2 Methods for improving road signs / symbols / text to adapt to today's driver's requirements

Stefan Egger, IllDre

IllDre

Stefan Egger
Information designer, researcher, speaker

Research projects on road signs/signals
2 international EU funded (3 years each):
SOMS/In-Safety, Safeway2school

7 x Conference co-organizer
Traffic & Transport Information Systems

Member working group AASTB10 of FSV
Recognised Austrian body to develop road signs

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Information Design

Enable informed decision making to carry out actions and meet set goals

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Definitions for graphical components

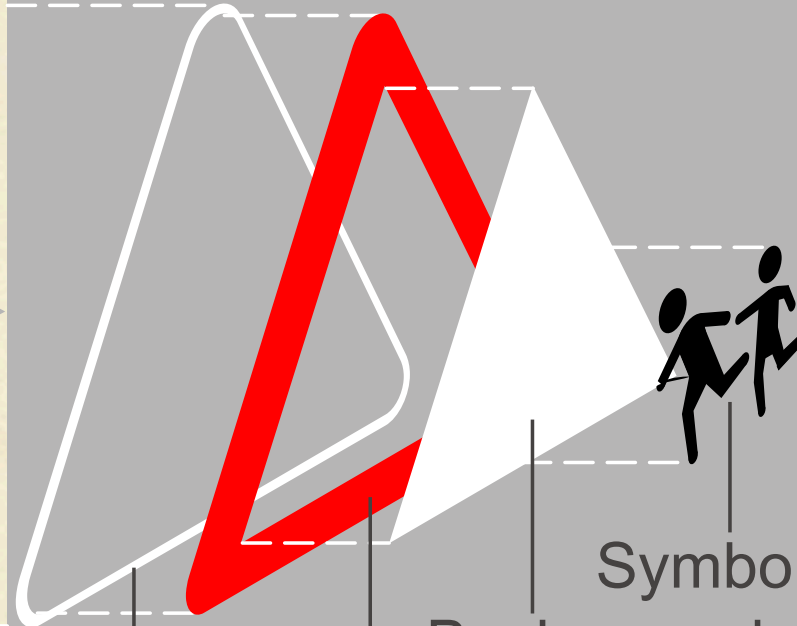## Traffic sign

Image carrier

Signal aspect

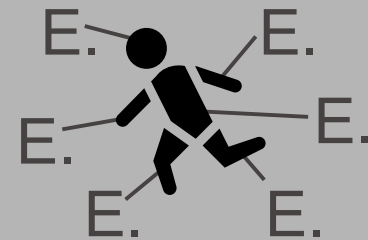## Signal aspect

Contrast edge

Border

Background

Symbol

Symbol

Figure

Figure

Figure

(E)lements:

E.
E.
E.
E.
E.
E.

Why improve road signs?
Since road signs were "defined", the road environment has changed dramatically.

Increasing cognitive stress is burdened upon drivers.

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Why improve?   / 1

Increase in <u>speed</u> −1968 and before: Few cars and roads to maintain speeds of more than 100 km/h

Increase in traffic <u>volume</u> – e.g. Austria: 143.000 cars in 1955 to 4.205.000 in 2006

Increase in <u>network</u> density – No or few motorways in many countries in 1955 .
E.g. Austria: 1955– 27.6 km; end 2007– 1.696 km

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Why improve? / 2

Increase of <u>long-distance</u> travel due to interconnected road networks and suitable cars

Increase of amount of <u>information</u> provided on / alongside roads

**To reduce the increased cognitive load,
– and increase road safety –
Road signs should be adjusted to human capabilities.**

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Opportunities for improvement

* ISO 9186 Test procedures *
fostering <u>understanding</u> of visual information

* MOA Design Method *
improving <u>visibility</u>

- Reducing uncertainty while transforming information into action
- Earlier recognition and driving action

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Improving understanding

ISO 9186 Procedures for the development and testing of graphical symbols

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Improving understanding   / 1

Two psychological test methods

Comprehensibility judgement test
to sort out less appropriate symbols

and

Comprehension test
measuring "understandability" of symbols

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Test requirements

- Extensive research for- and collection of symbols on international level

- Symbols to be brought to same visual quality level before testing*

- 50 respondents from 3 different cultures

- Carried out with paper and pencil, monitored (to allow questions and improvement of symbols)

See MOA Design Method

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Comprehensibility judgement test

- To identify the most promising symbols
- omit others
- find 1st indications for further development

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%

%

%

%

%

%

CJT

Fog (ahead)

