



Architecting a complex world

Example of a complete MBSE model

Daniel KROB
CESAMES – INCOSE Fellow

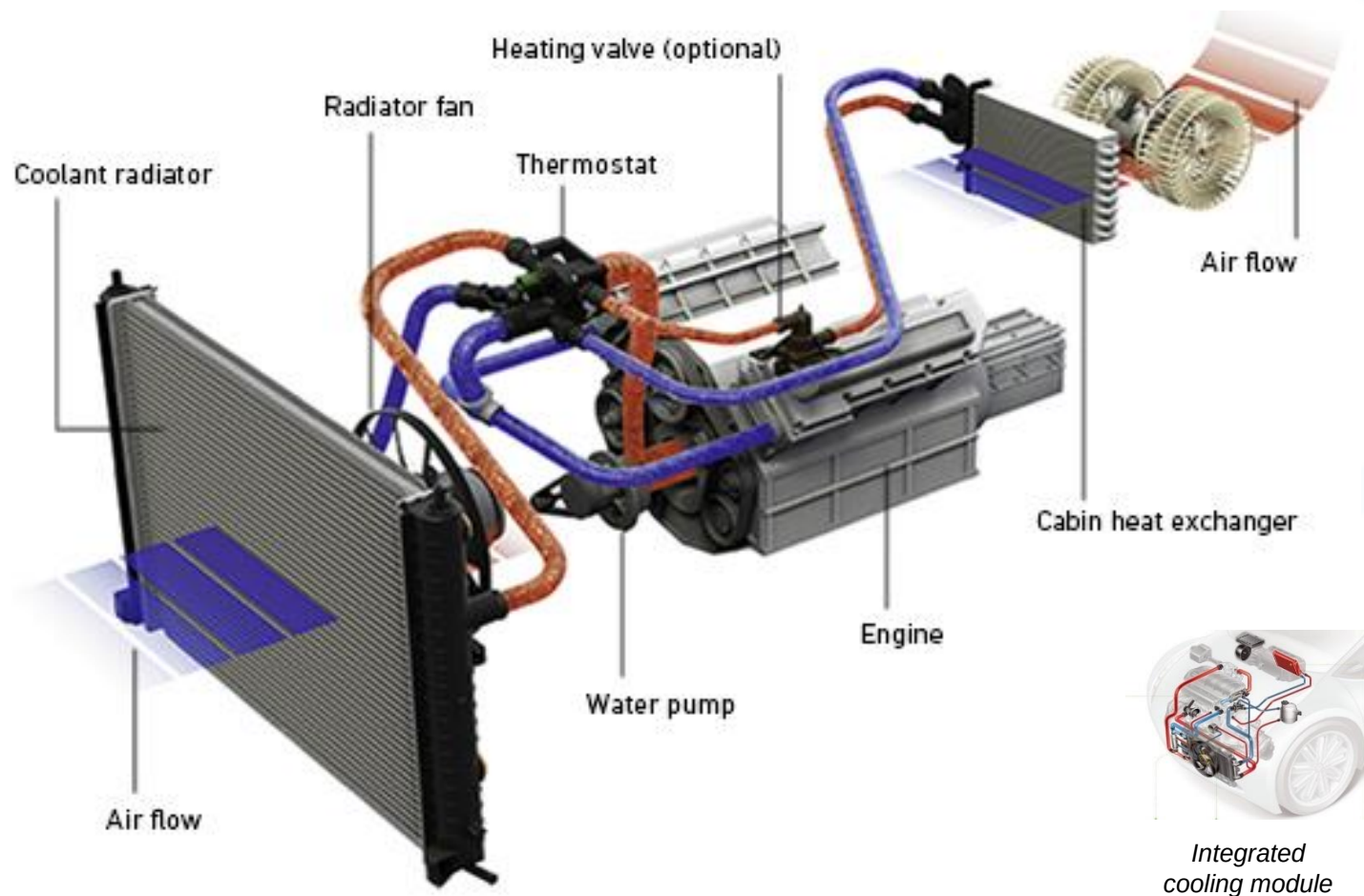


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CESAM systems architecture framework

The integrated cooling module

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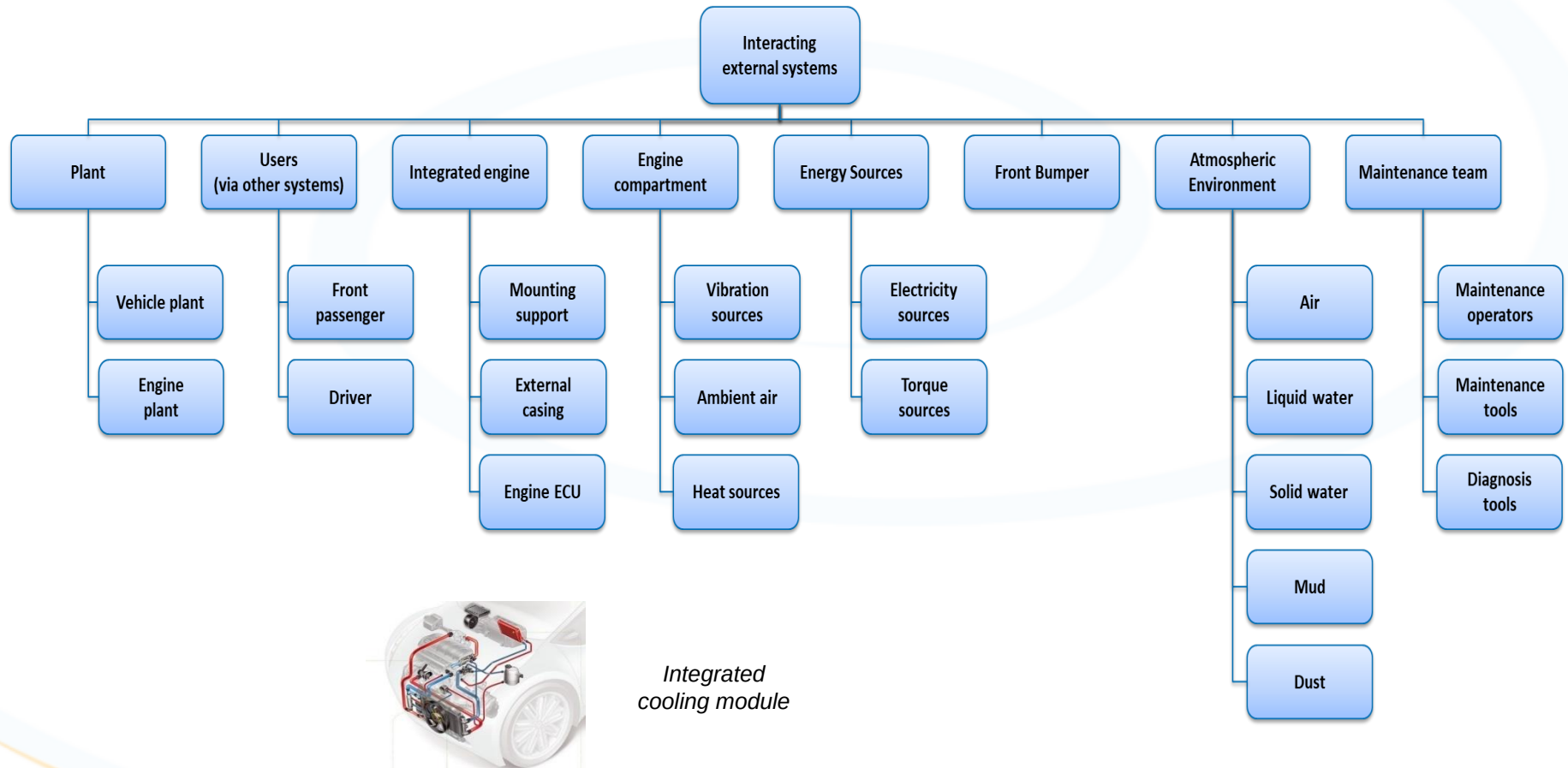
Our system of interest: an **integrated cooling module**



