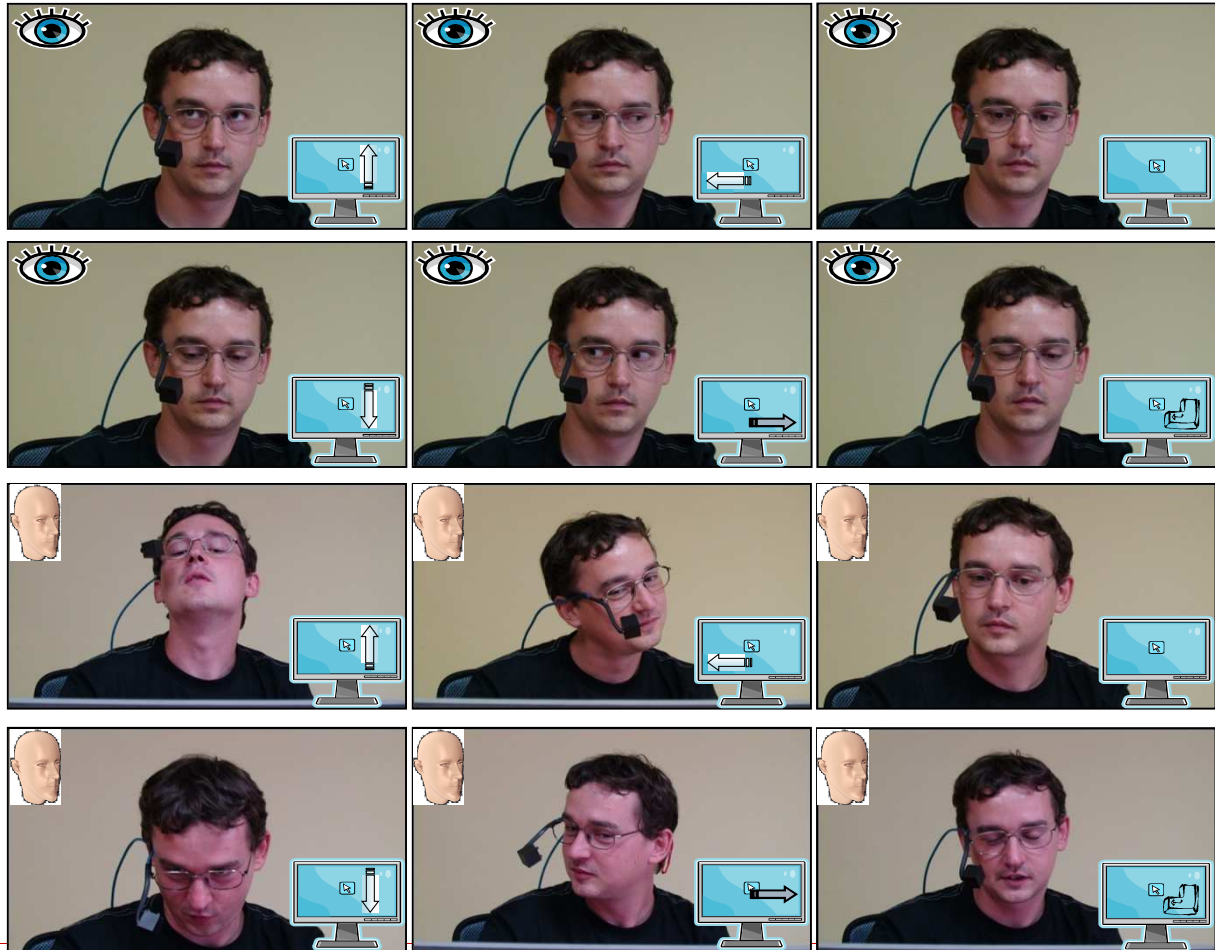
Calibration

- = relation definition between system and user
- Only once at the beginning when first working with the equipment
- Automatic x manual



Cursor movement

- Deviation of equilibrium position \Rightarrow eye determines the direction of movement (like a joystick handler)
- Eye movement x head movement



