# Management of engineering change
# Process map

This process map should be read in the context of the page on the RSSB website on the management of engineering change.



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# Management of engineering change
# Process map

## Introduction:

1. The process map is written primarily for organisations involved in the GB mainline railway system and can be used when the proposer (the organisation introducing the change) has decided to make an engineering change.

2. The engineering change ‘process map’ is made up of a series of pages that use the Unified Modelling Language.

3. The process map illustrates the relationships between elements.  It should not be read as a flowchart.

4. Where appropriate, links to relevant documents and websites have been provided.

## How to read the process map:

Follow the arrows and read the relationship between two elements as a sentence (name, verb, name)

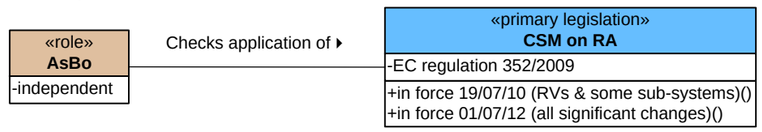
Examples:
1. On page 1 (CSM on Risk Evaluation and Assessment)
“The AsBo checks the application of the CSM on RA”

2. On page 6 (Component assessment process - not interoperability constituents, not novel)
“British Standards, Euronorms and Company Standards are types of Design and Manufacturing Standards”

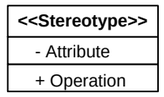
3. On page 8 (Sub-system authorisation process – first authorisation)
“The Technical File is made up of the certificate of verification (from the NoBo), the certificate of verification (from the DeBo) and the safety assessment report”

## Components of the process map:

Example




Each box is called an ‘element’.




A ‘Stereotype’ is used to define the element
An ‘Attribute’ describes the element
An ‘Operation’ shows what the element does

Some elements do not have attributes or operations or both (where further description is not necessary).

## Symbols used in the process map:

◁—— = “is a type of...”

◇—— = “is made up of...”

# Management of engineering change
# Process map

**Stereotypes used in the process map:**

1. Role

2. Legislation:
   i. UK Primary and EU legislation

   ii. UK Regulation (secondary legislation)