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The two initial diagrams (1/2)



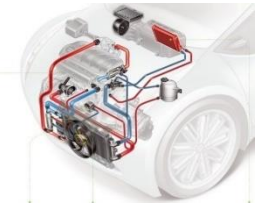
The **stakeholder diagram** organizes hierarchically all **stakeholders** of a system



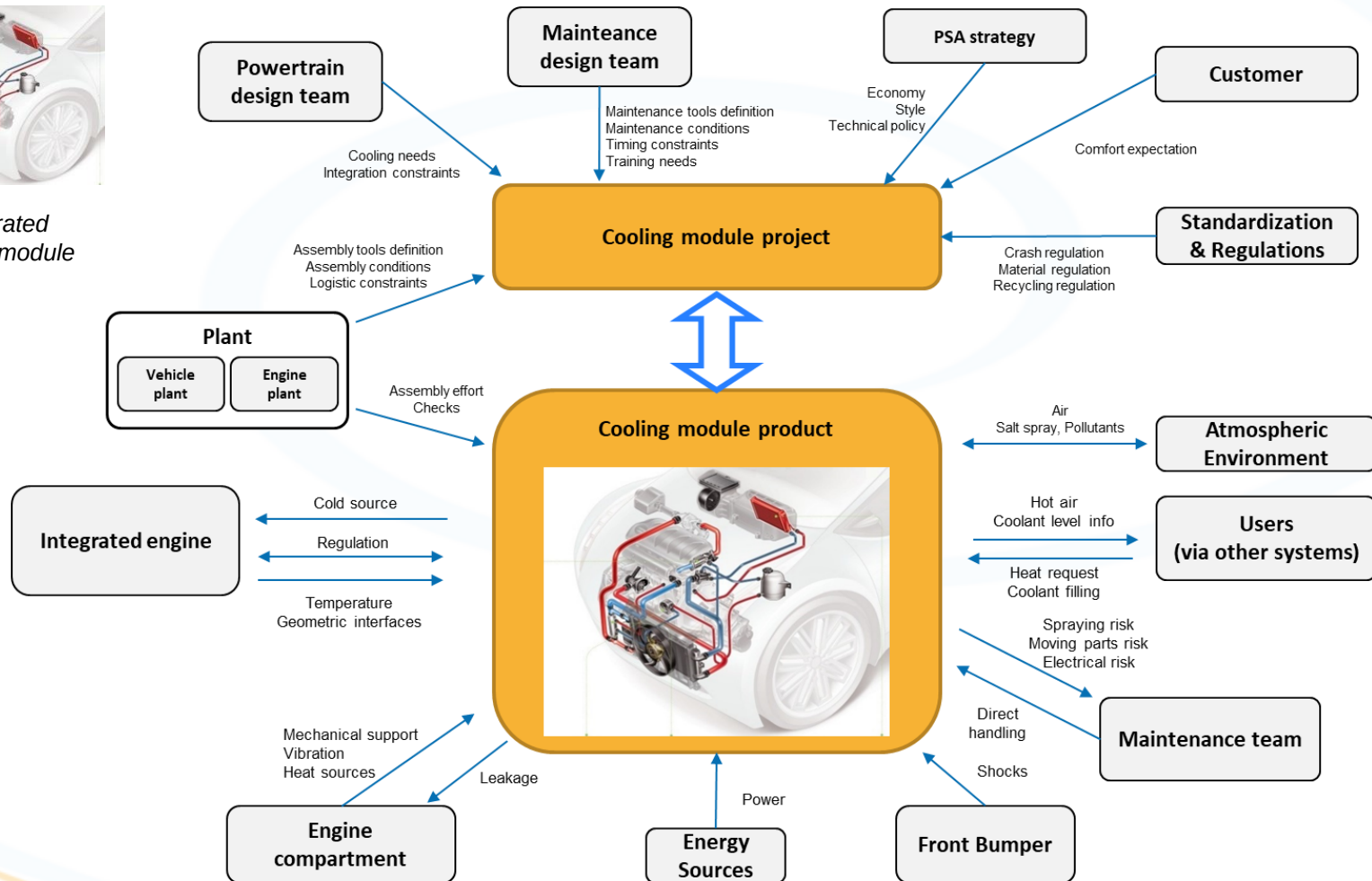
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The two initial diagrams (2/2)