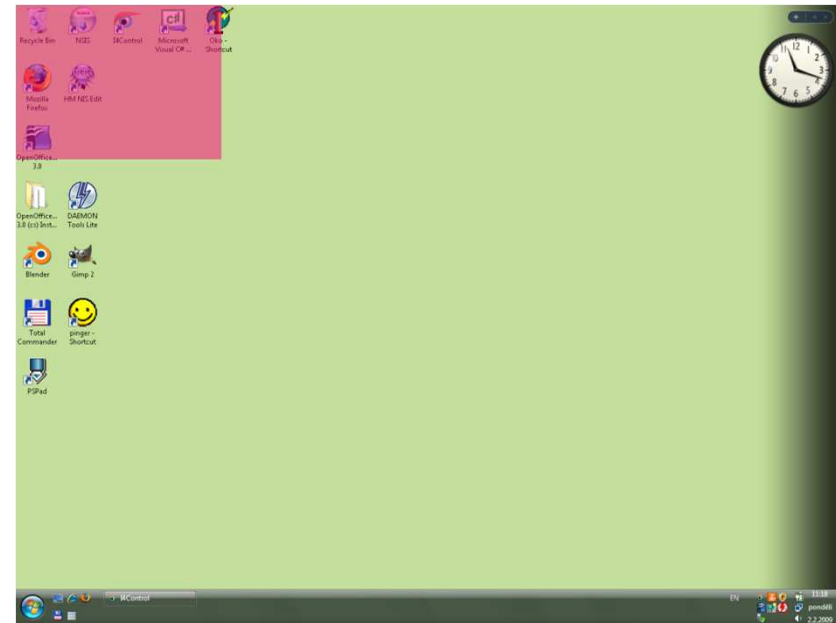
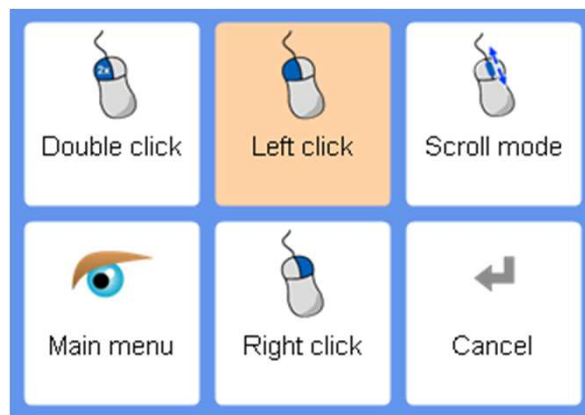
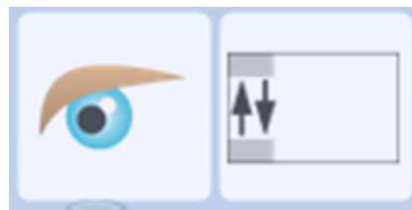
Mouse replacement



- Simple movements
- One click by left mouse button
- Double click by left mouse button
- Right click of mouse
- Drag & drop function
- Scrolling ball
- Triple click
- Quad click
- Dwell time

