THE COMMON LANGUAGE
FOR SYSTEMS BY ISO/IEC 81346

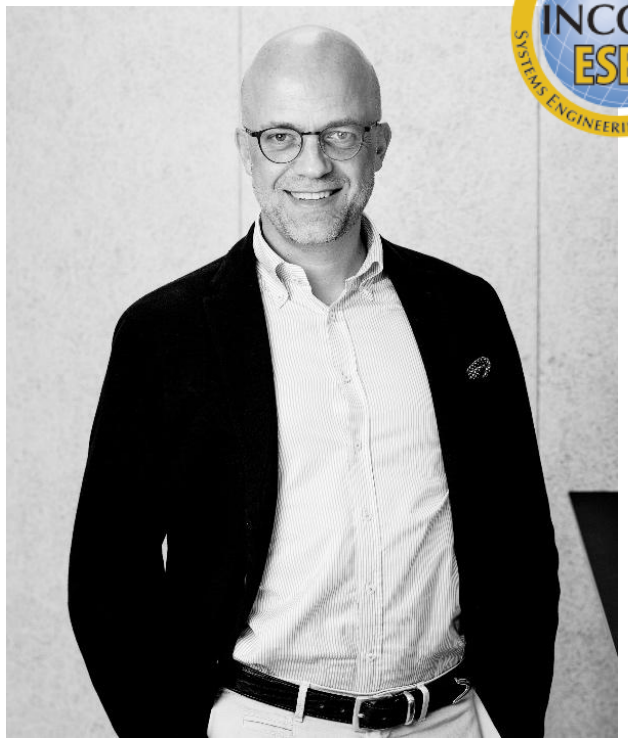
INCOSE SYSTEMS ENGINEERING PRACTICAL WEBINAR

Monday 2025-10-06 and Tuesday 2025-10-07

by Henrik Balslev (hb@syseng.dk)

SYSTEMS ENGINEERING A/S

Systems engineers certified by INCOSE



Henrik Balslev
Managing partner
Copenhagen - Denmark

HV Electrical Engineer B.Sc. 1988

Project manager & **project director** 50 MEUR

Prefers to be **practical and daily-life** orientated.

SYSTEMS ENGINEERING A/S

We do systems engineering with our clients in daily life

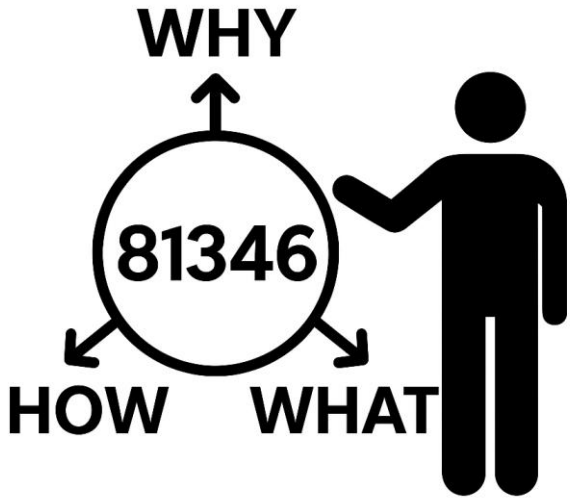
MOLIO viden, du bygger på · READI · GRUNDFOS · nel · Vestas · FLSmidth · Renewables Norway · LKAB