Integrated cooling module



The **environment diagram** models the main **external interfaces** of a system

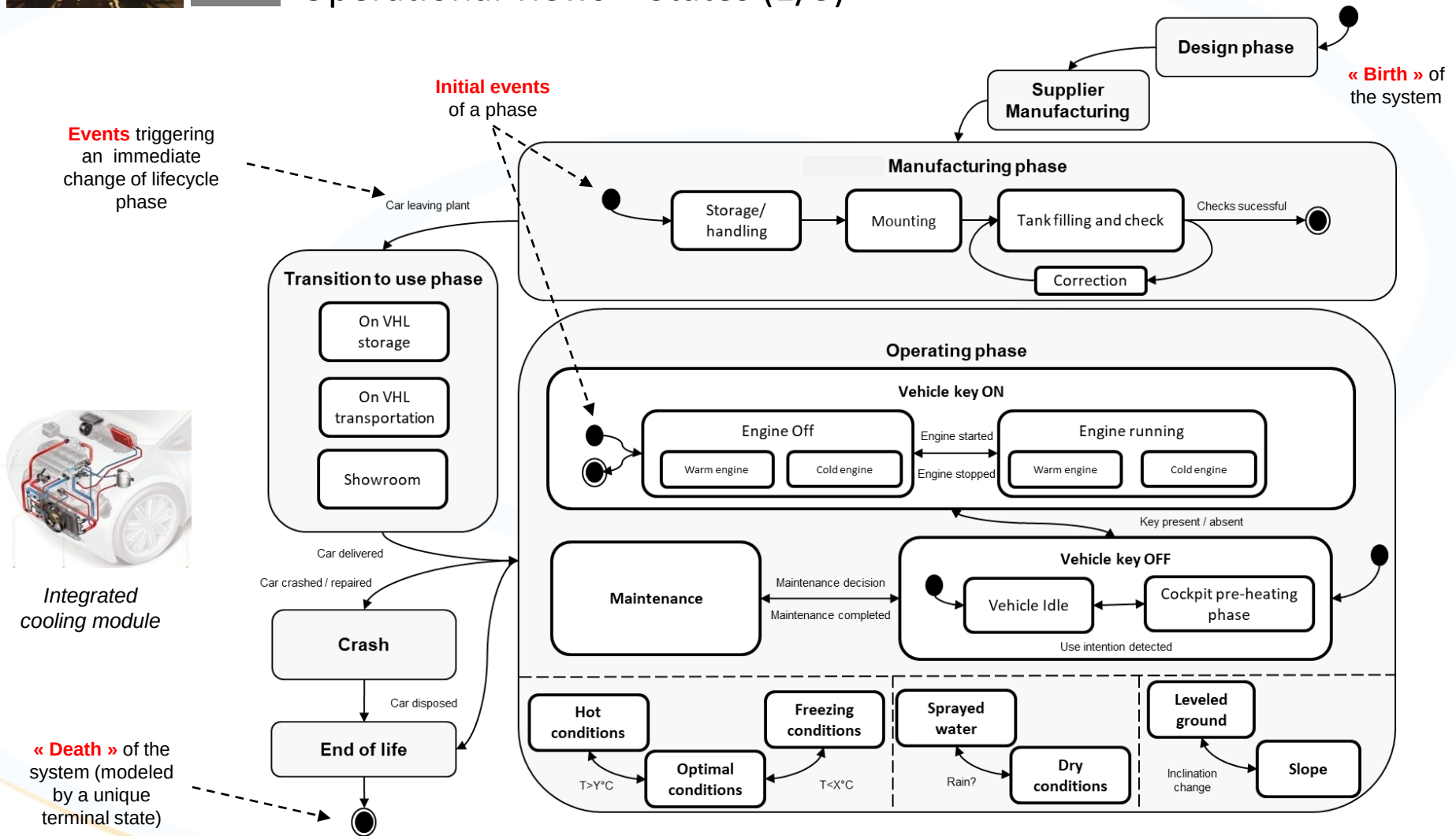


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Operational views – States (1/3)

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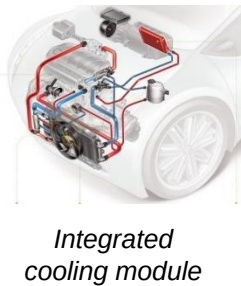
The **lifecycle diagram** models all **operational contexts** of a system, that is to say periods of times where the same stakeholders are interacting with the system



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Operational views – Static elements (2/3)



Lifecycle phase	Use case
Design phase	N/A
Supplier manufacturing phase	UC1: manage unitary tests
Manufacturing phase	UC2: manage integration test UC3: calibrate the integrated cooling module
Transition to use phase	UC3: transport the integrated cooling module
Operating phase	UC4: provide nominal cockpit heating UC5: use in cold conditions UC6: use in hot conditions
....	...

Operational Breakdown Structure

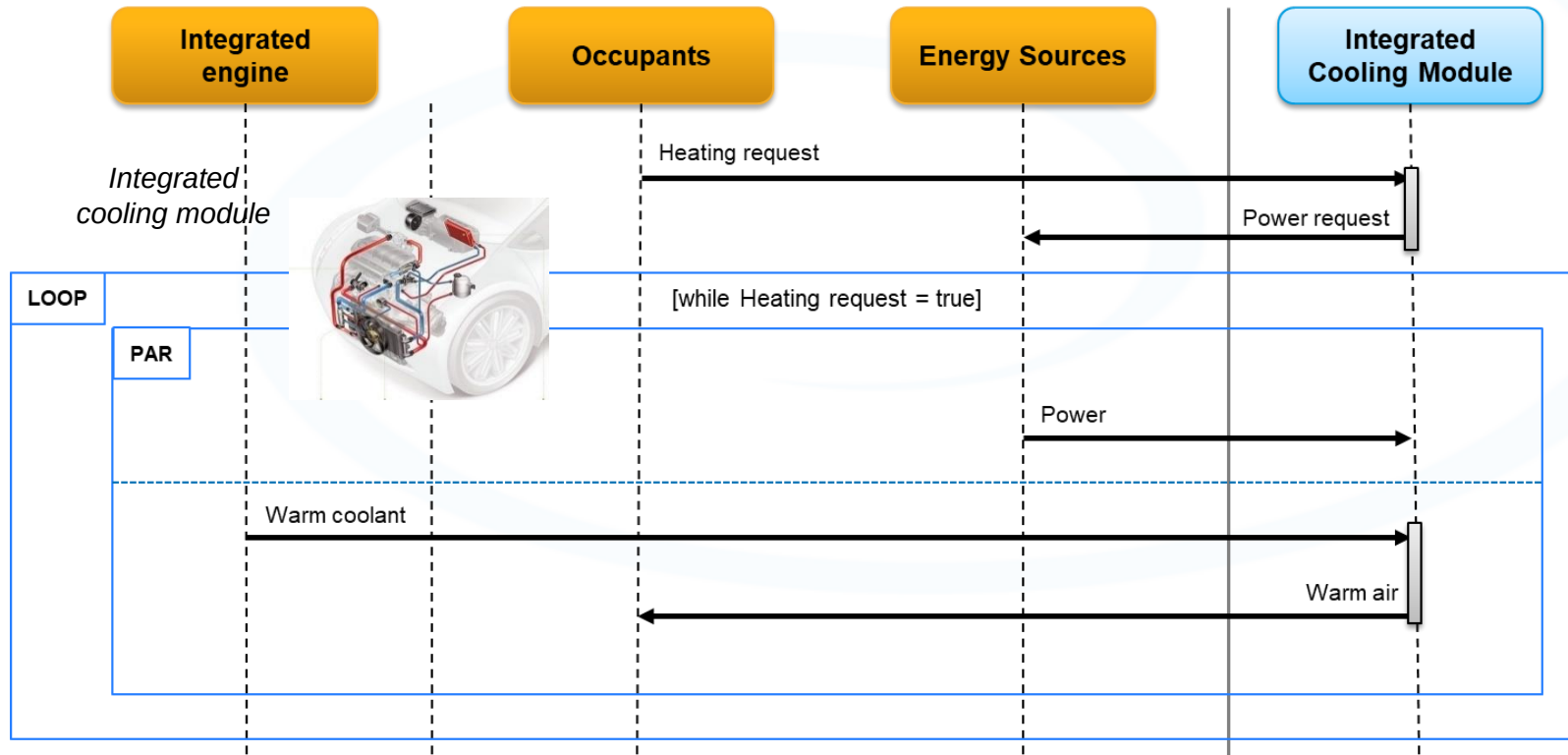
The **operational breakdown structure** represents hierarchically all **use cases** of the system, that is to say all functions of the environment of the system that involve the system