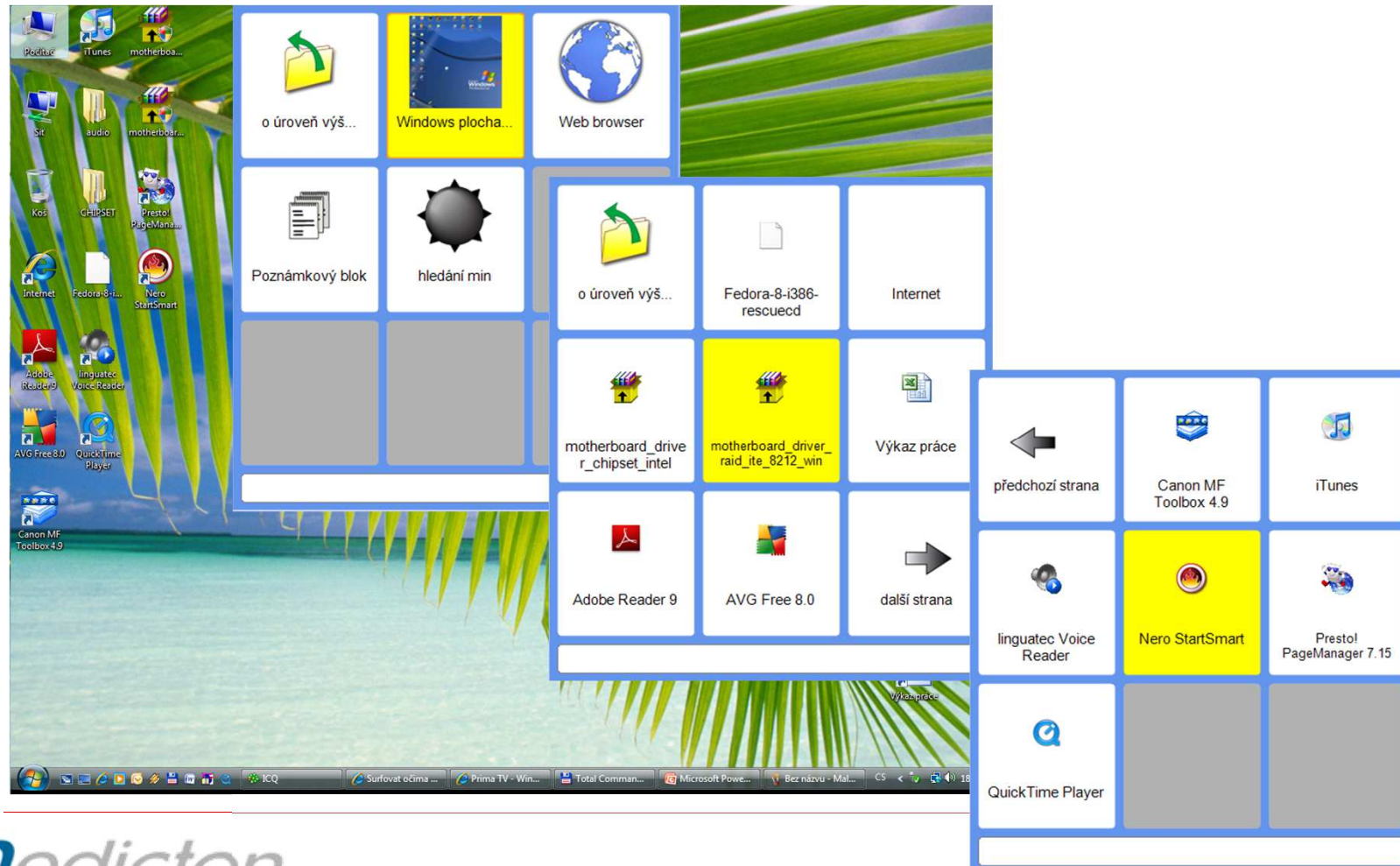
Simplified control

- Dwell time
- Automatic scanning



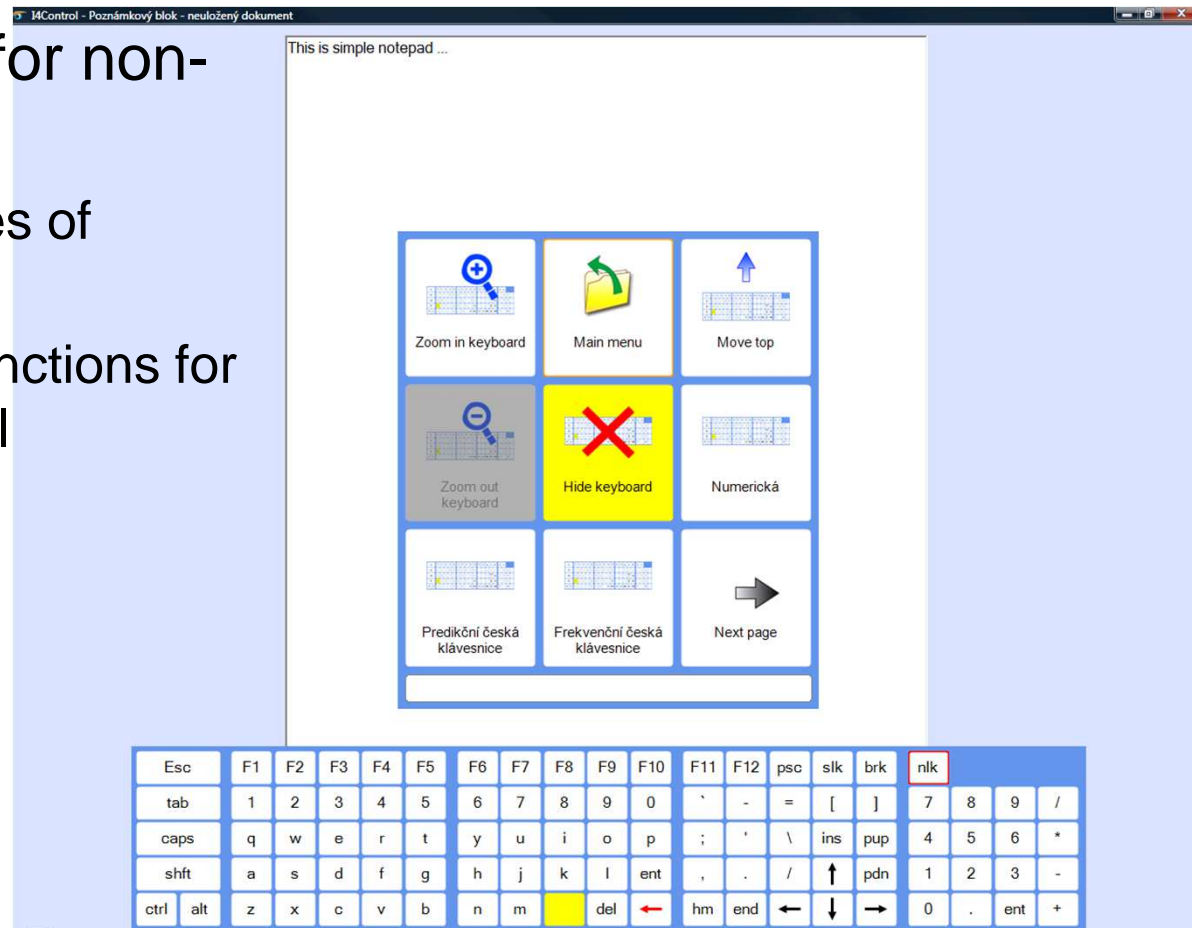
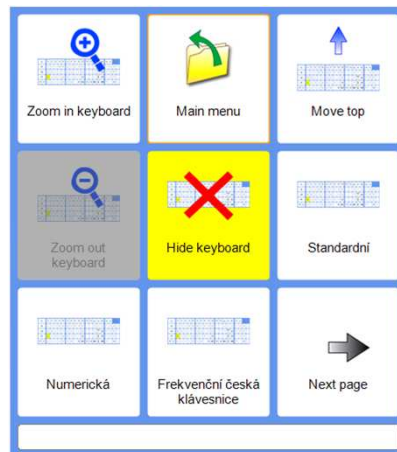
Esc	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
tab	1	2	3	4	5	6	7	8	9	0