novo nordisk® · Tetra Pak® · TransAlta™ · SYNTEGON · Ørsted · Chevron · Pågen

ISO/IEC 81346

Standard Series

AGENDA

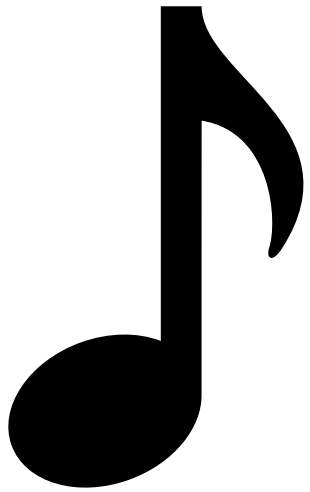


WHY ISO/IEC 81346

Our mission…

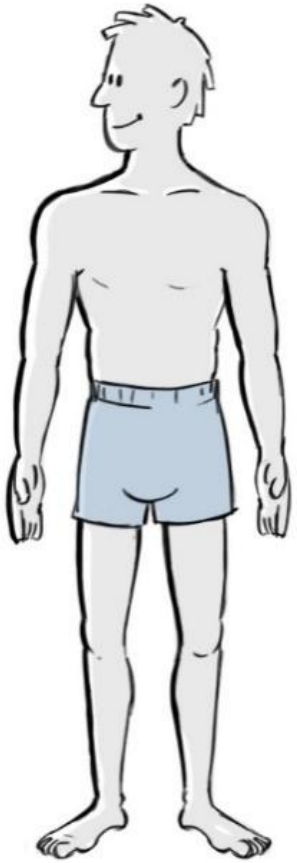
OUR MISSION

a common language



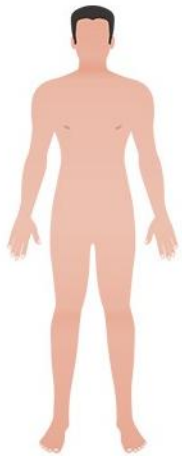
The common language for engineers

THE PREMISE: SYSTEMS THINKING



The common language for engineers

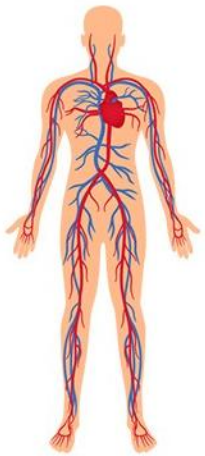
THE 11 HUMAN BODY SYSTEMS



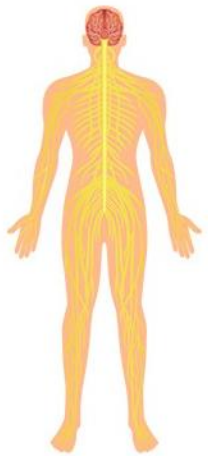
Integumentary System

Muscular System

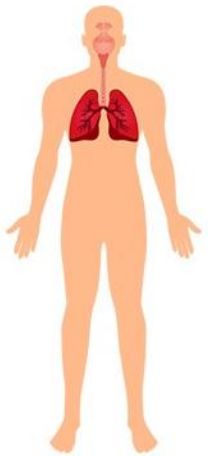
Skeletal System



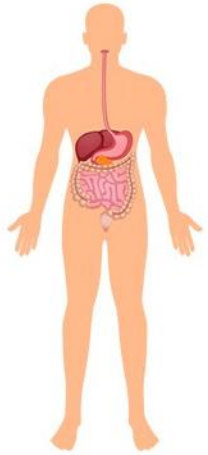
Cardiovascular System



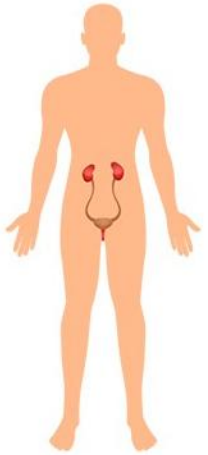
Nervous System



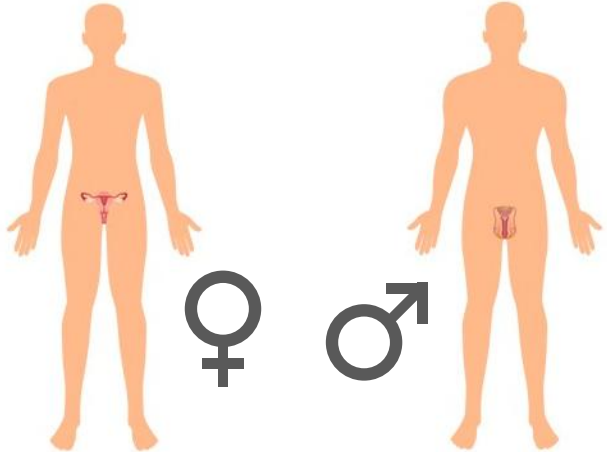
Respiratory System



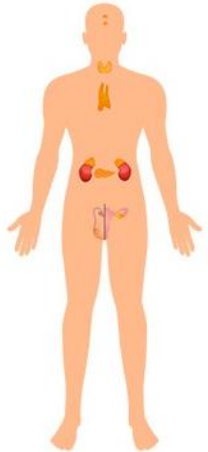
Digestive System



Urinary System



Reproductive System



Endocrine System

Lymphatic/Immune System

https://thebeakerlife.com/homework-helper-body-systems-7ec96976ab7b

SYSTEM MODELLING

How to model a system easily

LEGO MODEL

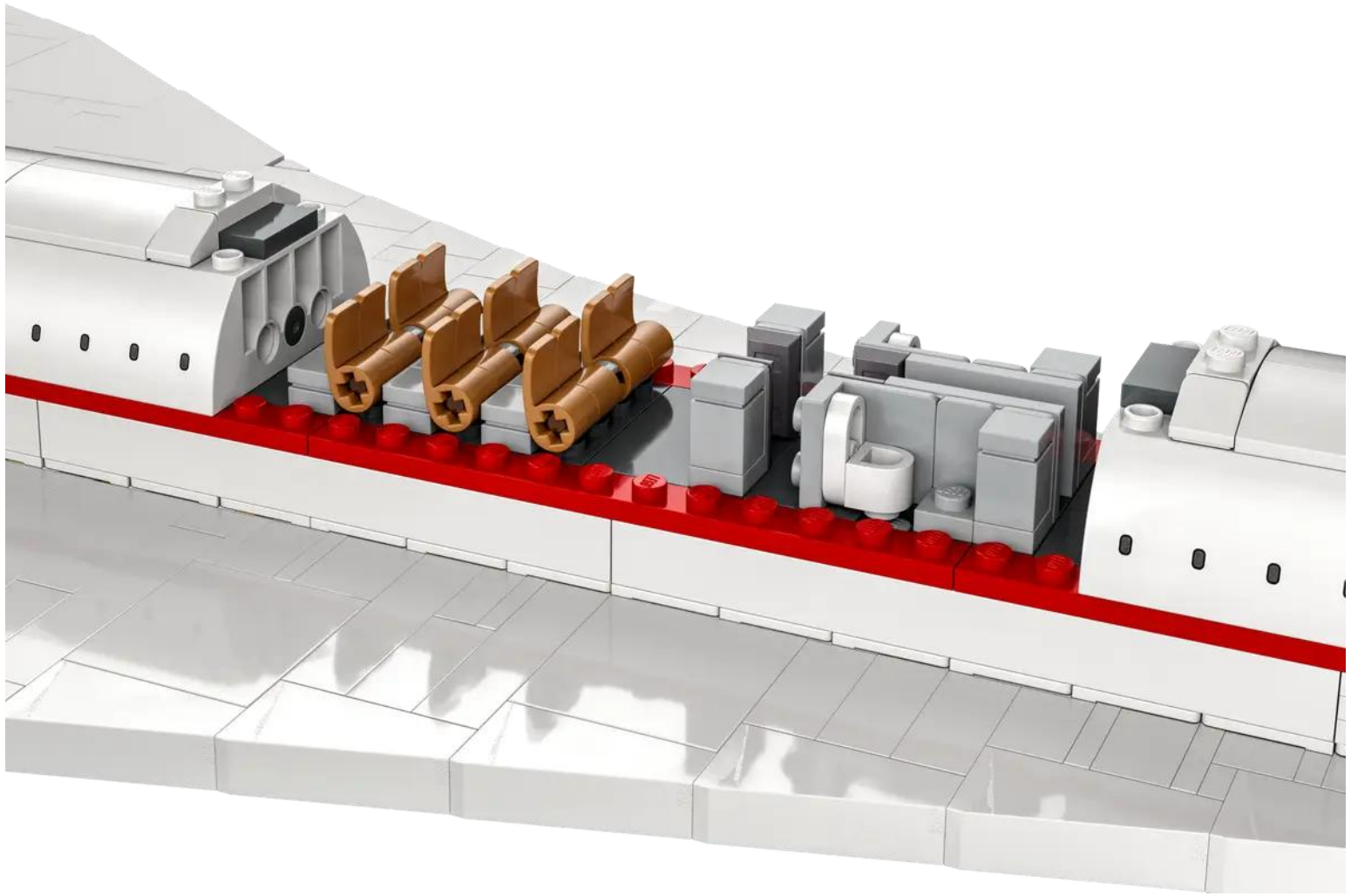
10 pcs.

LEGO MODEL

2083 pcs.

LEGO MODEL

2083 pcs.



More elements -> More details

COMMON LANGUAGE FOR SYSTEMS

Making a model any engineer can refer to: The Reference Model

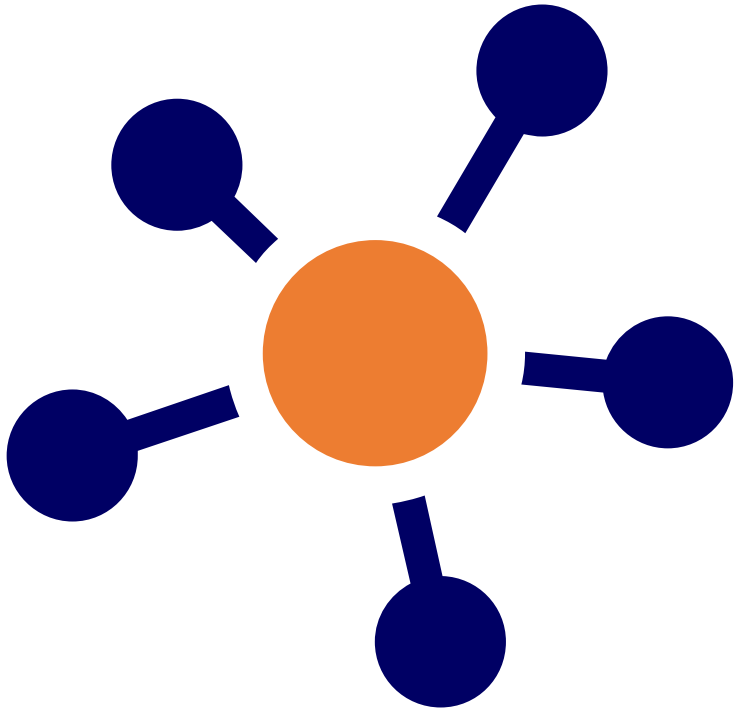
reference model

an informative representation
of an object, person or system
for reference purposes