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Operational views – Dynamic behaviors (3/3)



Operational scenario associated with the use case 'Provide nominal cockpit heating'

An **operational scenario** models the **dynamics of a use case**, that is to say the interactions between the stakeholders and the system during this use case

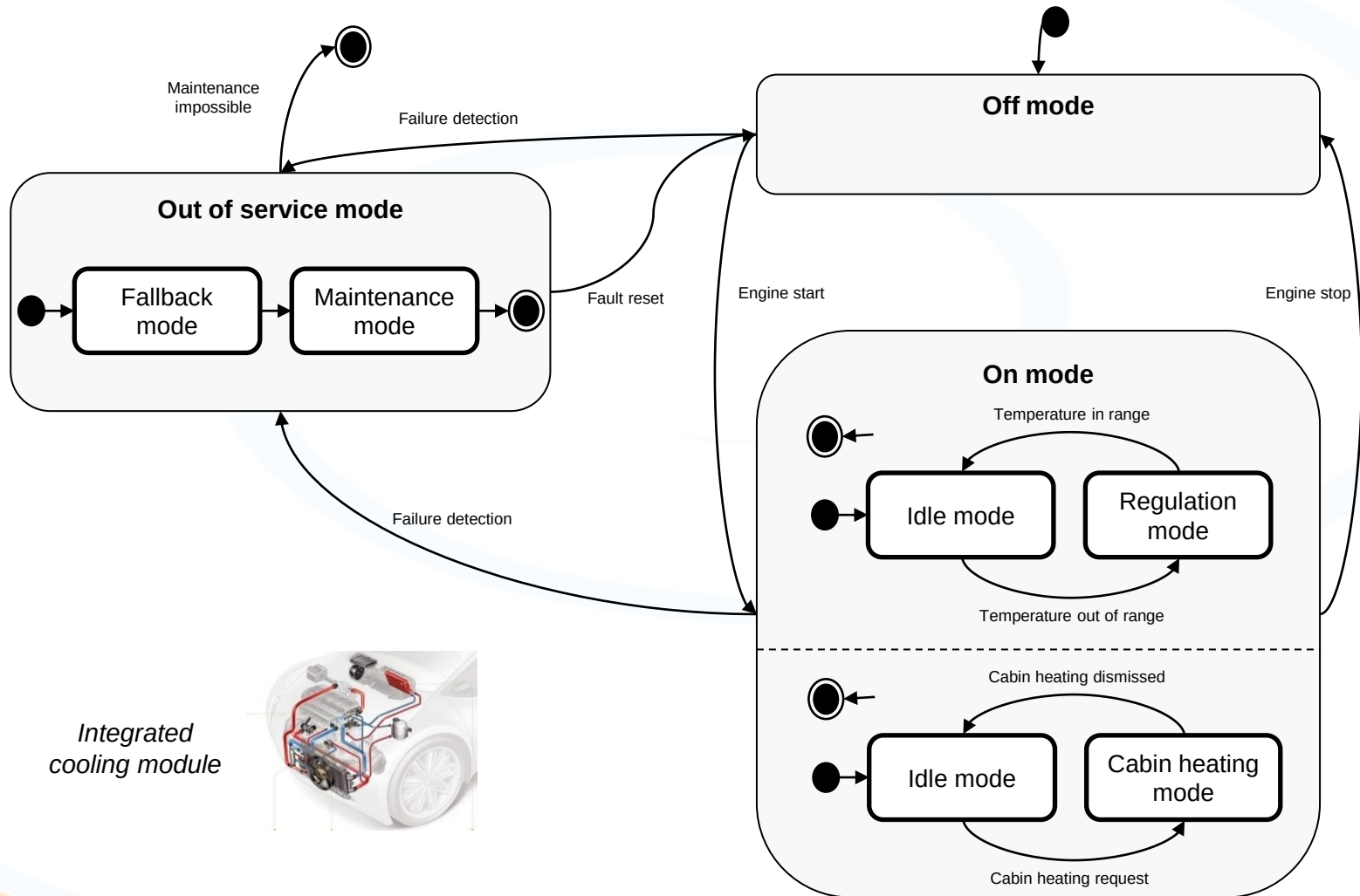


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Functional views – States (1/4)