3. Process

4. Decision

5. Document

   i. Mandatory document

   ii. Guidance

   iii. Certificate

   iv. File

6. Requirement

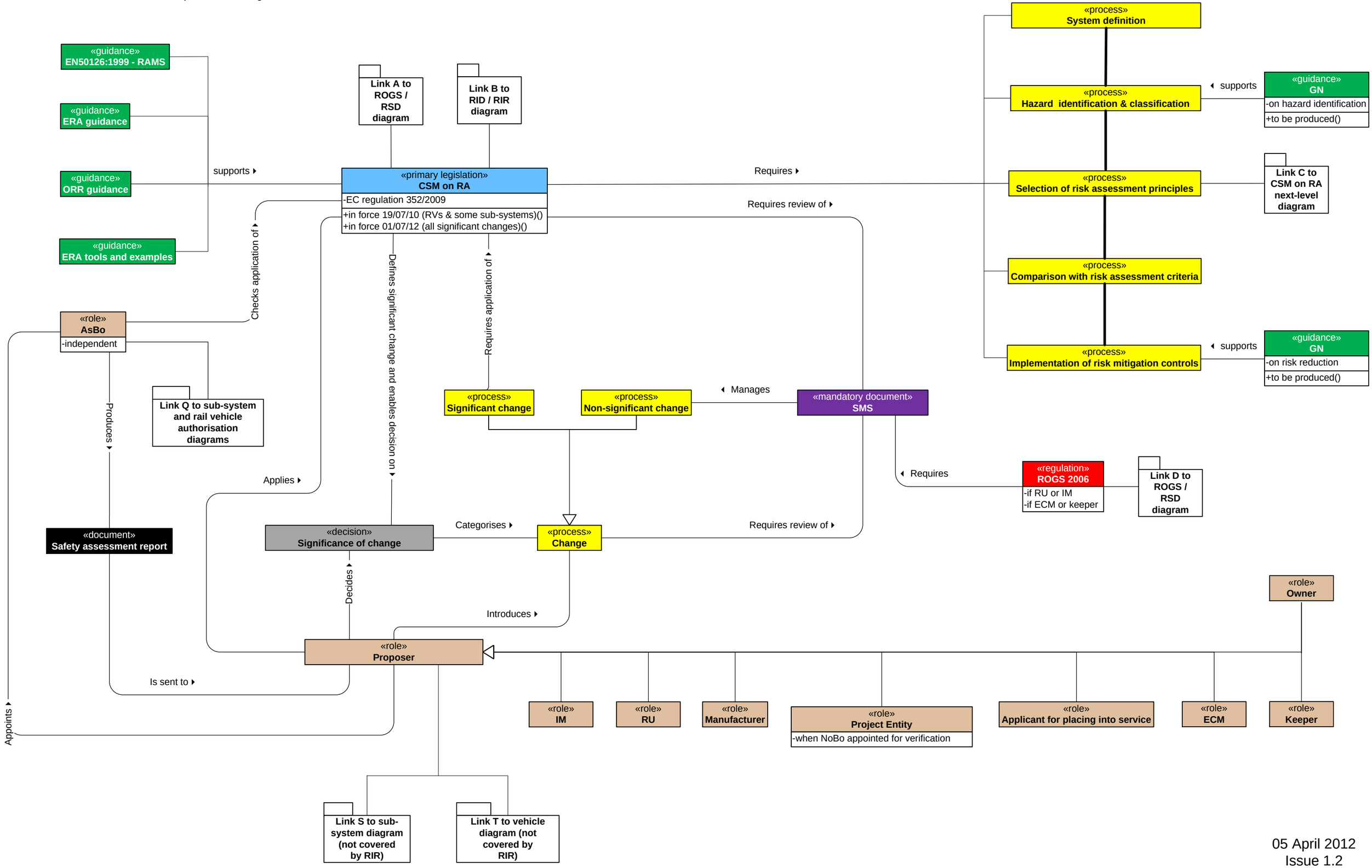
7. Body

**Abbreviations used in the process map:**

AsBo – Assessment Body
ATOC – Association of Train Operating Companies
CDM – Construction (Design and Management) Regulations
CSM on RA – Common Safety Method on Risk Evaluation and Assessment
DeBo – Designated Body
DfT – Department for Transport
EC – European Commission
ECM - Entity in Charge of Maintenance
EN - EuroNorm
ERA – European Railway Agency
GN – Rail Industry Guidance Note
HSAW – Health and Safety at Work Act
HS1 – High Speed 1
IM – Infrastructure Manager
NoBo – Notified Body
NSA – National Safety Authority
NSR – National Safety Rule
NTR – National Technical Rule
ORR – Office of Rail Regulation
RACOP – Rail Industry Code of Practice
RAMS – Reliability, Availability, Maintainability and Safety
RGS – Railway Group Standard
RID – Railways (Interoperability) Directive
RIR – Railways (Interoperability) Regulations
ROGS – Railways and Other Guided Transport Systems (Safety) Regulations
ROSCO – Rolling Stock Company
RSD – Railway Safety Directive
RU – Railway Undertaking
RV – Rail Vehicle
SMS – Safety Management System
SRM – Safety Risk Model
TSI – Technical Specification for Interoperability

# CSM on Risk Evaluation and Assessment

Note: in ROGS, RU is called 'Transport Undertaking'