%

%
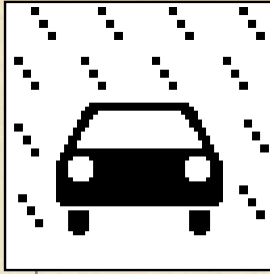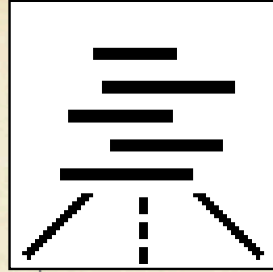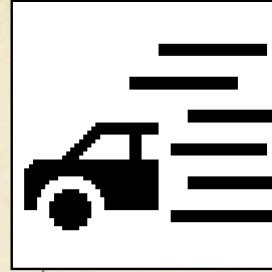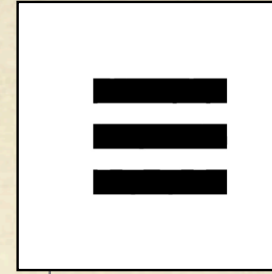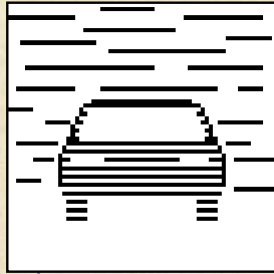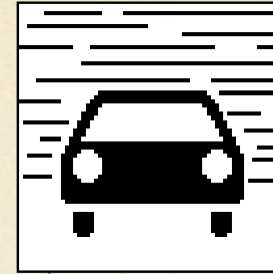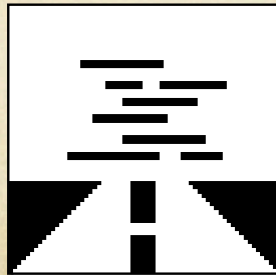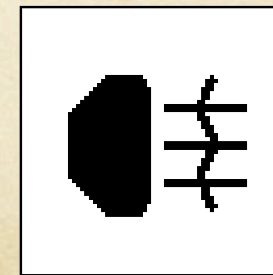
Comprehensibility judgement test

"In your opinion, what is the percentage of drivers in your country to understand the symbol?"
Then ask for reasons, taking notes.

After accumulation of results [country wise and total], symbols to reach a decided benchmark are accepted for further visual development* and the next test.

* See MOA Design Method

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Comprehension test

- Establishing an understandability score for each symbol
- Identifying the best symbol
- Poss. final indications for improvement

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Improving understanding   / 7

Date:

Location:

Conducted by:

Age of respondent: …………………

Driving experience: ………………

Kilometers per year: …………………

Female ☐   Male ☐

Education: Primary school ☐
                      Secondary school ☐
                      University ☐

On each page of this booklet is a traffic symbol.

Study each traffic symbol and write down below the symbol what you think that symbol means.

If possible, also write down what you would do if you saw this symbol.

Write down "Don't know" if you are unable to assign a meaning to the symbol.

An example is given overleaf.

This is an example:

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This is an example:

Construct

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Comprehension test

"What is the meaning of this symbol? And how would you react as driver when seeing it?"
Take notes..

After accumulation of results [country wise and total], symbols to reach a decided benchmark are accepted for final visual development* and standardisation.

* See MOA Design Method

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MOA Design Method

Maximum resilience of a visual signal by minimizing loss of contrast during transmission

or

It's all about maintaining contrast
in every detail

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Definitions for graphical components

Traffic sign

Signal aspect

Symbol

Figure

Figure

Image carrier

Signal aspect

Contrast edge

Border

Background

Symbol

Figure

(E)lements:

E. E. E. E. E. E.

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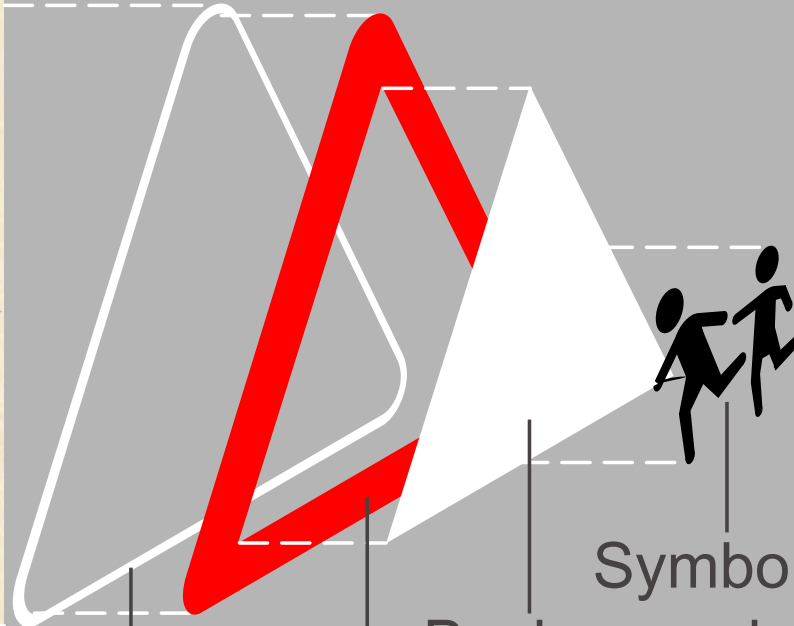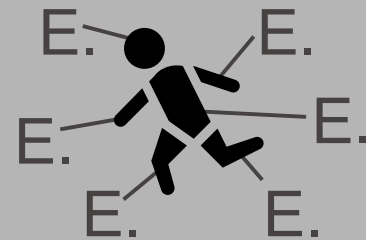
MOA Design Method   / 1

Every detail of any graphical element is made to be visually discerned (discriminable) over a precisely calculable viewing distance.