SYSTEM REFERENCE MODEL

Combining “systems thinking” with “reference” and “model”

More elements provides more details



Syntax to address any system or system element

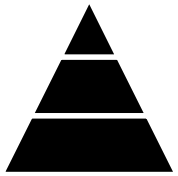
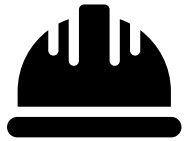
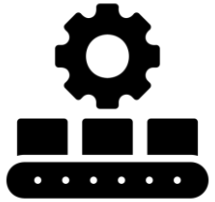
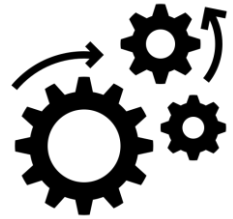
Not made with LEGO bricks but “SYSTEM” bricks defined by ISO/IEC 81346

HOW 81346 WORKS

ISO/IEC 81346
Standard Series

THE 81346 SYSTEM LIBRARIES

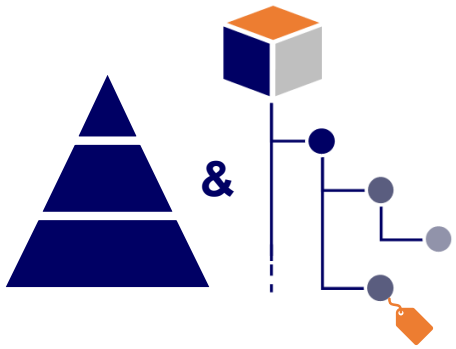
Different tables for different systems in different industries

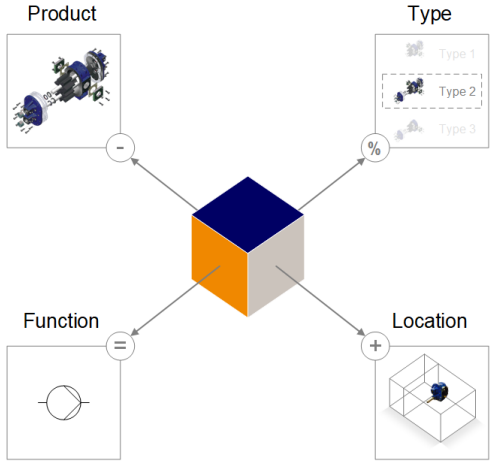
Basic systems	Power systems	Construction systems	Manufacturing systems	Vehicle systems	System processes
					
Part ***2***	*Part* ***10***	*Part* ***12***	*Part* ***14***	*Part* ***20***	*Part* ***50***

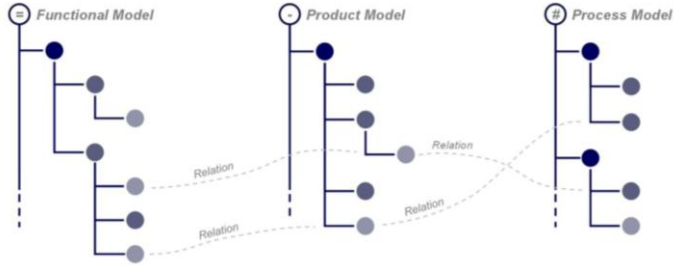
Part **1** – Rules and Principles

THE ISO/IEC 81346 STANDARD SERIES

The common language systems







System breakdown

Aspects

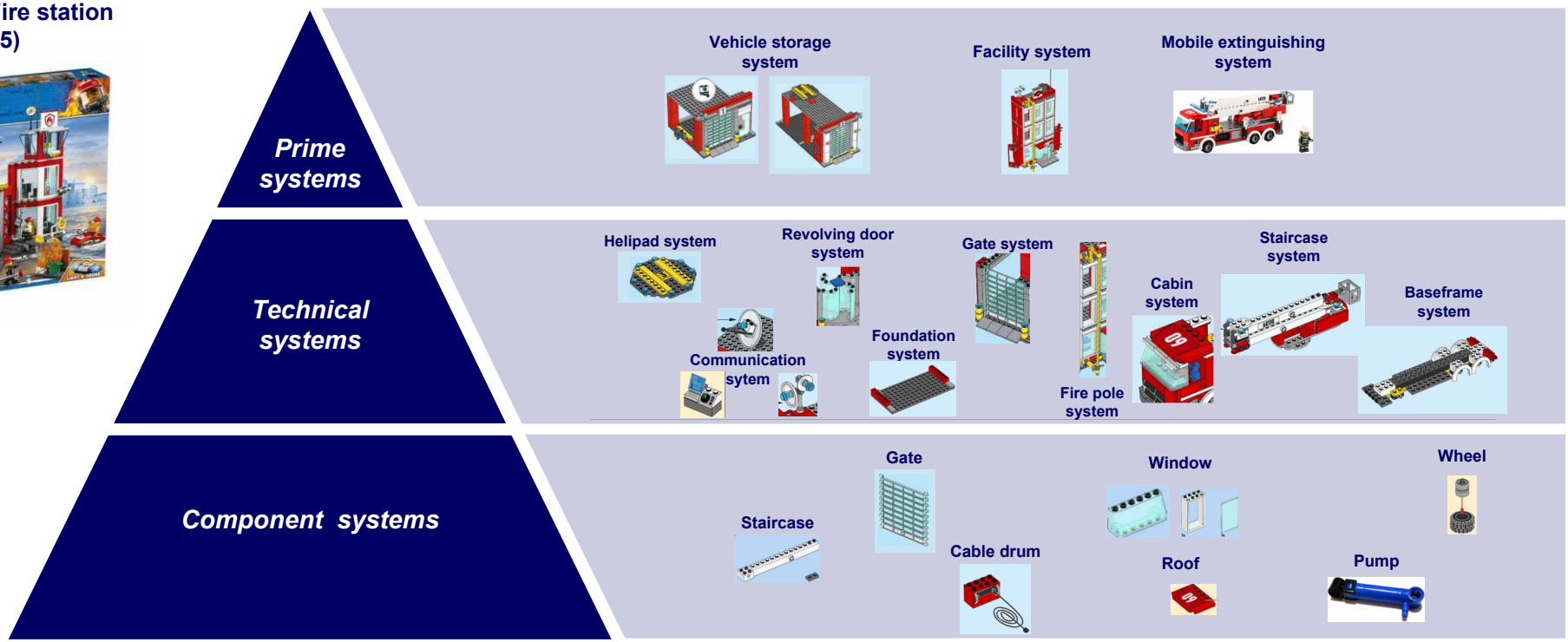
Relations

System Reference Model

THE 81346 “BOX OF SYSTEMS”