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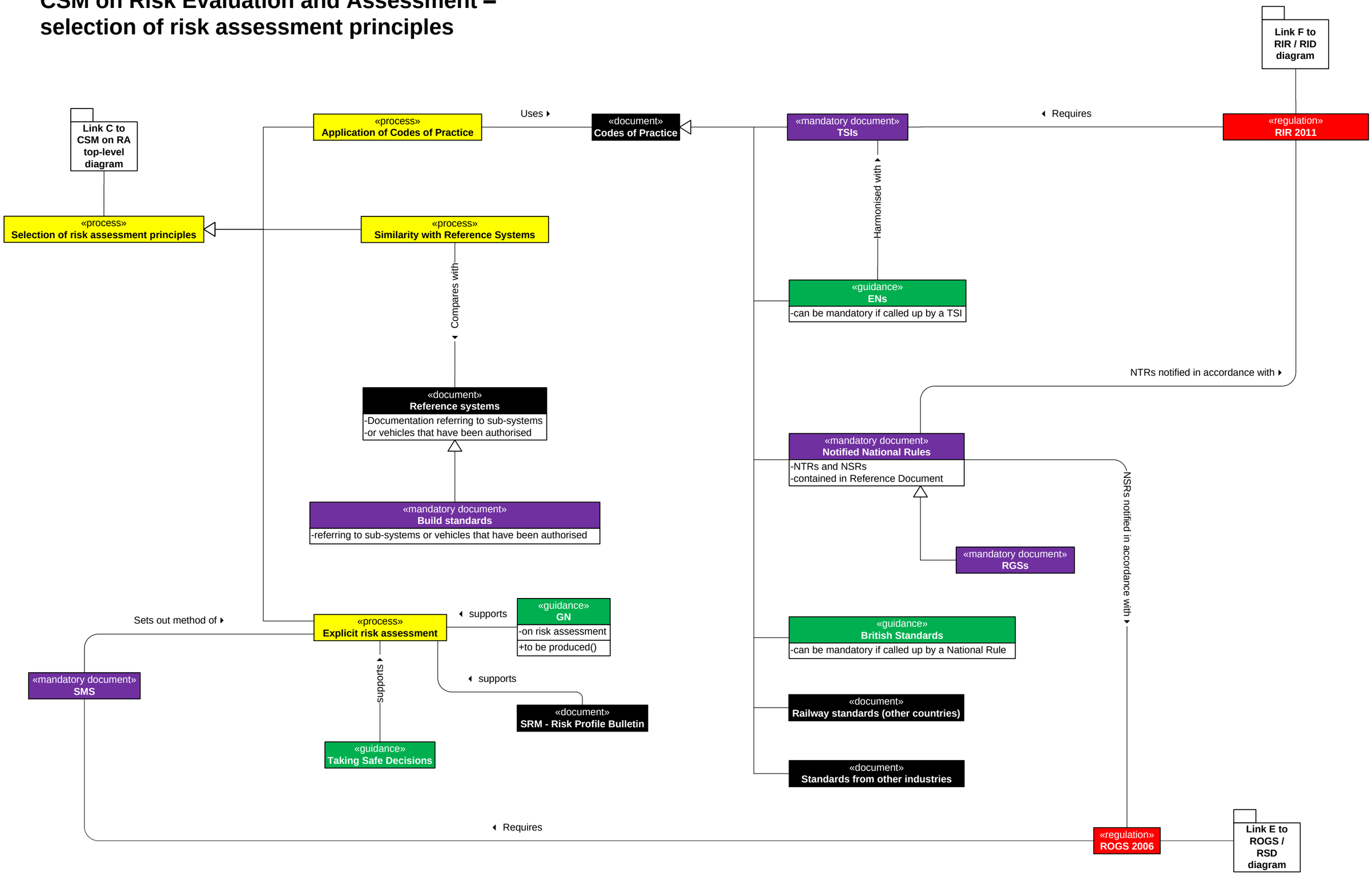
# CSM on Risk Evaluation and Assessment – selection of risk assessment principles

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# ROGS / Railway Safety Directive

Note: in ROGS, RU is called 'Transport Undertaking'

«role»
**IM**

«role»
**RU**

«role»
**Keeper**

«role»
**ECM**

«role»
**Owner**

«role»
**Organisation**
-with responsibilities under ROGS
+operate and manage assets()
+check conformity of products for use in service()
+manage authorisation of products for use in service()