MOA Design Method

SGD Design

Math

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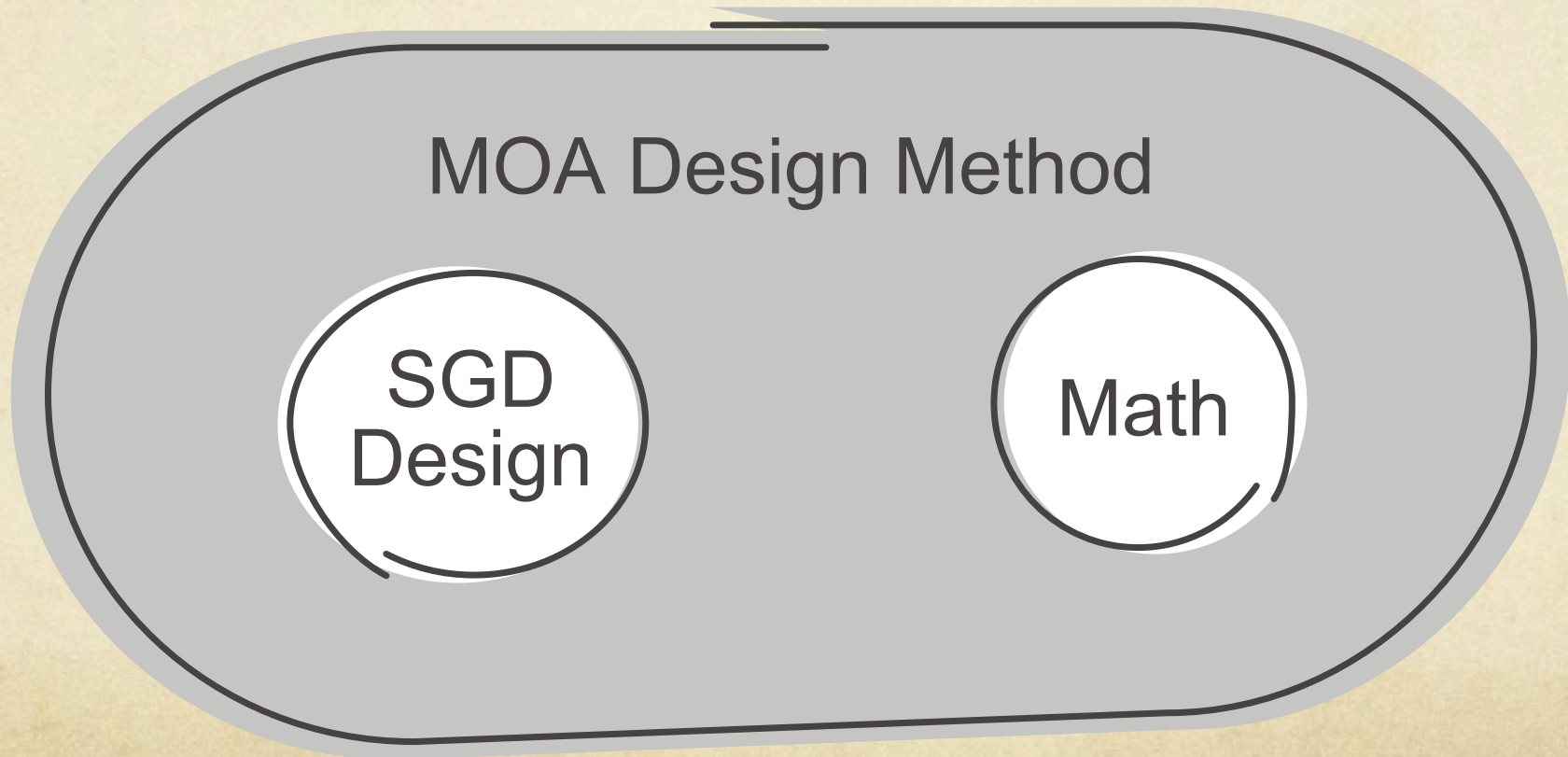
Contrast-Transfer-Function
Siemens-Star
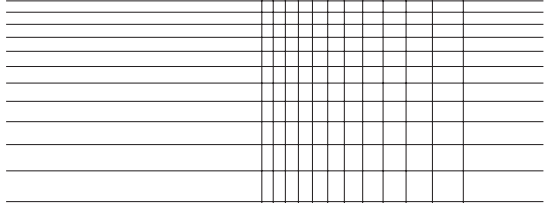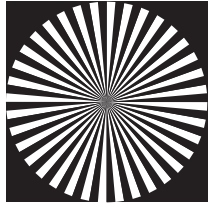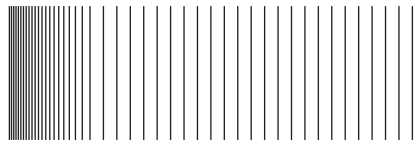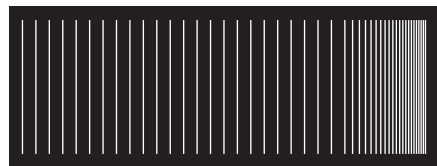