caps	q	w	e	r	t	y	u	i	o	p
shft	a	s	d	f	g	h	j	k	l	ent
ctrl	alt	z	x	c	v	b	n	m	del	←

Icons on desktop



Writting

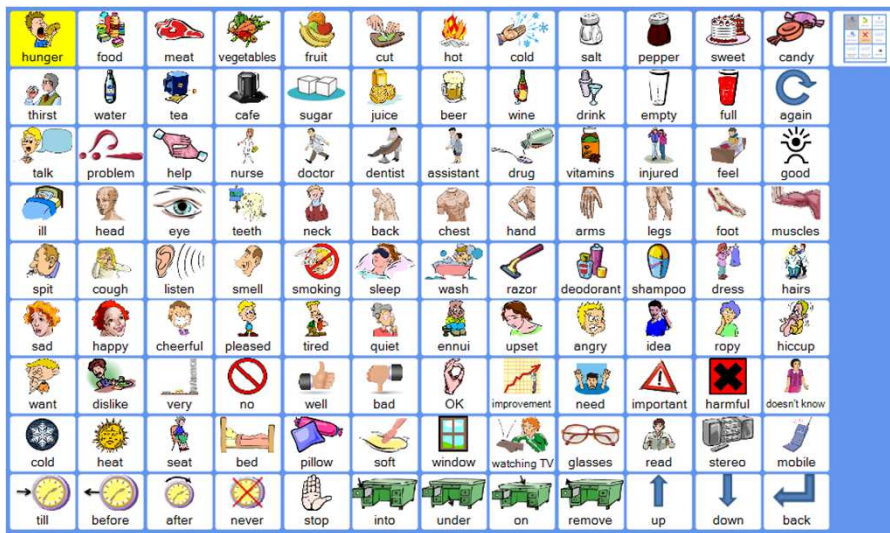
- Simple editor for non-formated text
 - Different types of keyboards
 - Menu with functions for easier control