Example of system libraries

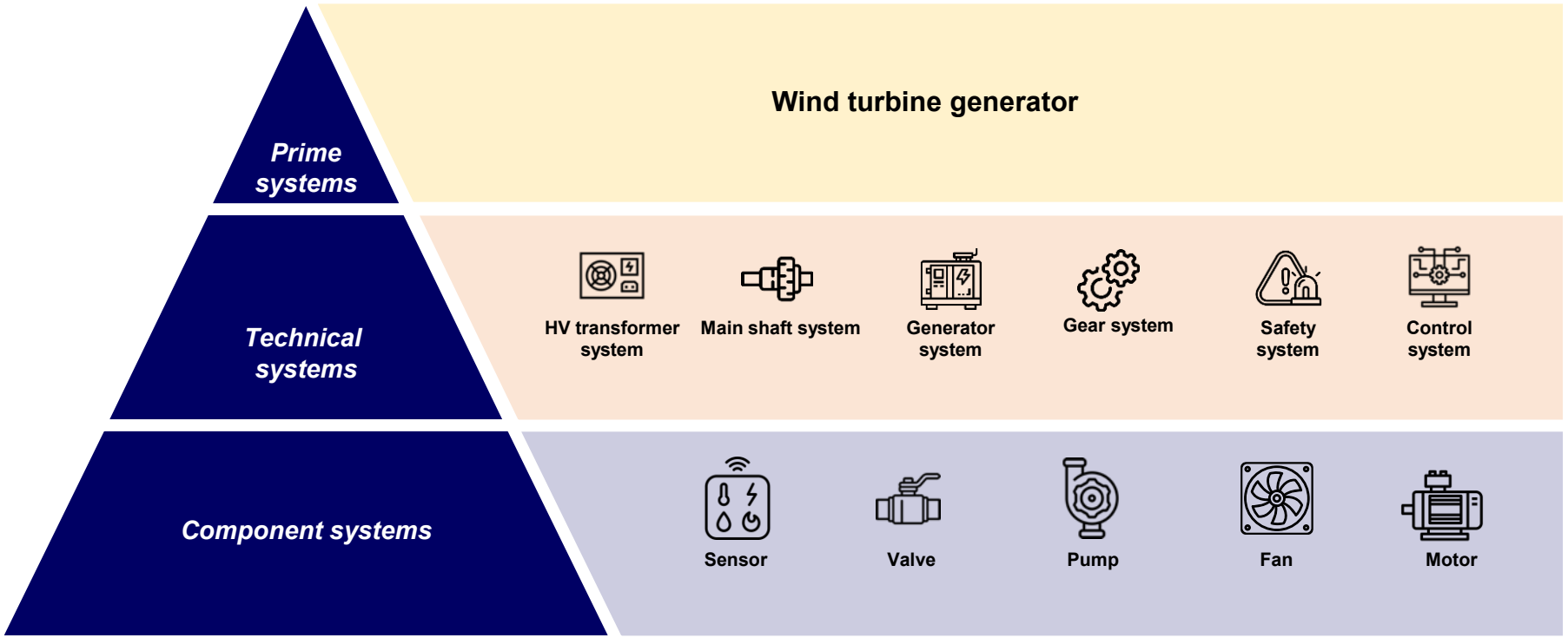
LEGO CITY: Fire station (60125)



Illustrations used with kind permission from LEGO System A/S

RDS-PS (81346-10) BOX OF POWER SYSTEMS

Examples of Power Systems



RDS 81346 SYNTAX

The 81346 reference designation syntax

Prefix

Defines from which aspect the system is viewed.

- = Functional
- - Product
- + Location
- % Type

Class

Defines the system type and relative size/complexity.

- _ Prime system
- _ _ Technical system
- _ _ _ Component system

Number

Running number to distinguish from other systems of the same class within the same parent system

1, … n

Reference designation example

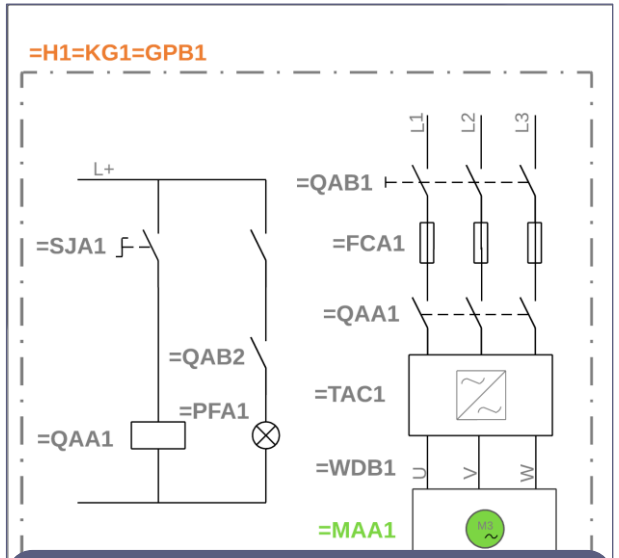
=M1=MS1=ULN1

Thrust system – Combustion engine system – motor block

MY ENTRY POINT TO SYSTEMS ENGINEERING

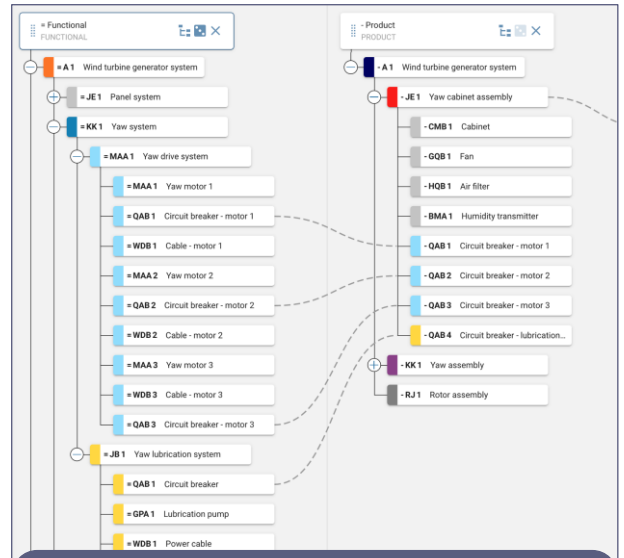
This is where we always recommend new beginners
to start with systems engineering: **The system breakdown model**