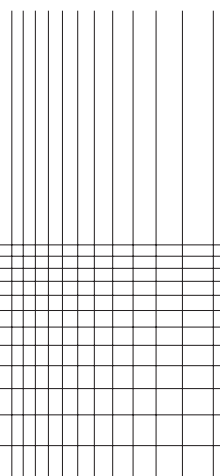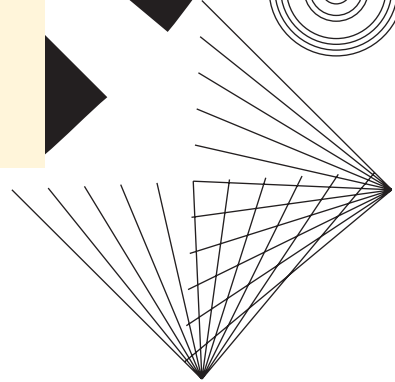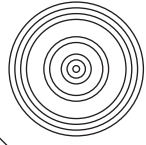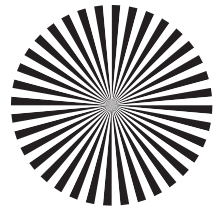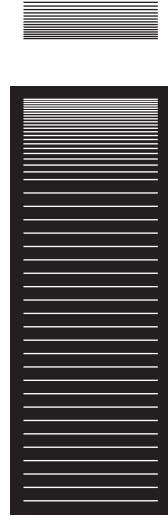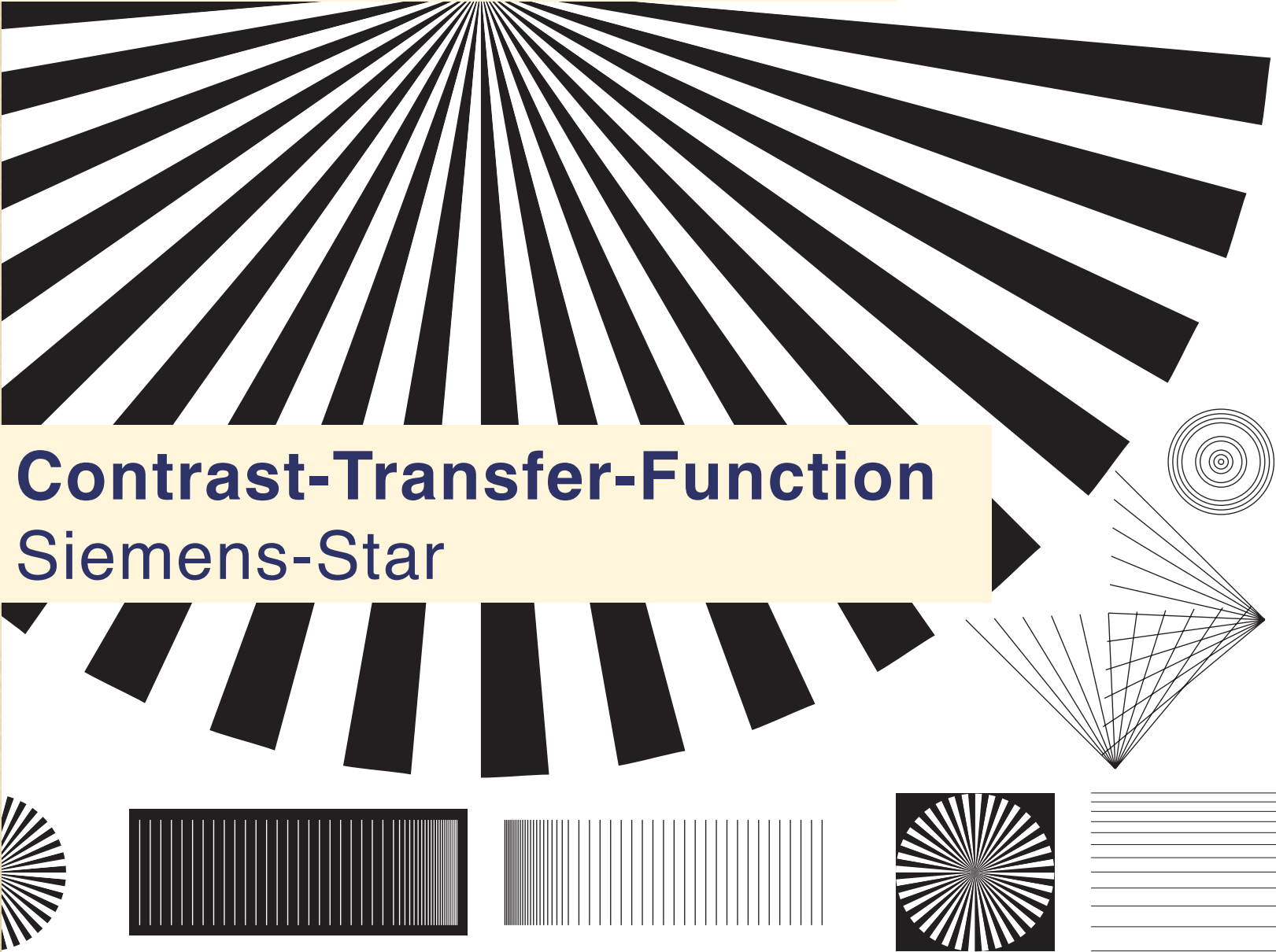
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Design according to Smallest Graphical Detail