Implements

Constrains

**Link G to RIR / RID diagram**

**Link I to sub-system diagrams**

**Link N to vehicle diagrams**

«process»
**Authorisation of sub-systems and vehicles for placing into service**

«guidance»
**Guidance on HSAW act**
-issued by HSE

Supports

«primary legislation»
**HSAW Act**

Enacts

«European legislation»
**RSD**
-Directive 2004/49/EC

Is transposed into UK law by

«guidance»
**ORR guidance**

Supports

«guidance»
**RSSB guidance**
-ROGS regulation 22

Supports

**Link D to CSM on RA top-level diagram**

**Link E to CSM on RA 2nd-level diagram**

Complies with

«process»
**Safety verification**

Supports

«guidance»
**ORR guidance**

Requires

**Link P to vehicle (not RIR) diagram**

**Link J to sub-system (not RIR) diagram**

Checks

«process»
**Authorisation/certification of operations**
-by ORR

**Link R to component (not IC) diagrams**

«regulation»
**ROGS 2006**

Requires

«mandatory document»
**SMS**

Checks duty holders' compliance with

«role»
**NSA**
-ORR in UK

Requires

Supports

Compliance supports

Requires review of

«role»
**Member State**
-DfT in UK

Manages notification of

«mandatory document»
**NSRs**
-on GB mainline railways

«guidance»
**ERA Guidance**

«regulation»
**CDM regulations**
-infrastructure projects only

«primary legislation»
**CSM on RA**
-application of CSM on RA

**Link A to CSM on RA top level diagram**

«mandatory document»
**HS1 standards**
-on HS1 only
-notified as NSR

«mandatory document»
**NR standards**
-on GB mainline only
-notified as NSR

«mandatory document»
**ATOC standards**
-on GB mainline only
-guidance if not notified as NSR

«mandatory document»
**RGSs**
-on GB mainline only
-notified as NSR

Supports

«guidance»
**Associated documents**
-GNs and RACOPs

«mandatory document»
**C06/OS/09/1200**
-issue 2, 24/02/09
-process for the assessment of route level compatibility
-on HS1 only

«mandatory document»
**GE/RT8270**
-process for the assessment of route level compatibility
-on GB mainline only

Supports

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# Railway Interoperability Regulations / Railway Interoperability Directive sub-systems and vehicles only

**Link O to vehicle diagrams**

**Link L to sub-system diagrams**

«role»
**Project Entity**

«role»
**Applicant for placing into service**

**Link M to vehicle diagrams**

**Link F to CSM on RA 2nd-level diagram**

**Link H to component (IC) diagram**

«European legislation»
**RID**
-Directive 2008/57/EC
-as amended by Directive 2011/18/EC
-as interpreted by Recommendation 2011/217/EU

Is transposed into UK law by

Complies with

«guidance»
**DfT explanatory memoradum**

supports

«regulation»
**RIR 2011**

**Links to other diagrams**

**Link K to sub-system diagrams**

«guidance»
**DfT Helpnotes**

supports

requires production of

Requires notification of

«mandatory document»
**ATOC standards**
-on GB mainline only
-guidance if not notified as NTR

«mandatory document»
**NR standards**
-on GB mainline only
-notified as NTR

«mandatory document»
**HS1 documents**
-on HS1 only
-notified as NTR

«mandatory document»
**RGSs**
-on GB mainline only
-notified as NTR

Supports

Defines

«mandatory document»
**TSIs**

harmonised with

«guidance»
**ENs**
-can be mandatory if called up by TSI

Used to demonstrate achievement of

«mandatory document»
**NTRs**
-supports UK Specific Cases in TSIs
-fills open points in TSIs
-supports derogation from TSIs
-defines compatibility with existing rail network

manages notification of

«role»
**Member State**
-DfT in UK

«guidance»
**Associated documents**
-GNs and RACOPs

«requirement»
**Essential Requirements**

Defines

checks compliance with

Checks

«process»
**Verification of interfaces**
-RIR regulation 17 para 2b

«process»
**Verification of sub-systems and vehicles**
-requirement for technical compatibility at European level