Communication

Pg Up	!	Esc	w	y	m	g	ť	(2	9	/
Pg Down	?	Tab	ř	ý	v	j	š	ó	1	8	*
Home	.	f	b	r	t	s	c	č	0	7	-
End	,	p	d	e	o	i	í	↑	6	+	
Caps	;	é	ě	n	a	l	u	ú	→	5	=
Ctrl	-	ď	ň	z	k	á	ů	x	←	4	.
Enter	@	Del	←	ž	h	ch	q)	↓	3	%

- Special keyboard
 - Frequency
 - Predictable
 - Pictogram (Sound alternative communication)



ze	a	a	b	c	d	e	f	g	h	á	ř	0	1	2	3
z	ve								ch	č	š	4	5	6	7
že	v	z	a		v				i	ď	ť	8	9	↑	%
který	se	y	s		p				j	é	ú	Esc	←	↓	→
o	být	x							k	ě	ů	←	.	!	
mít	na	w							l	í	ý	Del	,	?	
do	ten	v	d		n				m	ň	ž	Enter	;	Tab	
i	s	u	t	s	r	q	p	o	n	ó	@	Shift		Caps	

For children

Esc	;	!	?	,	.	←	↓	↑	→	
tab										
caps										ent
shft									←	del



Web browser

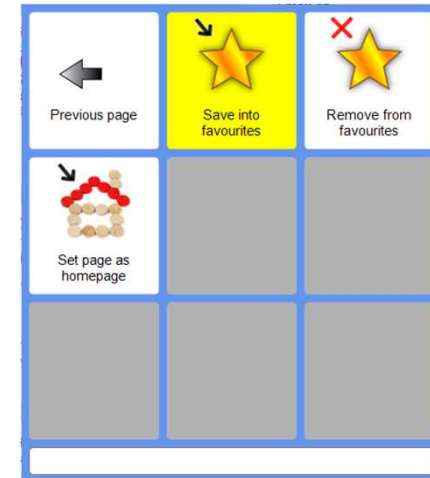


The screenshot shows the i4control web browser interface. At the top, there is a search bar and navigation links for English, Home, News, and Contact us. The main content area features a 'HOME' section with a welcome message and a 'Latest news' section. A large blue-bordered box highlights various navigation and utility buttons: 'Folder back...', 'Quit application', 'Forward', 'Back', 'Home', 'Enter URL address', 'Reload', 'Favourites', and 'Next page'. Below the browser window, there is a detailed explanation of the system's operation and its advantages.

The camera records and evaluates on-line position of the user's eye: when the eye is within the stable position it sends over the signal "stop", otherwise the signal "proceed in the same direction" is generated. As long as the eye is outside of its stable position, the system repeats all the time the same signal, which moves the computer cursor in the direction corresponding to the present position of the eye with respect to the placement of the camera. The cursor can be stopped, of course: the corresponding signal is blinking and it emulates click or double-click. Both signals are activated by keeping the eye closed for sufficiently long period (the corresponding time parameter can be set individually to filter out spontaneous blinking).

The main advantages of the system are simple installation and usage, mobility as well as universality of the system, which can be connected to any computer through the USB interface. Last but not least merit is a low price of the system.