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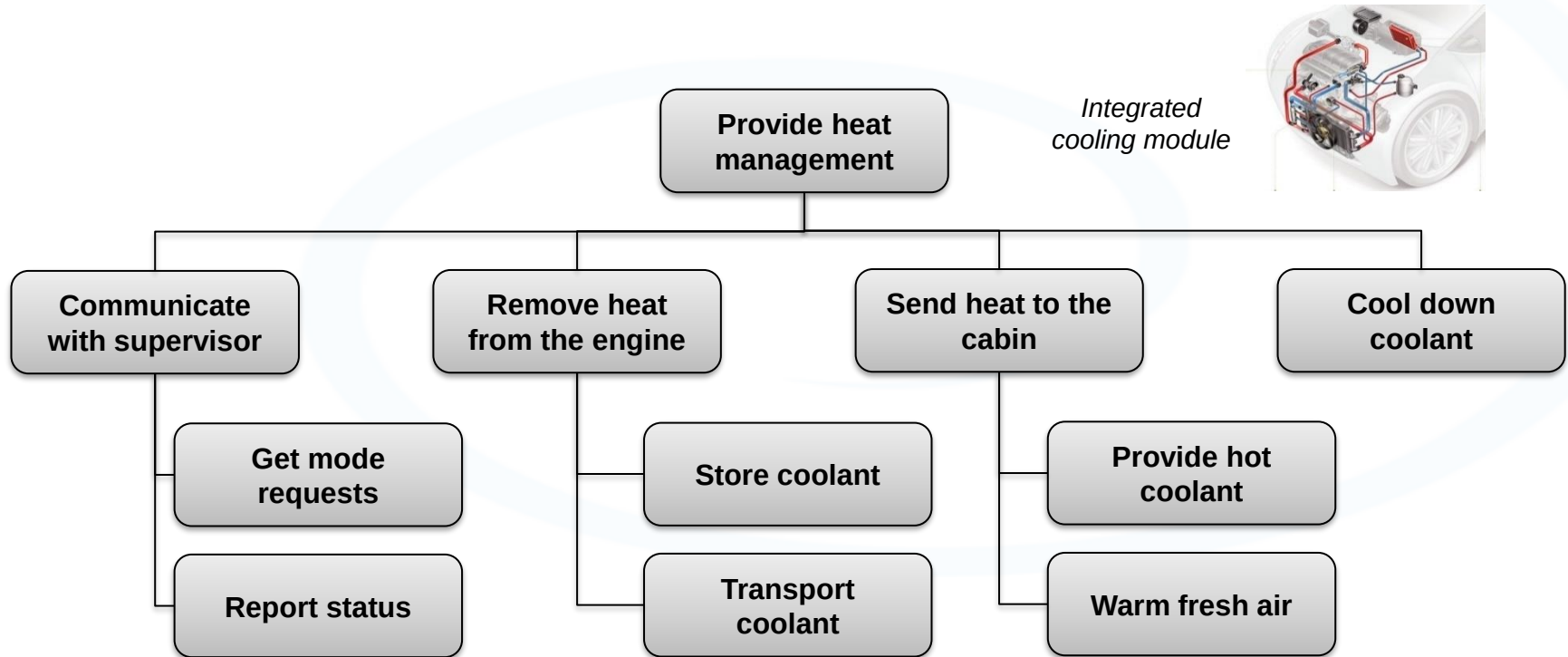
The **functional mode diagram** models all **functional modes** of a system, that is to say periods of times where the same functions are used by the system



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Functional views – Static elements (2/2)



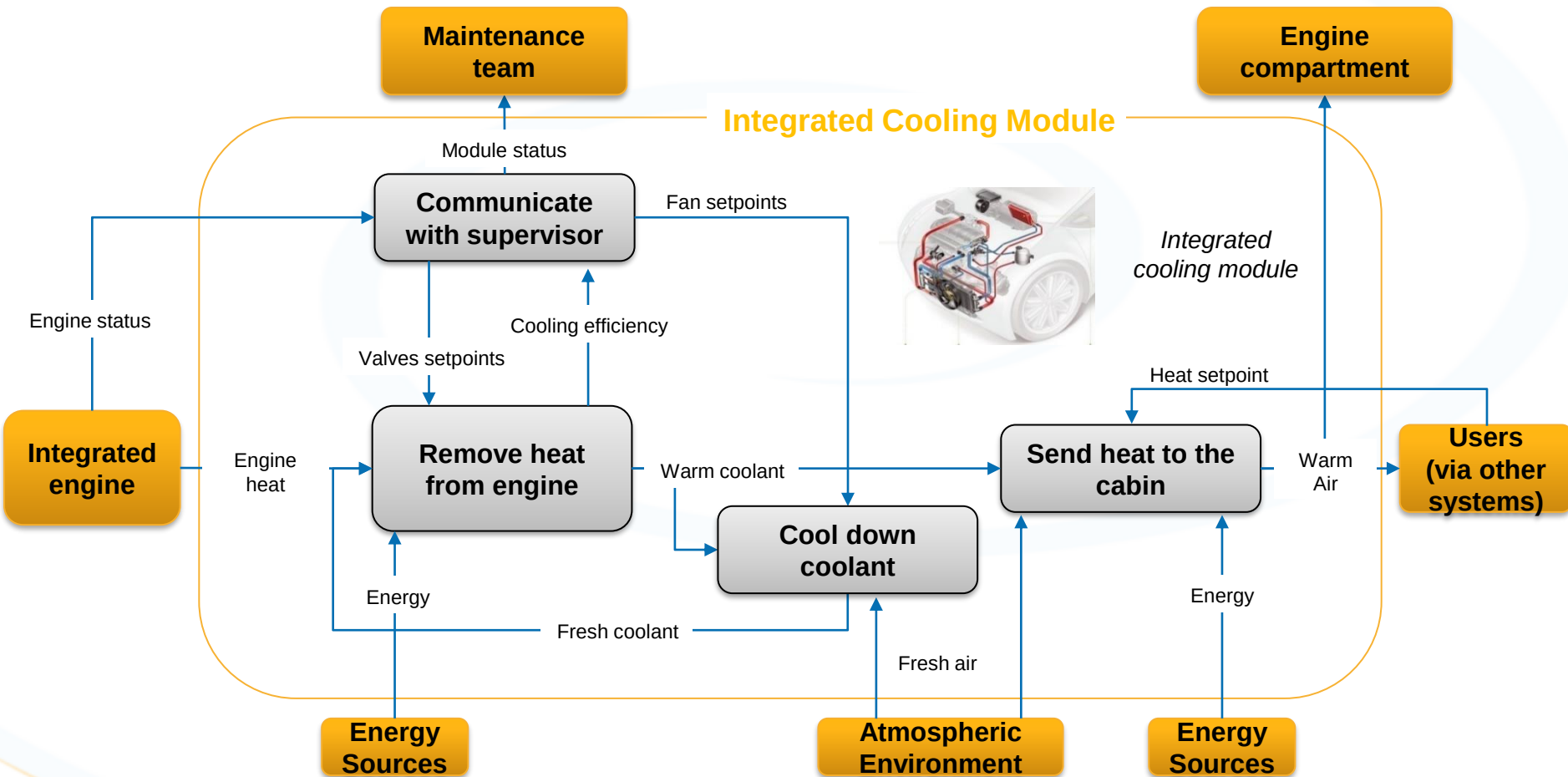
The **functional breakdown structure** represents hierarchically all the functions of a system



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Functional views – Static elements (3/4)