Checks

«process»
**Safe integration**

Demonstrated by application of

«primary legislation»
**CSM on risk evaluation and assessment**

**Link B to CSM on RA top-level diagram**

provides for

**Link G to ROGS / RSD diagram**

«process»
**Authorisation of sub-systems and vehicles for placing into service**

Requires

«process»
**Authorisation/certification of operations**
-by ORR

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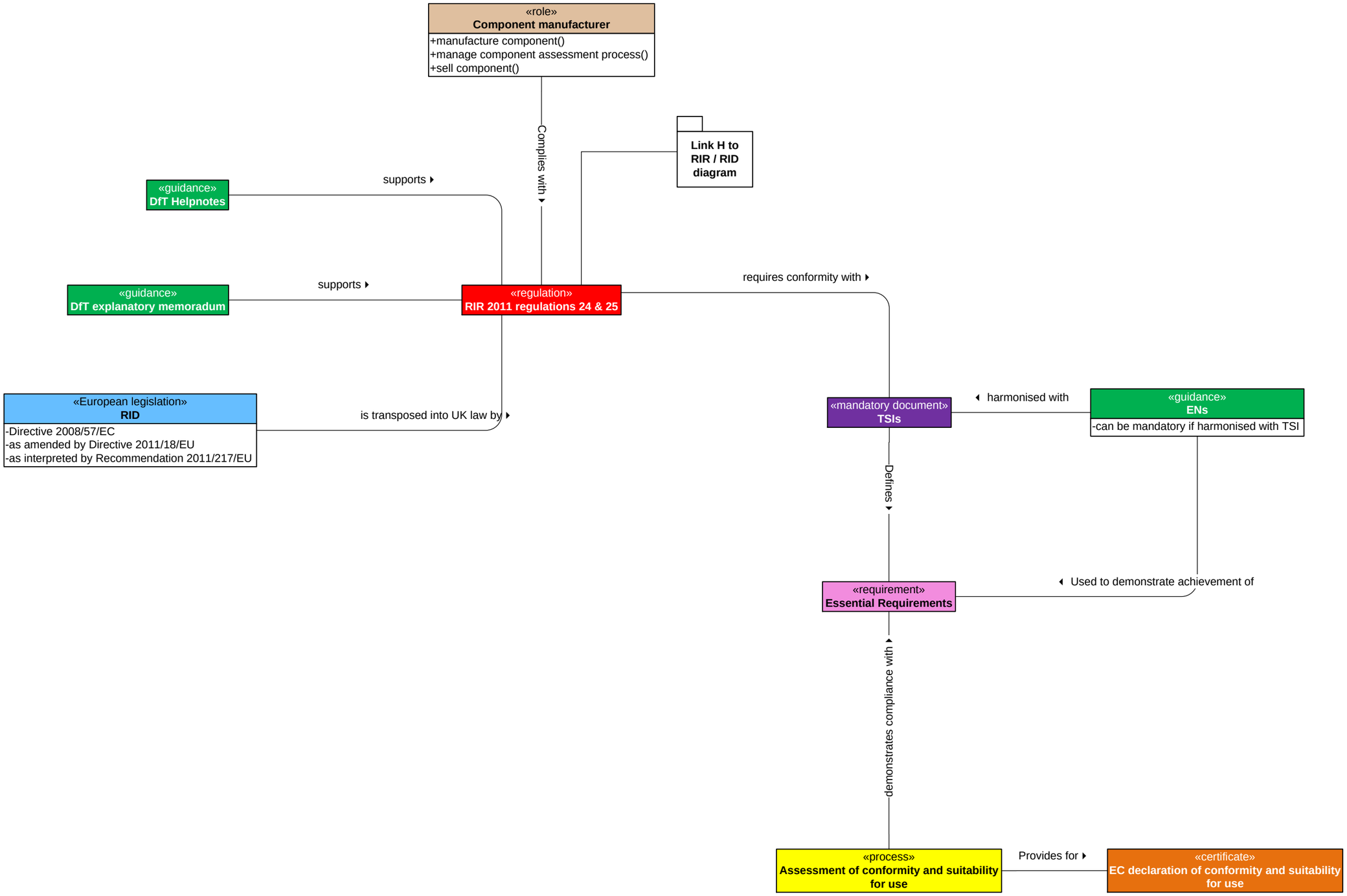
# Component assessment process – Interoperability constituents