MAKING A SYSTEM REFERENCE MODEL



Explicit knowledge

Implicit knowledge

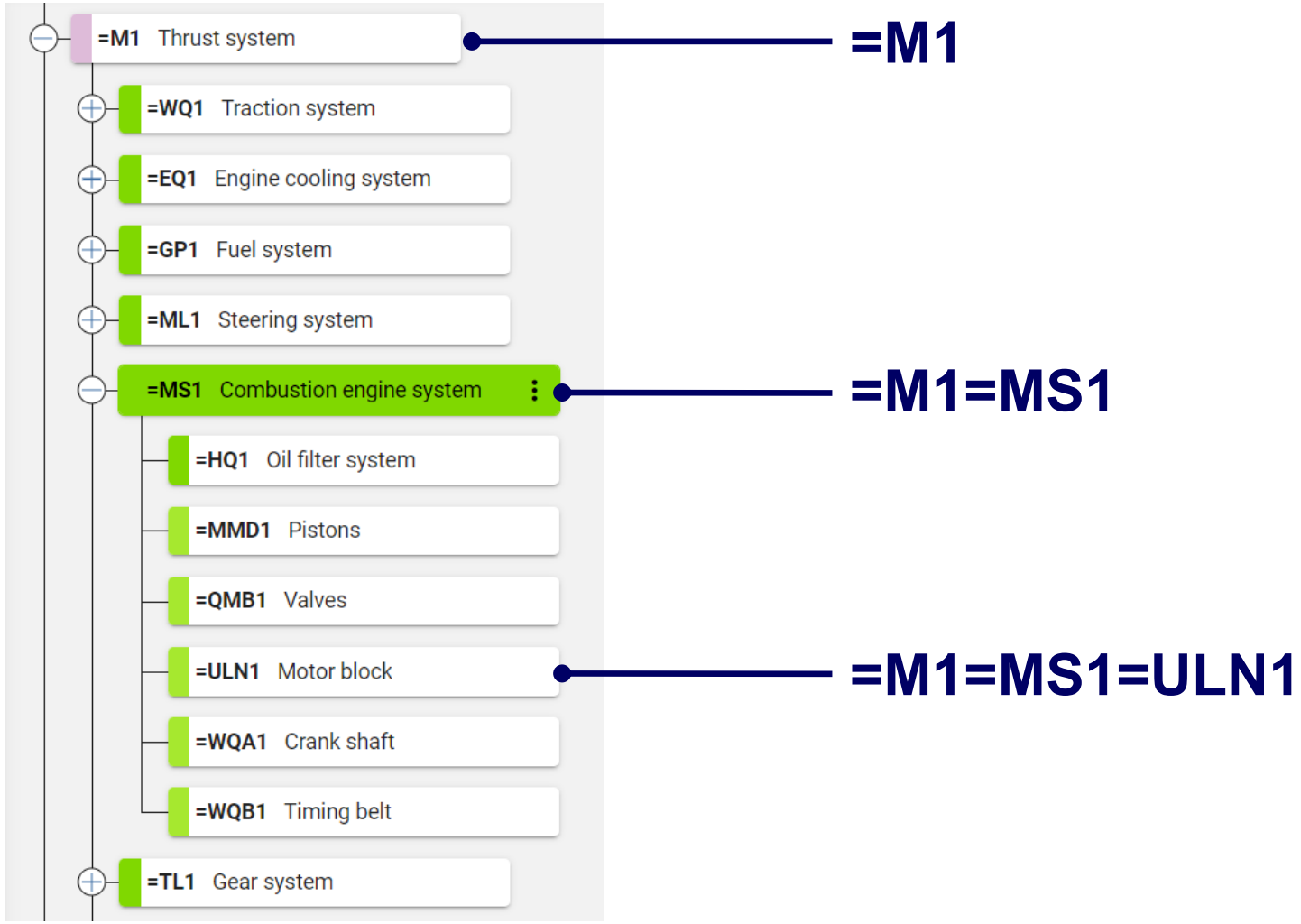


Relations knowledge

System breakdown model = The 81346 system reference model

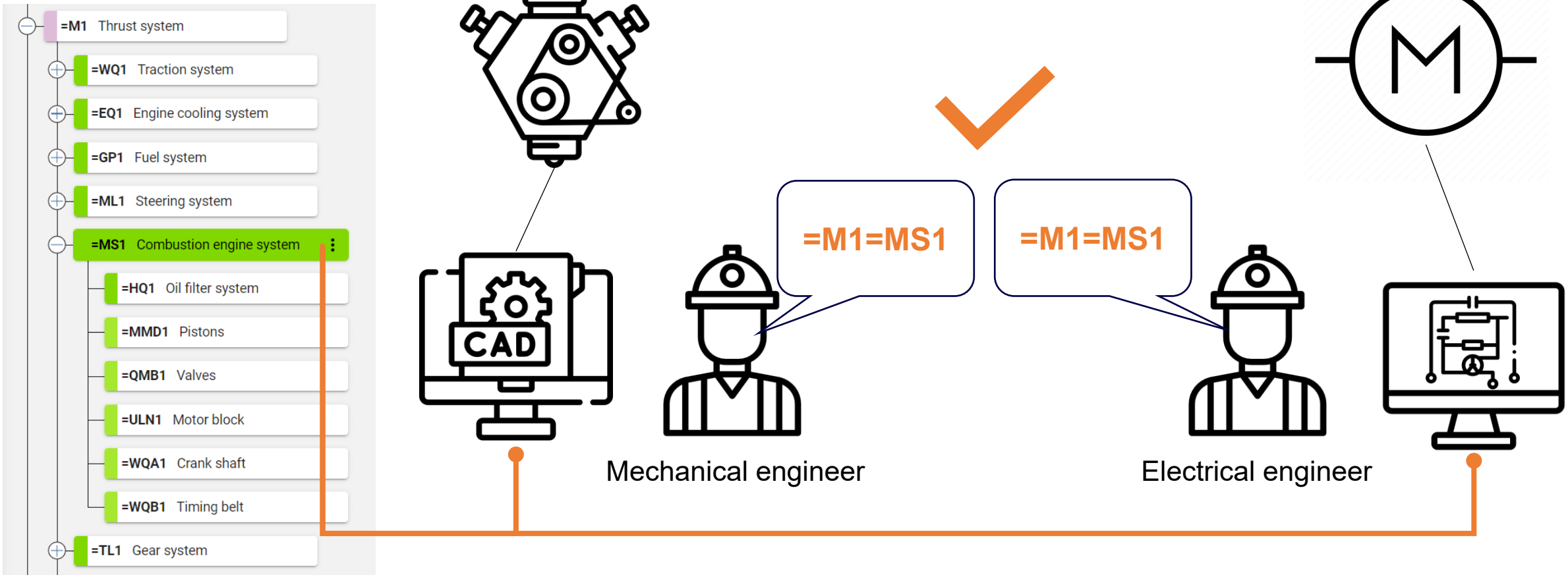
SYSTEM REFERENCE MODEL

Using the ISO/IEC 81346 common language for systems



SYSTEM REFERENCE MODEL

Different disciplines “talks the language of systems”



OUTPUT FROM 81346

Selected 81346 offers (i.e. what can you use it for)

WHAT 81346 OFFERS BY AI

I asked AI what 81346 offers, and this is the response:

1. **Reference Designations**: Structured identifiers for systems, components, and assets.

2. **System Architecture Models**: Clear, hierarchical representations of complex systems.

3. **Cross-domain Consistency**: Unified naming and classification across electrical, mechanical, software, and civil domains.

4. **Digital Twin Enablement**: Foundational structure for interoperable digital representations.