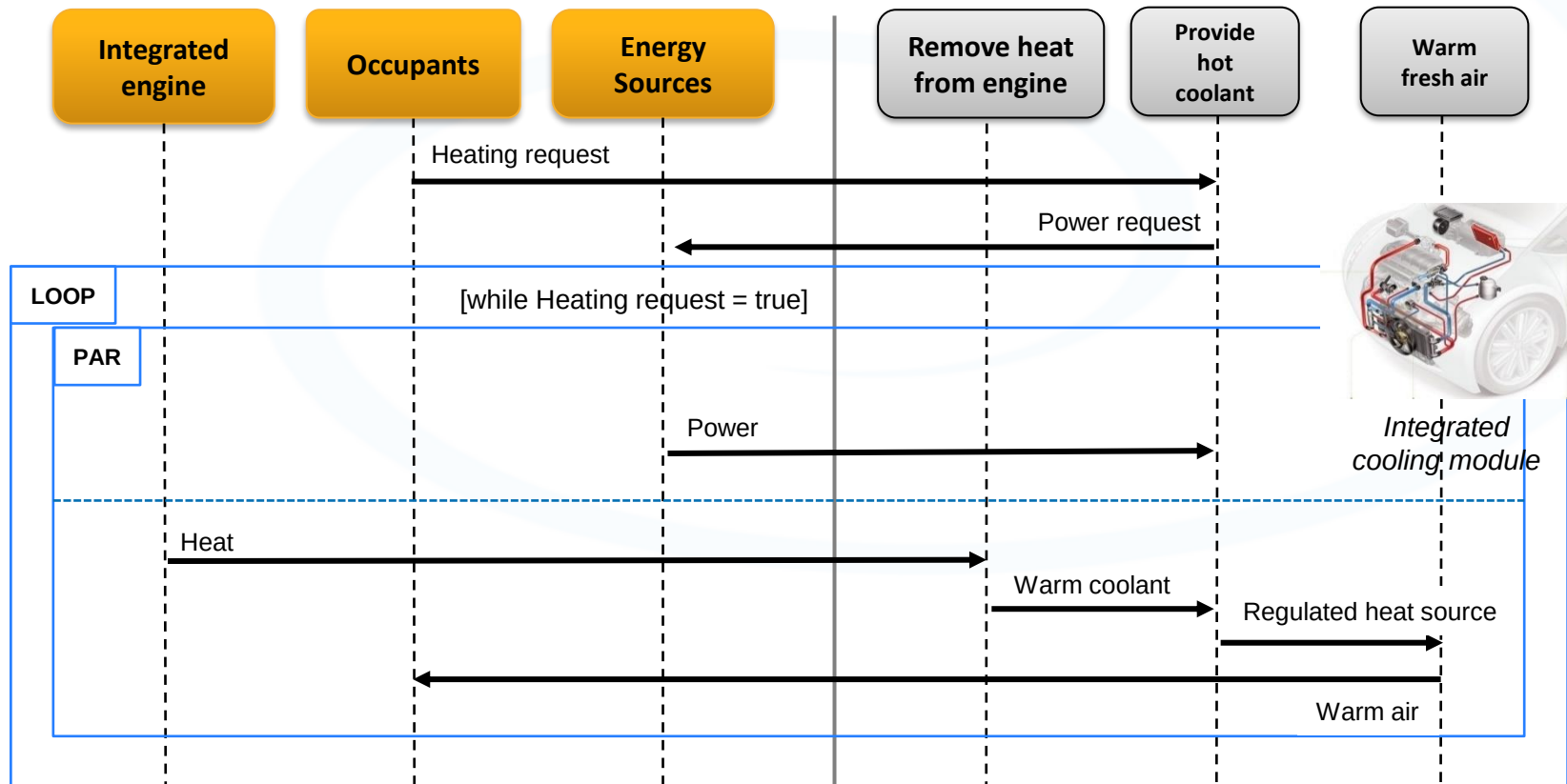
The **functional interaction diagram** represents the interactions between the functions of a system



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Functional views – Dynamic behaviors (4/4)



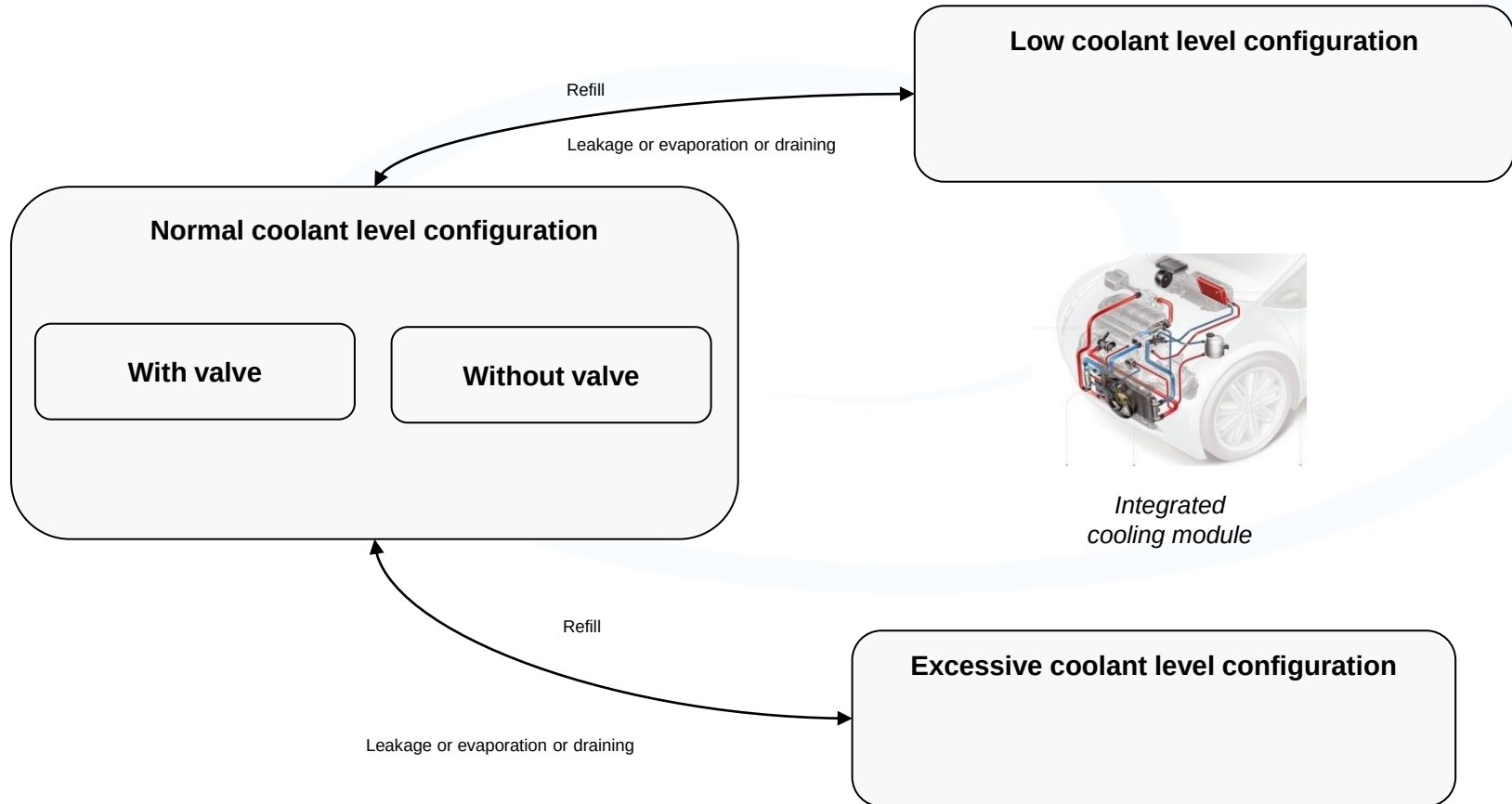
An **functional scenario** models a **functional dynamic**, that is to say the interactions between the stakeholders and the functions during a functional mode