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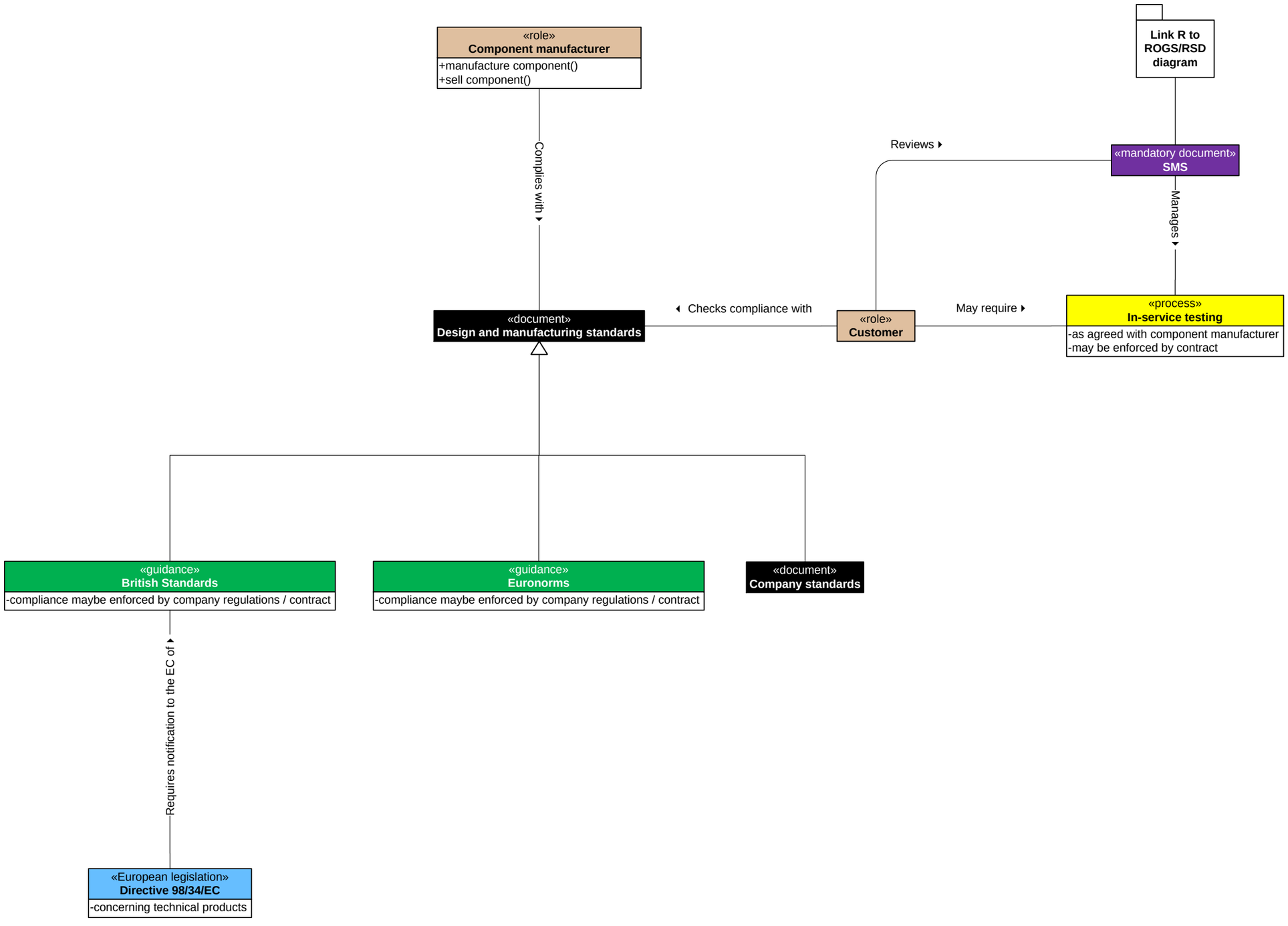
# Component assessment process -
# not interoperability constituents, not novel