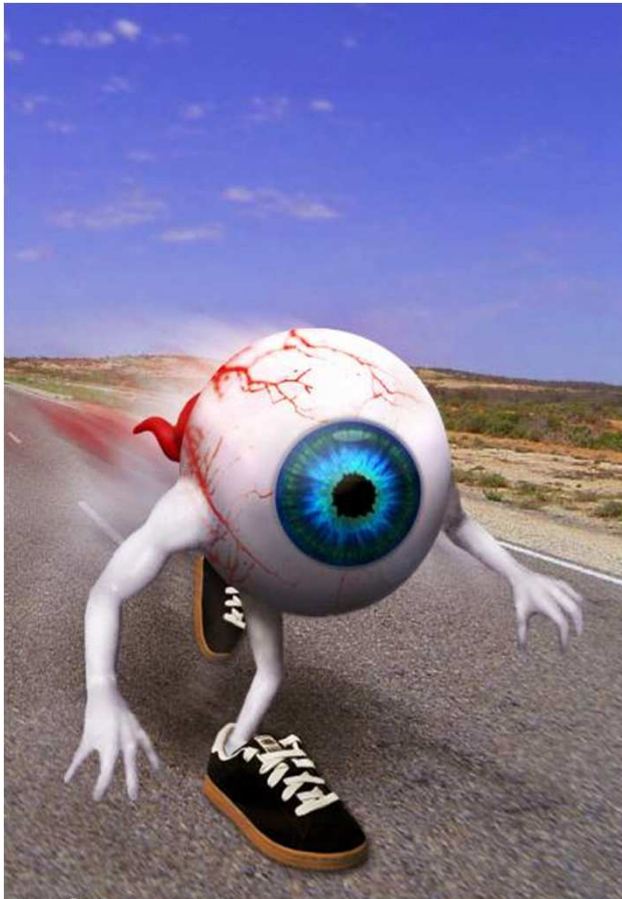
Communication is ensured through an exchange of information, which can be achieved using different types of communication media. The way a man provides information to a technical system represents a very specific category of communication. Input information is mediated to a technical system through various peripheries, e.g. a keyboard, mouse, light pen or a punch tape for a computer. Whenever there appear some reasons, which restrain human users from using standard peripheries, we are facing a serious problem.



A grid of navigation buttons with the following labels: 'Previous page', 'Save into favourites', 'Remove from favourites', and 'Set page as homepage'.

Denní tisk	Časopisy
Rádia	Televize
Vyhledávače	Informační portály
Zábava	i4Control

Limitations



- Difficult detection of pupil → pre-learned algorithm
- Hang down palpebra = visible small part of eye
- Need to correctly position the user



Certification

Medical device

Declaration of conformity CE



ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV



ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC
ELEKTROTECHNISCHE PRÜFANSTALT - TSCHJECHISCHE REPUBLIK
INSTITUT ELECTROTECHNIQUE D'ESSAIS - RÉPUBLIQUE TCHÈQUE
ЭЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ИНСТИТУТ - ЧЕШСКАЯ РЕПУБЛИКА

Pod Lisem 129, 171 02 Praha 8 - Troja

CERTIFICATE

No.: 1110203

Product: Equipment enabling control of a personal computer using eyes and/or head movements for disabled person

Type: I4Control ver. 2.0

Rating: 5 V DC, 3 W (USB)

Ordering firm: Medicton Group s.r.o.
Jiráskova 609, 572 01 Polička, Czech Republic

Manufacturer: Medicton Group s.r.o.
Jiráskova 609, 572 01 Polička, Czech Republic

Trade mark:

The test results are stated in the test-report No.: 004426-01/02 of: 24.02.2011

A sample of the product was found to be in conformity with:
ČSN EN 60601-1 ed. 2:2007, ČSN EN 60601-1-2 ed. 2:2008, ČSN EN 60601-1-6 ed. 2:2008

The validity of the certificate is limited to: 28.2.2014

9.3.2011

Prague

Miroslav Sedláček
Head of Certification Body

Stamp



004426-01

Technical specification



- The minimum recommended configuration of the PC:
 - Pentium III with clock frequency 500 MHz
 - 1GB memory
 - operating system Microsoft Windows 2000 or newer
 - USB ports



Commercial availability

- Availability in CR: as of 10.Sep. 2008
- Availability in EU: as of 1. Jan. 2009
- Producer: Medicton Group Ltd.



Users