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Constructional views – States (1/4)



The **technical configuration diagram** models all **technical configurations** of a system, that is to say periods of times where the system is formed with the same components

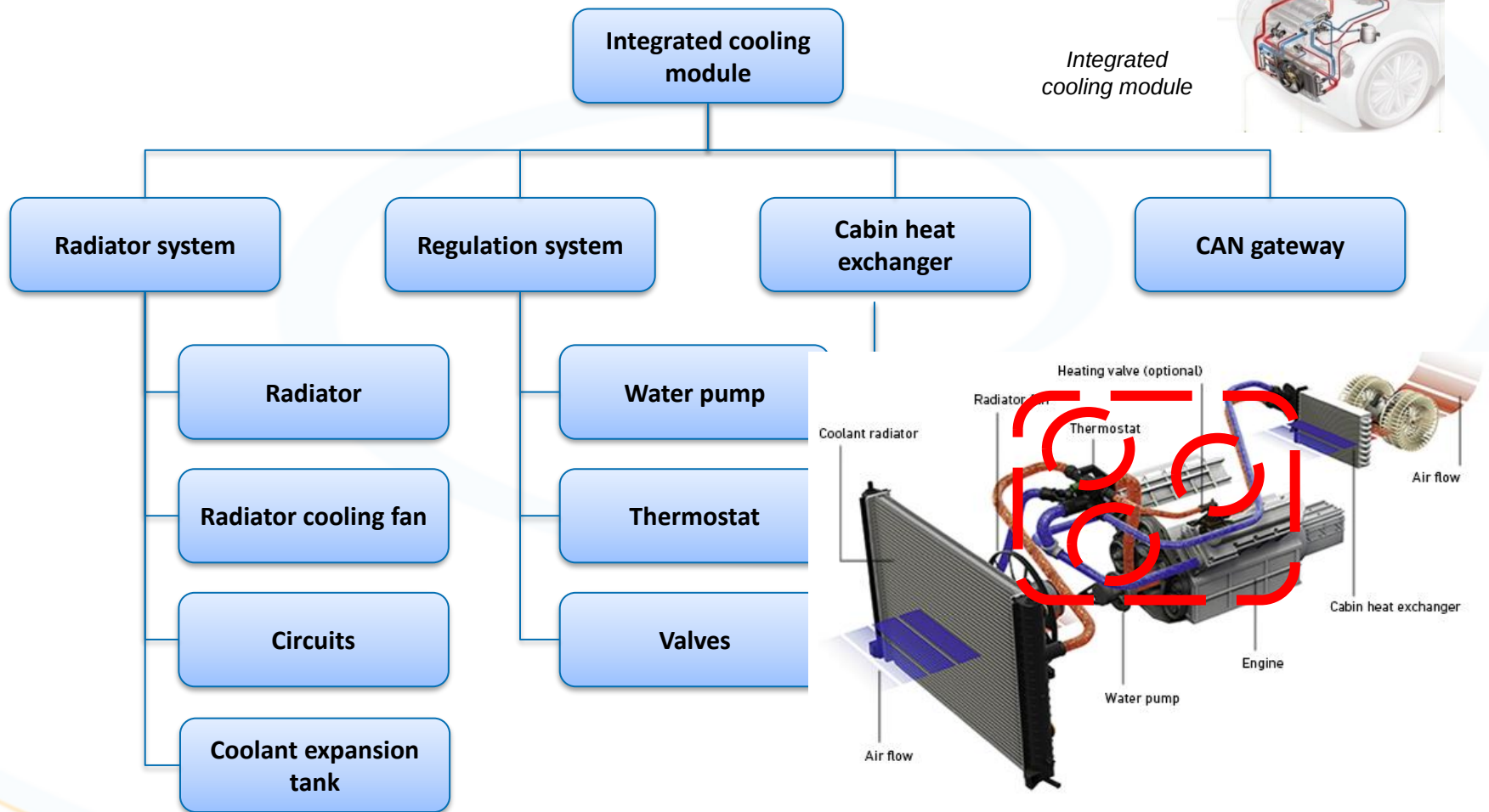


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Constructional views – Static elements (2/4)