SGD Design
providing full (100%) discriminability
= Contrast-Transfer-Function is at maximum

•=SGD

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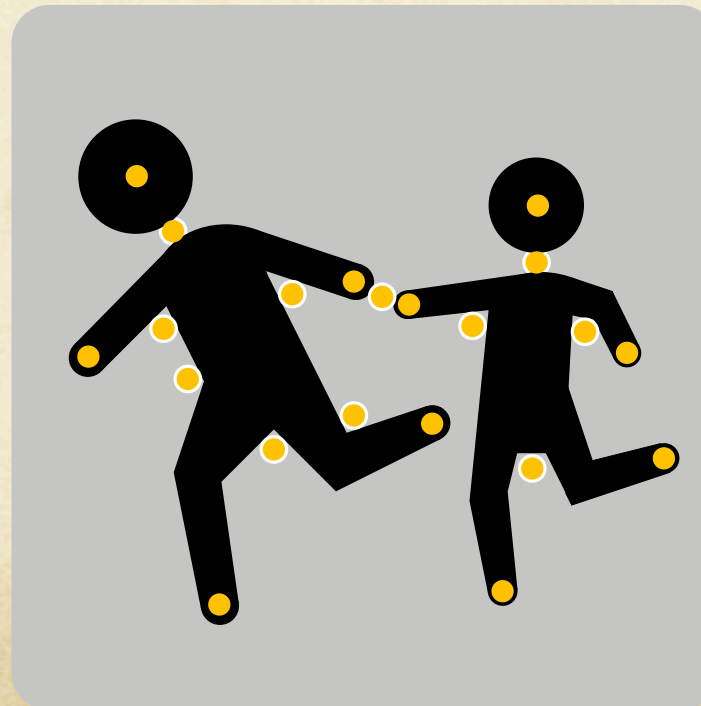
MOA Math: Calculation of discriminability

Minute-Of-Arc (MOA)

1'
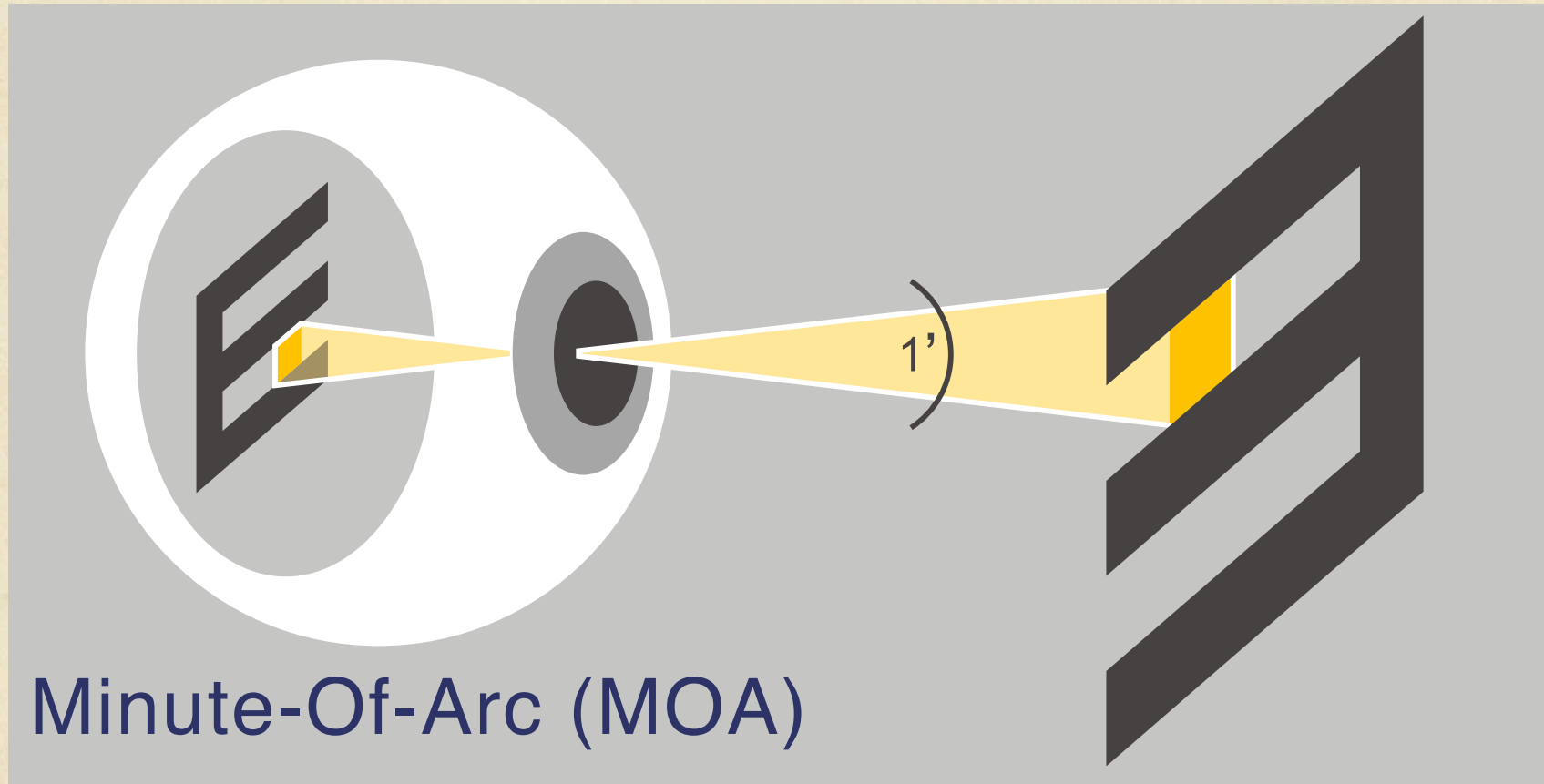
SGD dimension, viewing-distance & time, max. speed, min. visus etc.