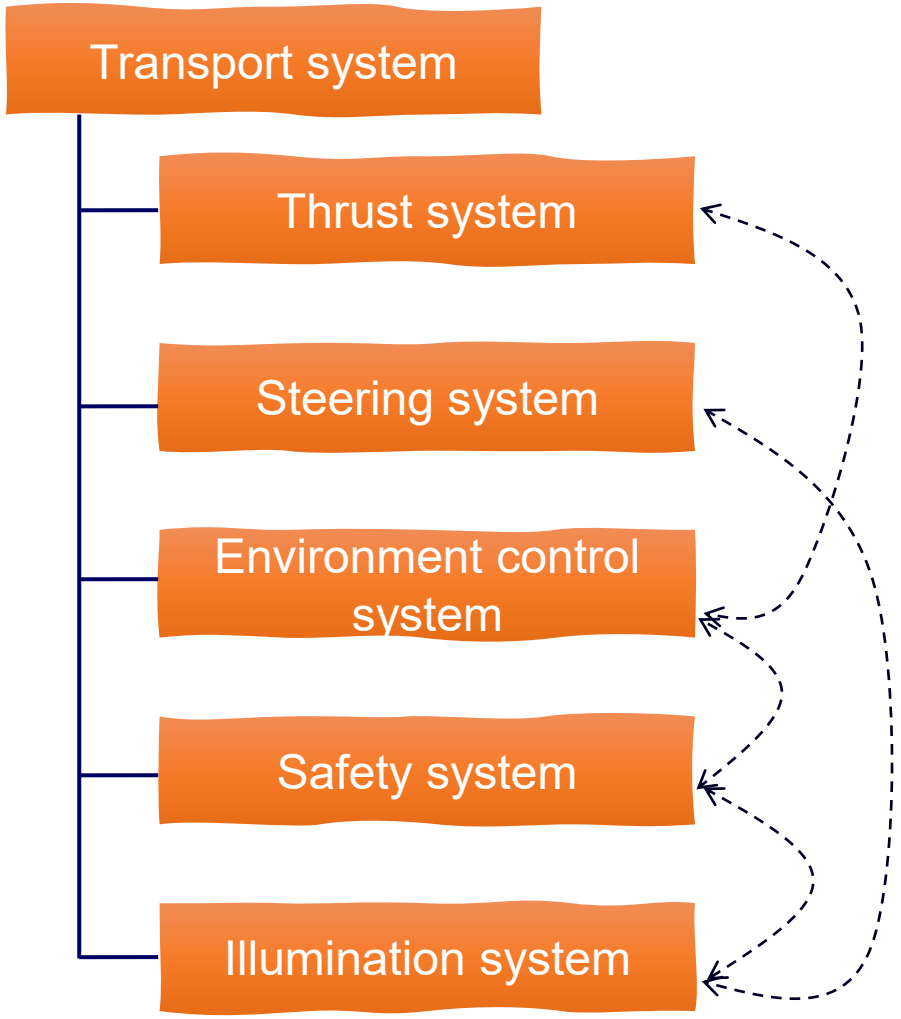
5. **Improved Lifecycle Management**: Better traceability from design to operation and maintenance.