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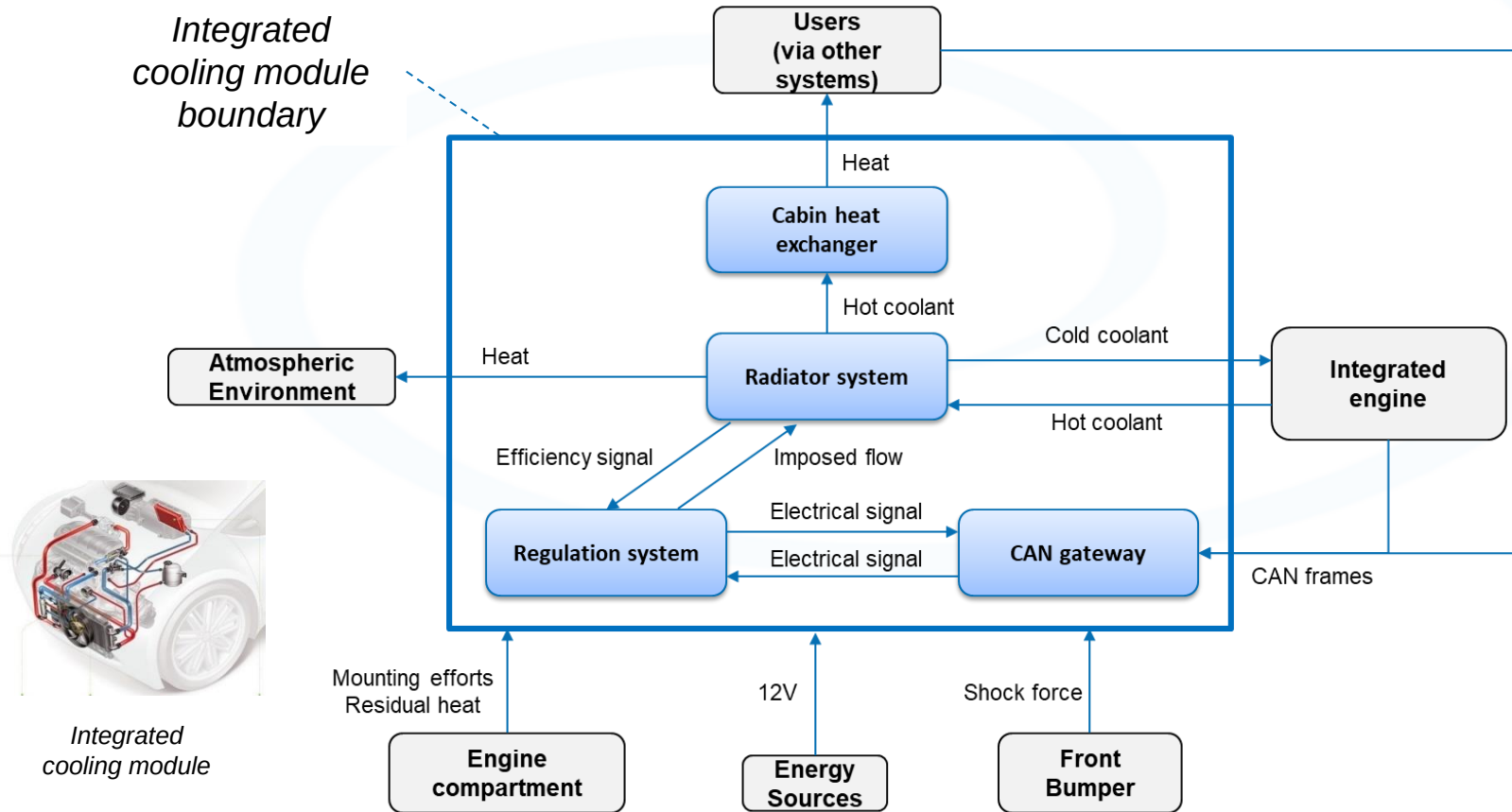
The **constructional breakdown structure** represents hierarchically all the **components** of a system. It is also usually called a product breakdown structure (PBS).



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Constructional views – Static elements (3/4)



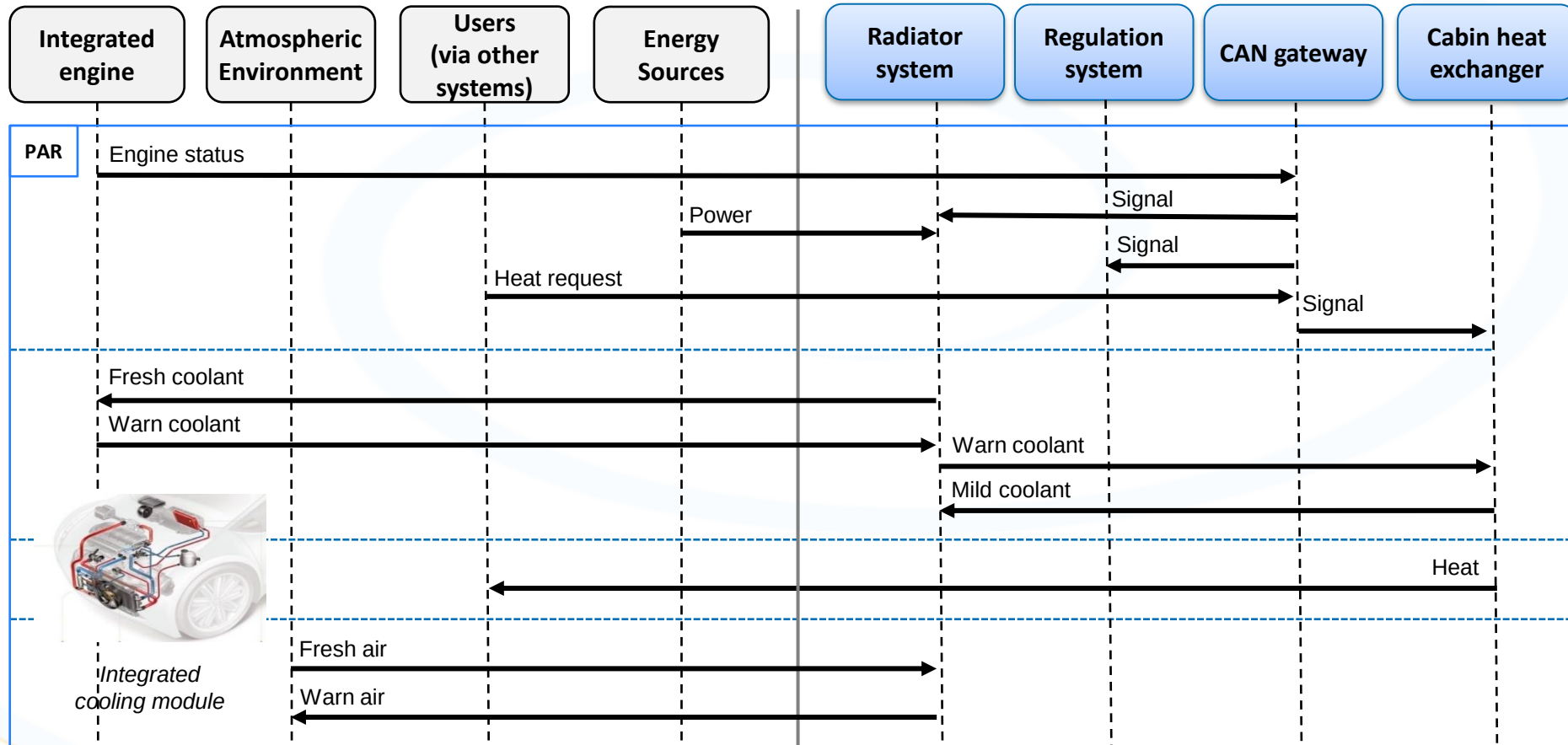
The **constructional interaction diagram** represents the interactions between the components of a system



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Constructional views – Dynamic behaviors (4/4)



A **constructional scenario** models a **constructional dynamic**, that is to say the interactions between the stakeholders and the components during a certain moment of time



C.E.S.A.M.E.S. China

系以思以迈管理咨询(上海)有限公司

WOFE – Share capital: 100,000 € – Business License: 0100000220190903009

Legal Address: 公司上海市黄浦区马当路159号5楼505室 邮编200021

Contact: daniel.krob@cesames.net – Phone: ++ 33 6 60 42 34 49 –

Wechat: daniel-krob



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