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Calculability of discriminability

MOA => SGD

SGD => MOA

IllDre
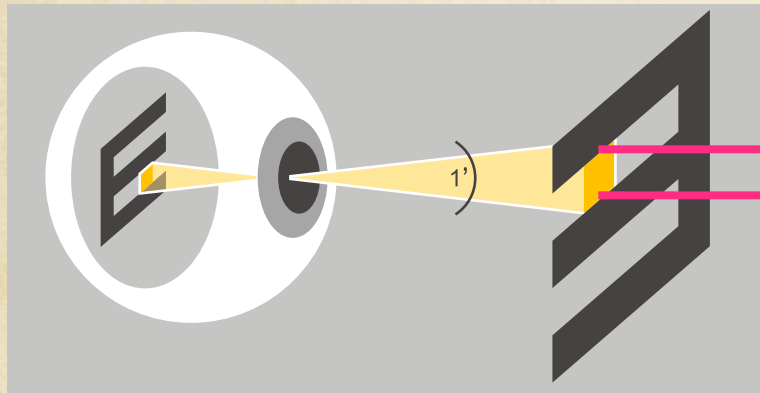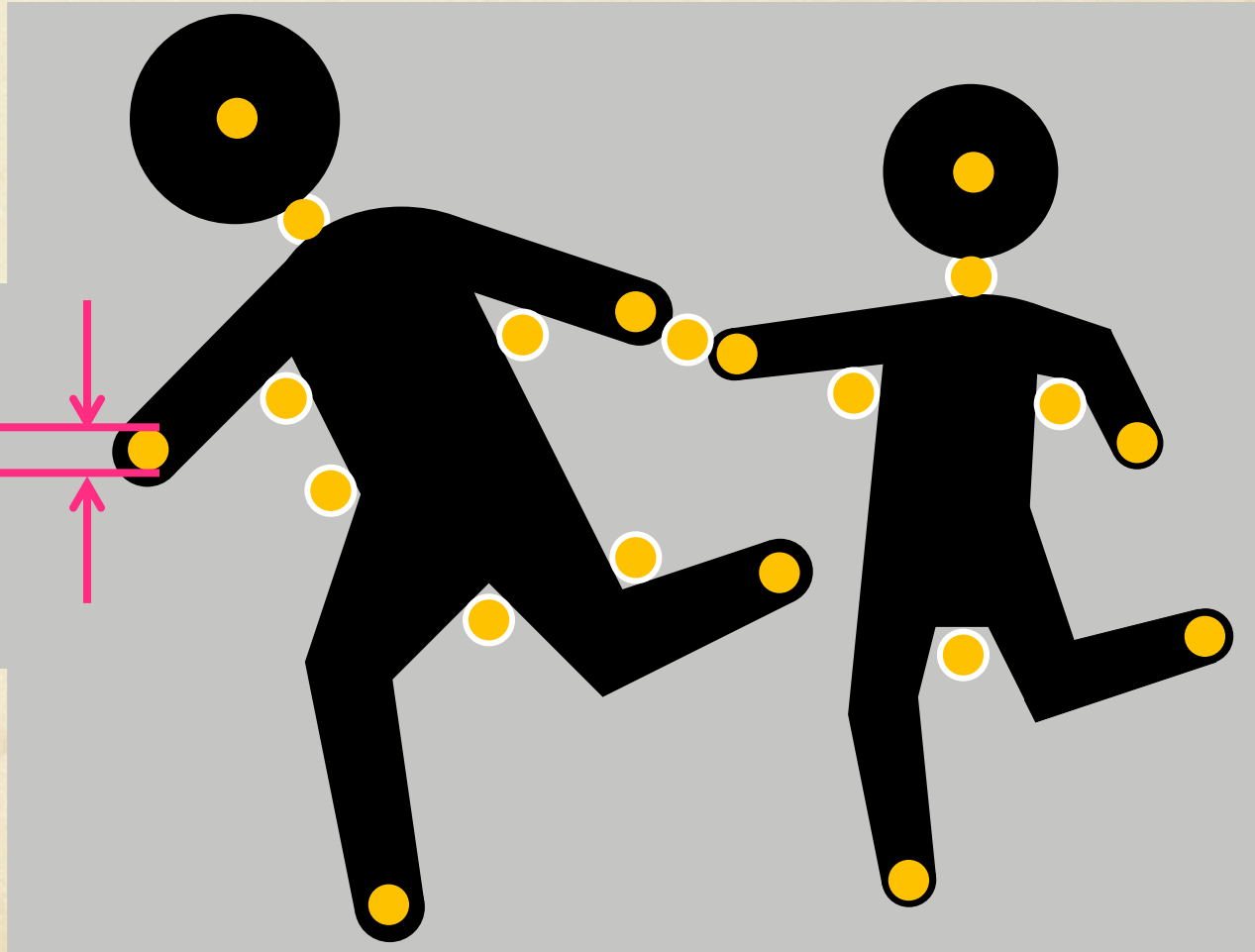
MOA Design Method   UNECE ITC

Viewing distance:

100%   max. 74%

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Comparison of discriminability
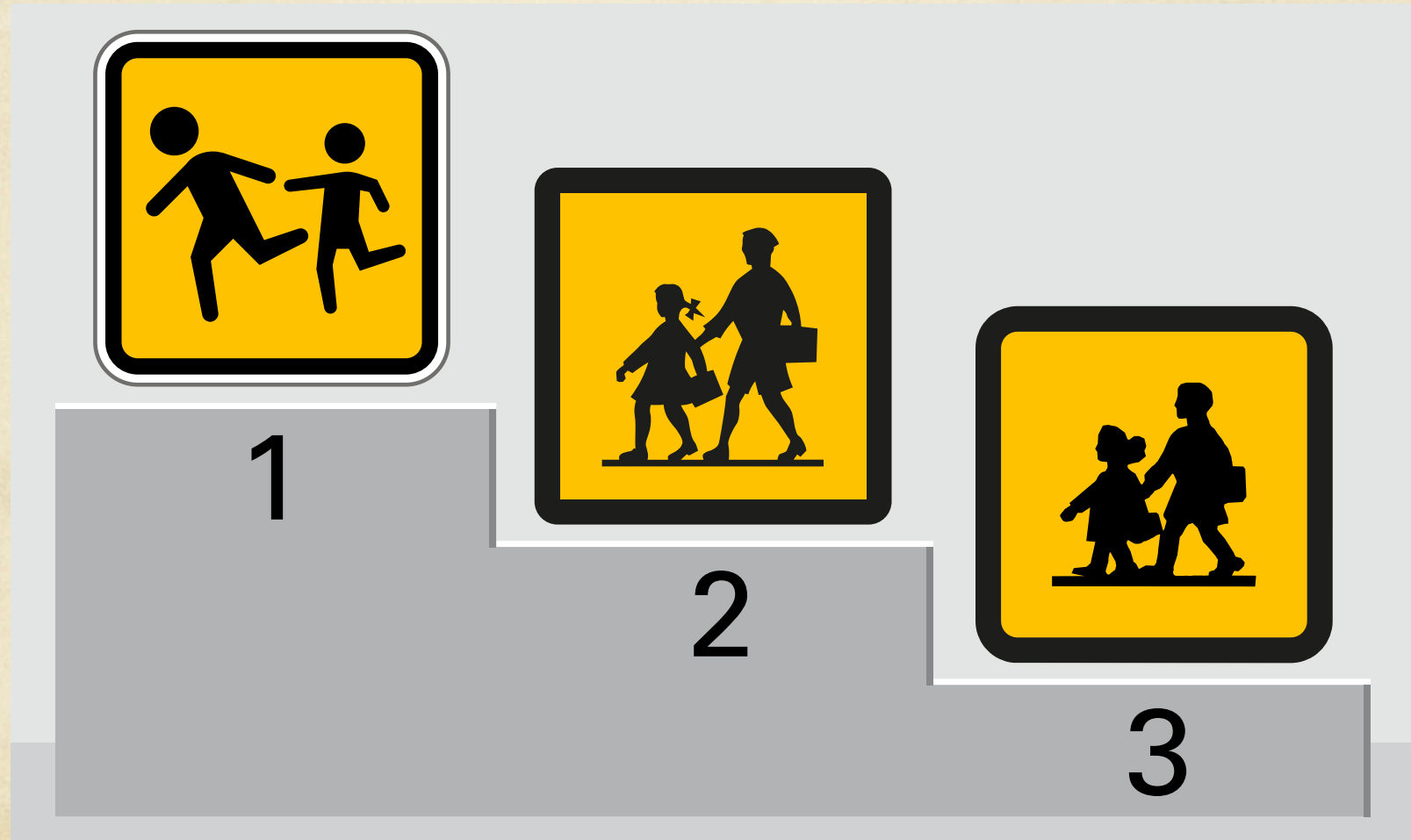
University Stuttgart/Fraunhofer Institute (2011)

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Prepares simultaneously for
conventional signage (vectors)
&
Enhanced dot-matrix application (screen, VMS)

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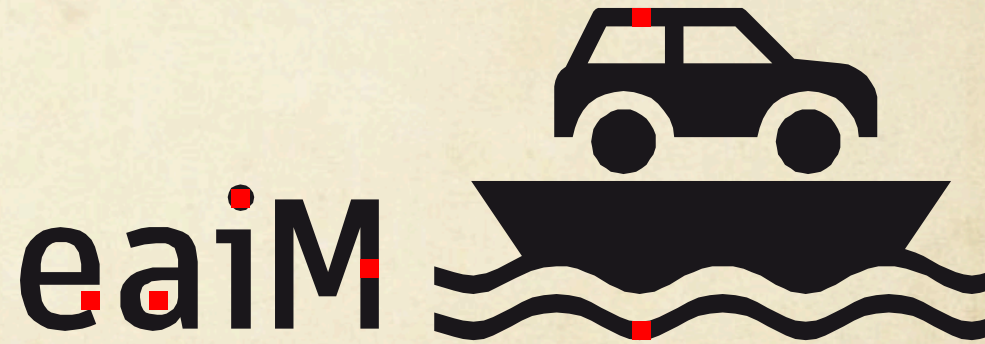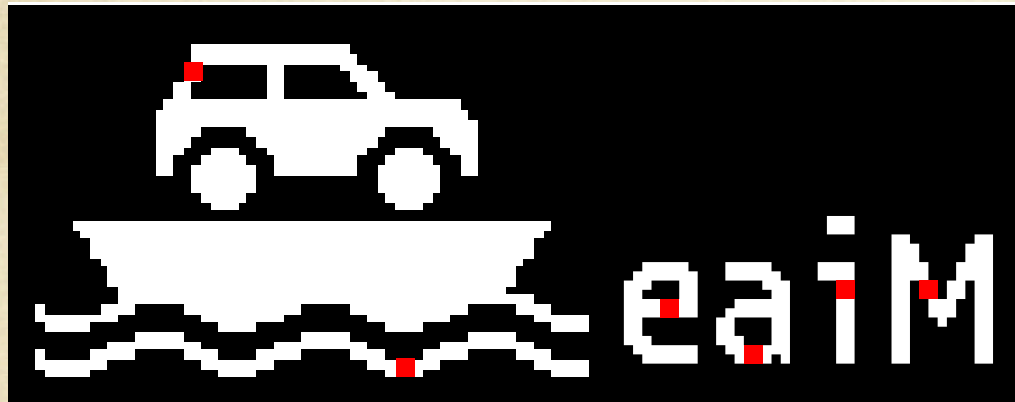
Current implementation status