LET’S TALK INTERFACES

My Favorite Engineering Puzzle…

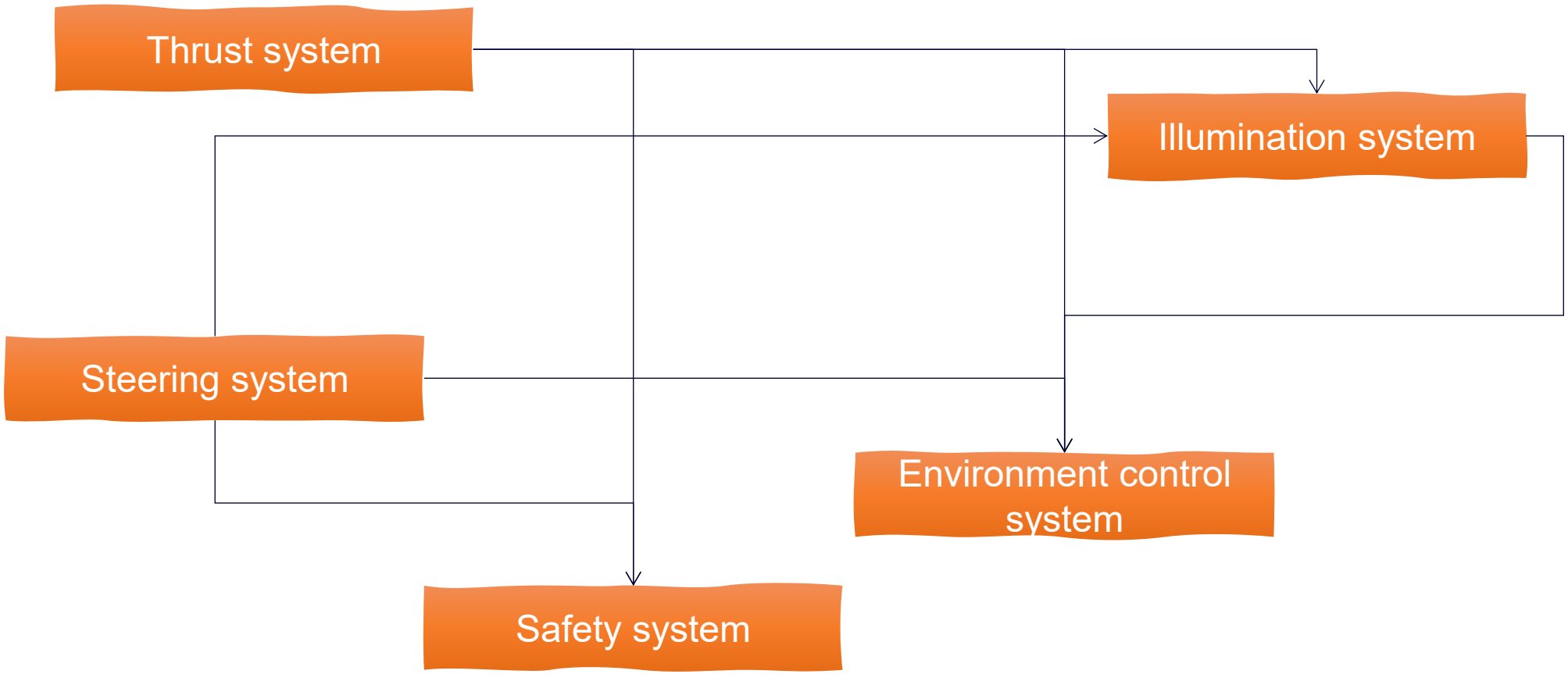
SYSTEM INTERFACES

Identify and control system interfaces

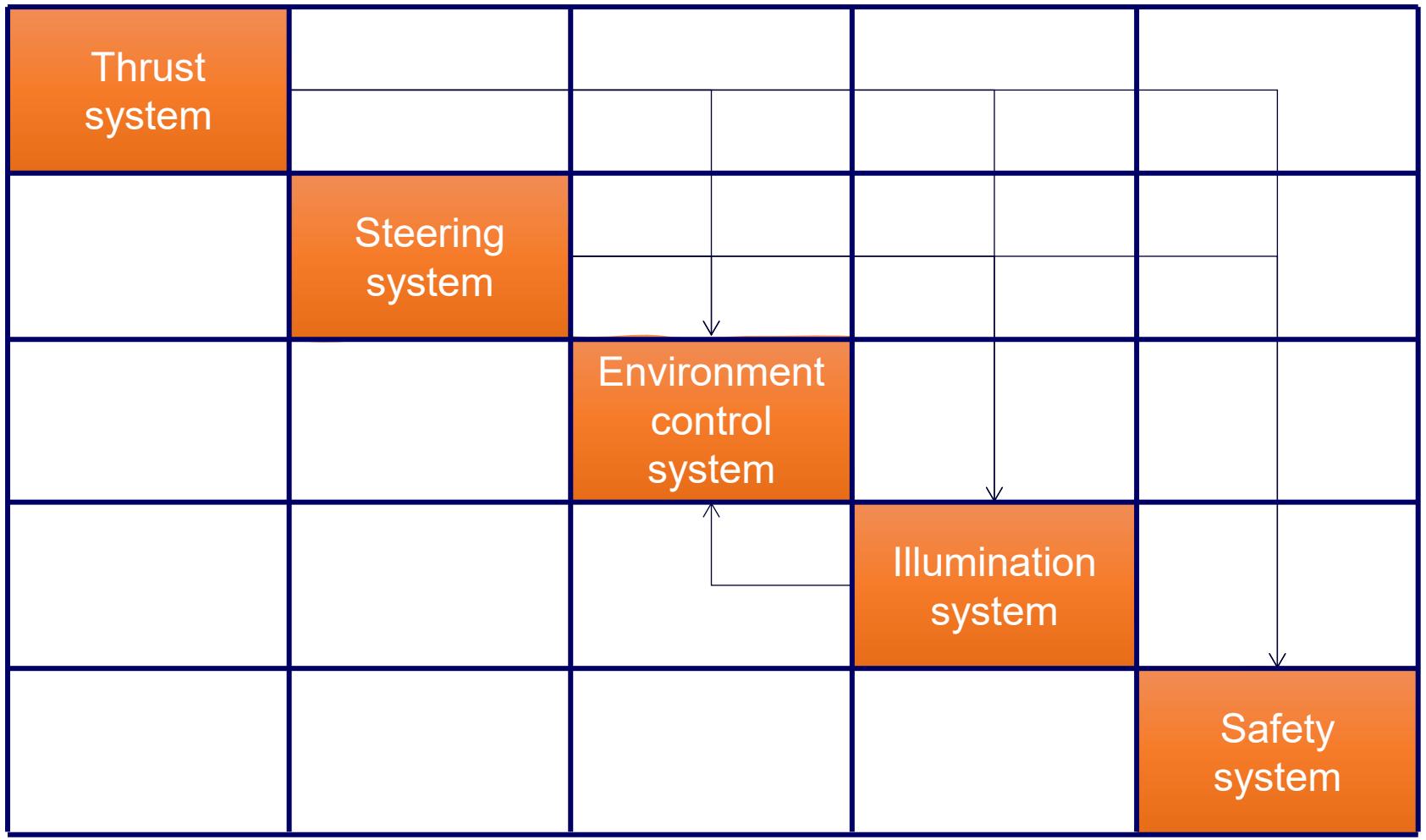


ISO/IEC 81346
Standard Series

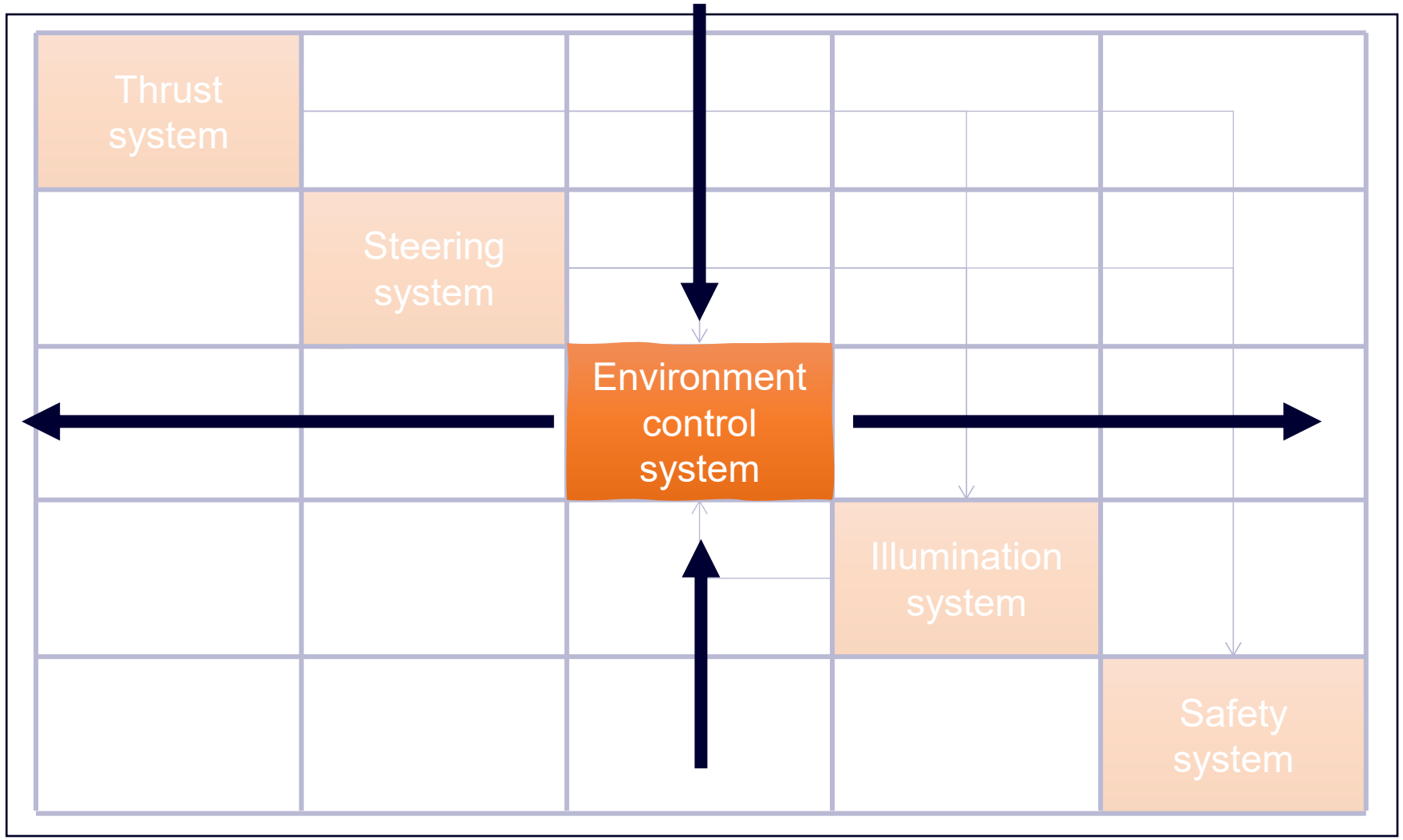
Transport system

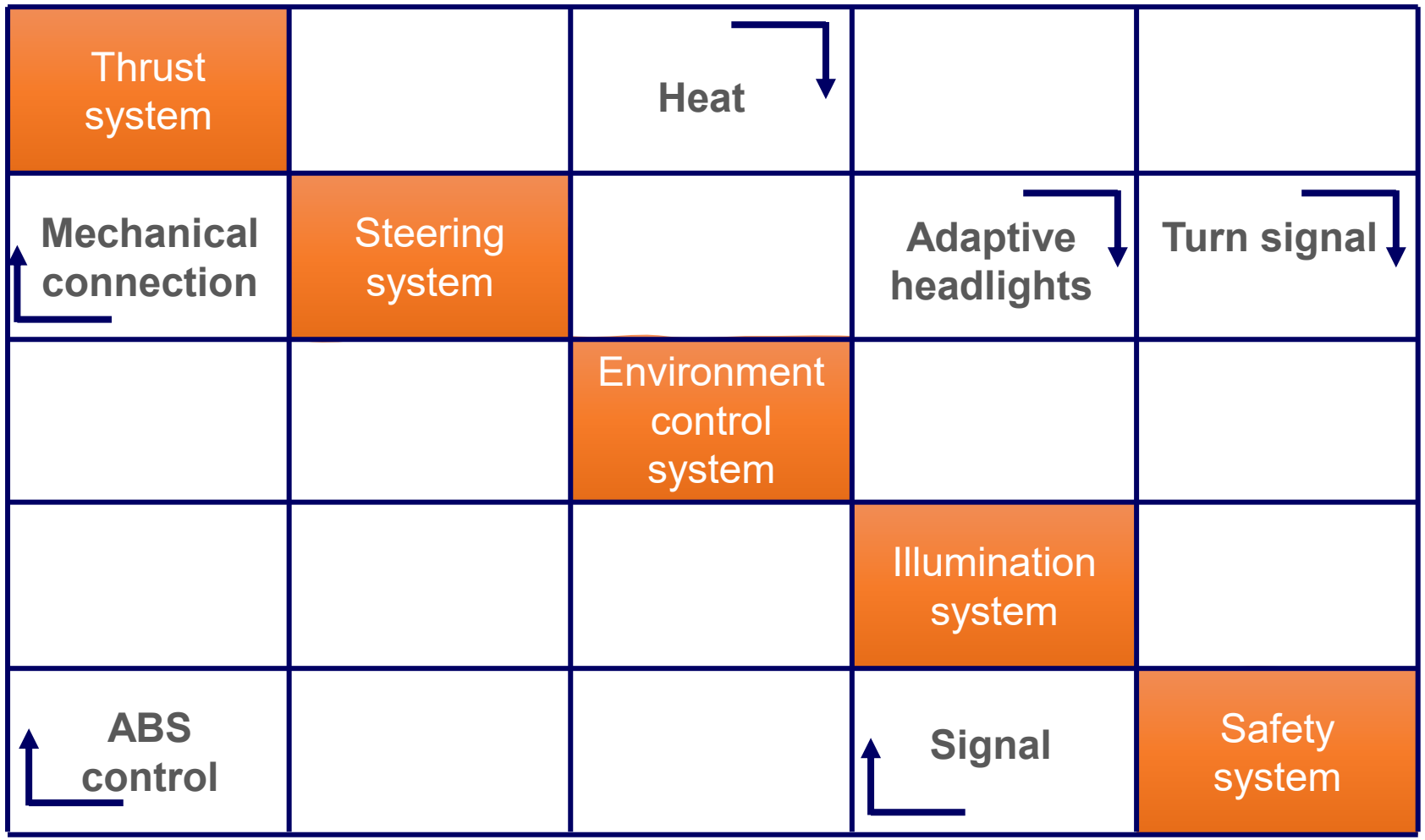


81346 FEEDING THE N2 DIAGRAM



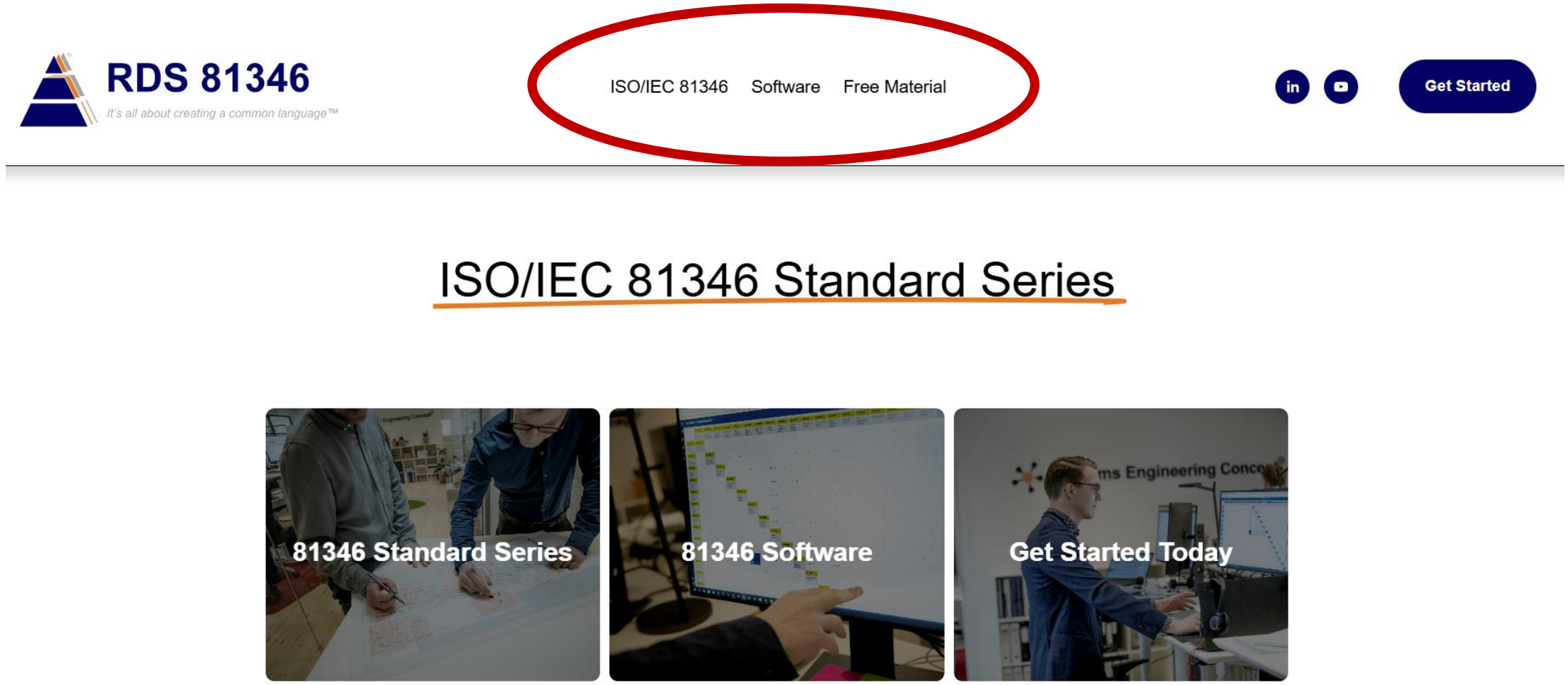
Transport system




Thrust system
Heat
Mechanical connection
Steering system
Adaptive headlights
Turn signal
Environment control system
Illumination system
ABS control
Signal
Safety system

Thrust system	-	**Heat**	-	-
Mechanical connection	Steering system	-	**Adaptive headlights**	**Turn signal**
-	-	Environment control system	-	-
-	-	-	Illumination system	-
ABS control	**?**	-	**Signal**	Safety system

VISIT WWW.81346.COM



THANK YOU
FOR YOUR ATTENTION

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It's all about creating a common language™