- Tern Typeface in Austria, Slovakia and The Netherlands

- Tern Symbols to be implemented in Austrian guidelines

- MOA Design Method became success criterion for new Austrian symbols

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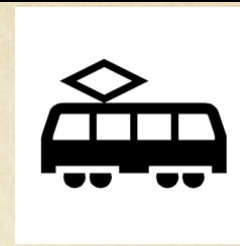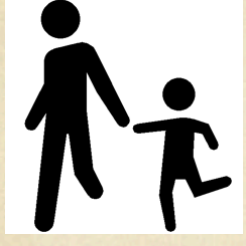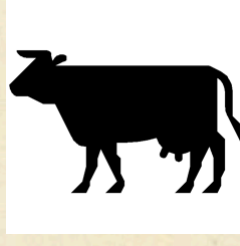
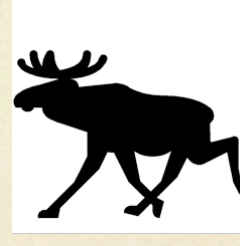- <u>Tern typeface</u> legally binding use in Austria (2013) and Slovakia (2014)
- <u>Tern VMS typeface</u>: Standard for Full-Matrix-Displays "DRIPS" in the Netherlands (2009)

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TS0010	TS0020	TS0030	TS0040	TS0050	TS0060	TS0070
TS0080	TS0090	TS0100	TS0110	TS0120	TS0130	TS0140
TS0150	TS0160	TS0170	TS0180	TS0190	TS0200	TS0210
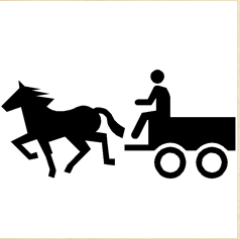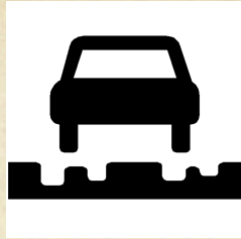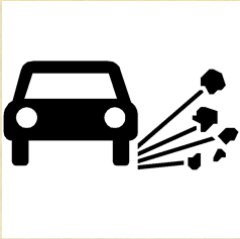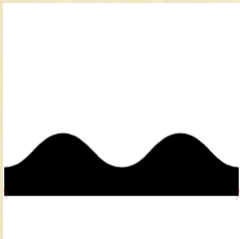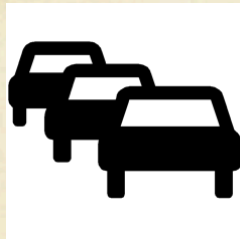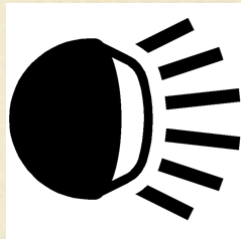
Tern Symbols: Discriminability enhanced

MOA Design Method   / 12

TS0220	TS0230	TS0240	TS0250	TS0260	TS0270	TS0280
TS0285	TS0290	TS0300	TS0310	TS0320	Visual accessibility	Accessibility
					TS0330	TS0340
TS0350	TS0360	TS0370	TS0380	TS0390	TS0400	TS0410

Tern Symbols: Discriminability enhanced

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		Tank	RADAR			
TS0420	TS0430	TS0440	TS0450	TS0460	TS0470	TS0480
			Danger of accidents			
TS0490	TS0500	TS0510	TS0520	TS0530	TS0540	TS0550
TS0560	TS0570	TS0580	TS0590	TS0600	TS0605	TS0610

Tern Symbols: Discriminability enhanced

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MOA Design Method   / 14

TS0620	TS0630	TS0640	TS0650	TS0660	TS0670	TS0680
TS0690	TS0700	TS0710	TS0720	TS0730	TS0740	TS0750
TS0760	TS0770	TS0780	TS0790	TS0800		

Tern Symbols: Discriminability enhanced

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**To reduce the increased cognitive load
and increase road safety:
Improvement of signs & symbols through:**

* ISO 9186 Test procedures *
fostering <u>understanding</u>

* MOA Design Method *
better <u>discrimination</u> & precise effectivity calculation

- Reducing uncertainty while transforming information into action
- Earlier recognition and driving action

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Thank you!

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The MOA Design Method
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