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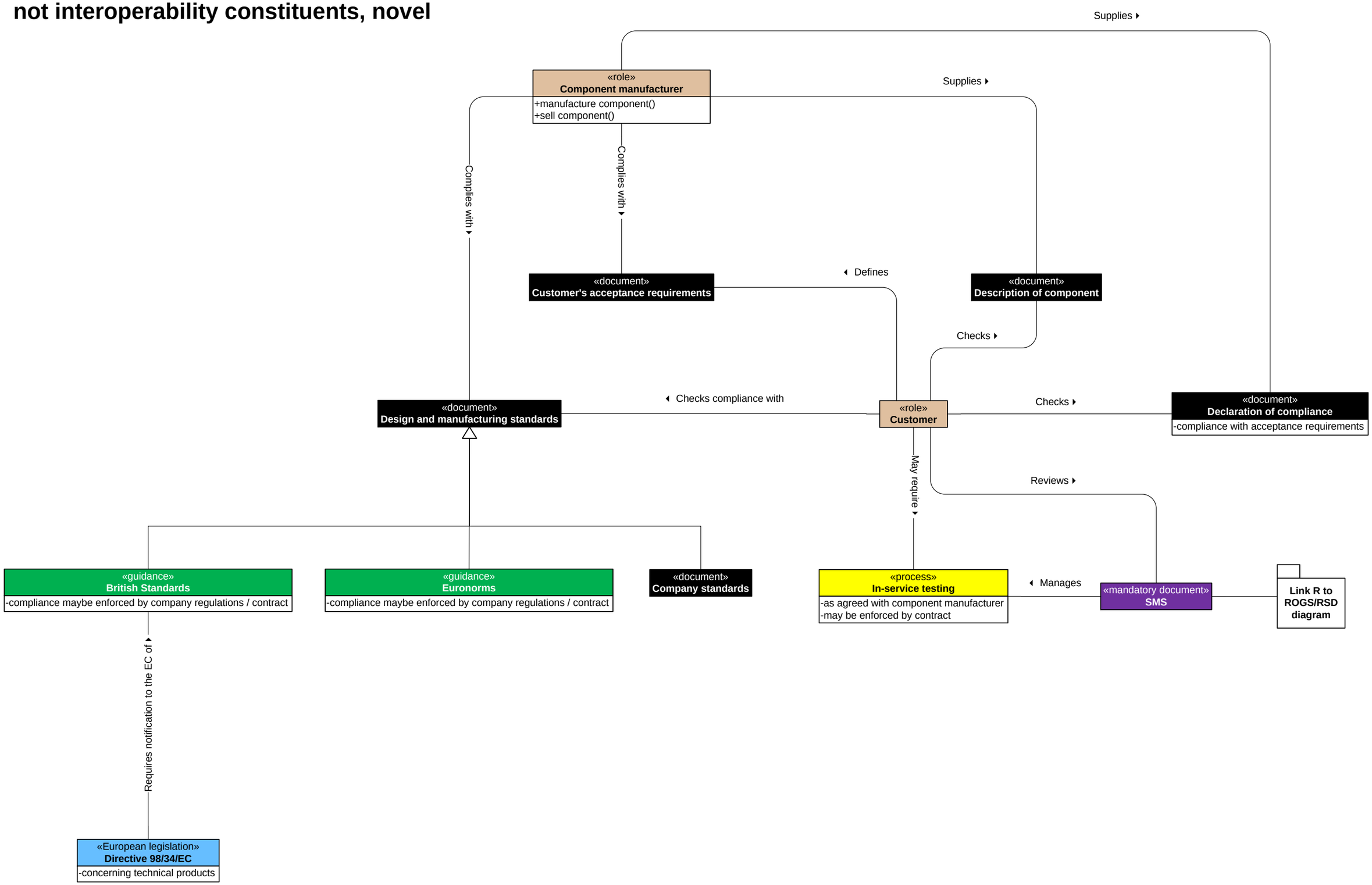
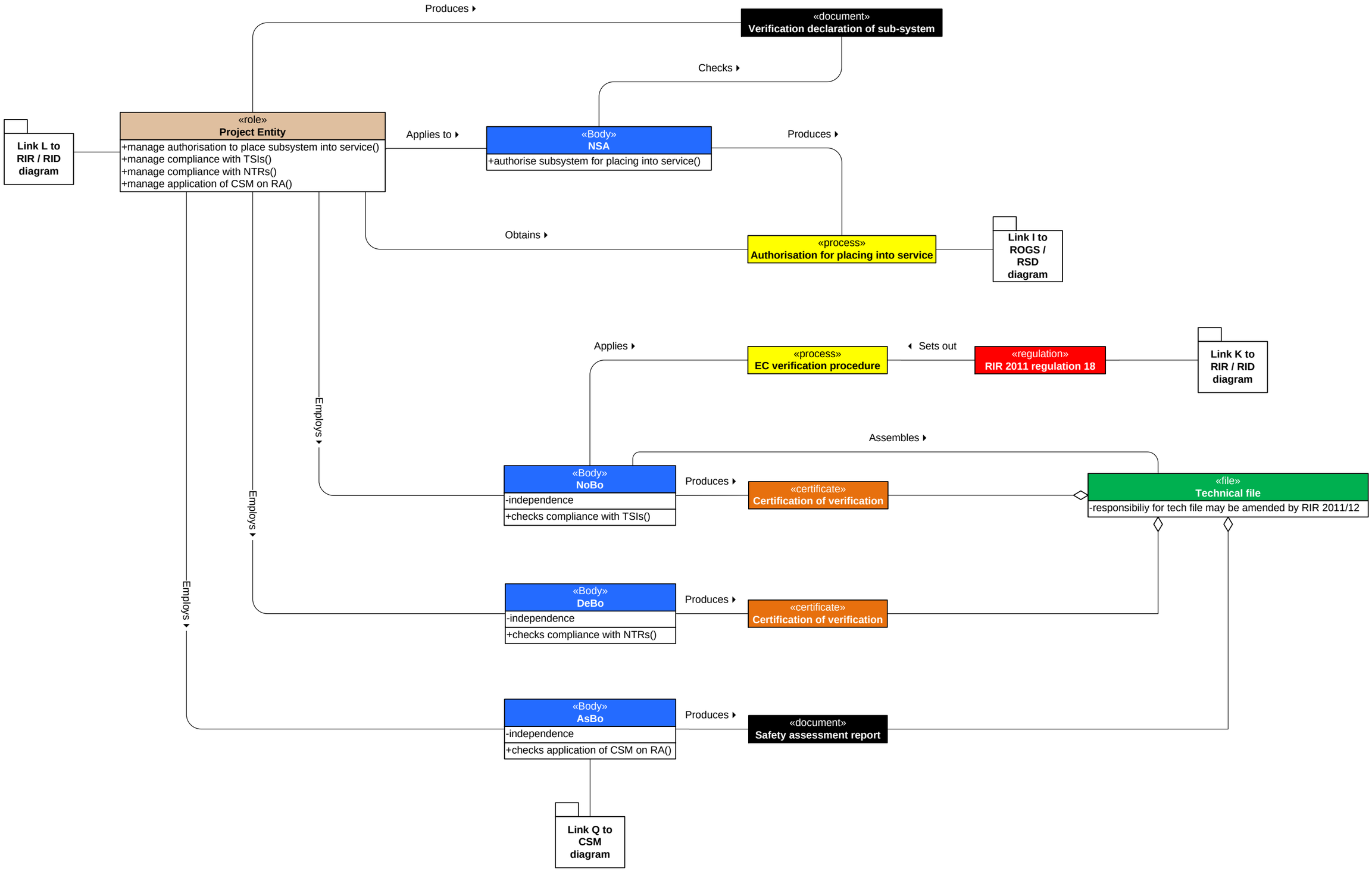
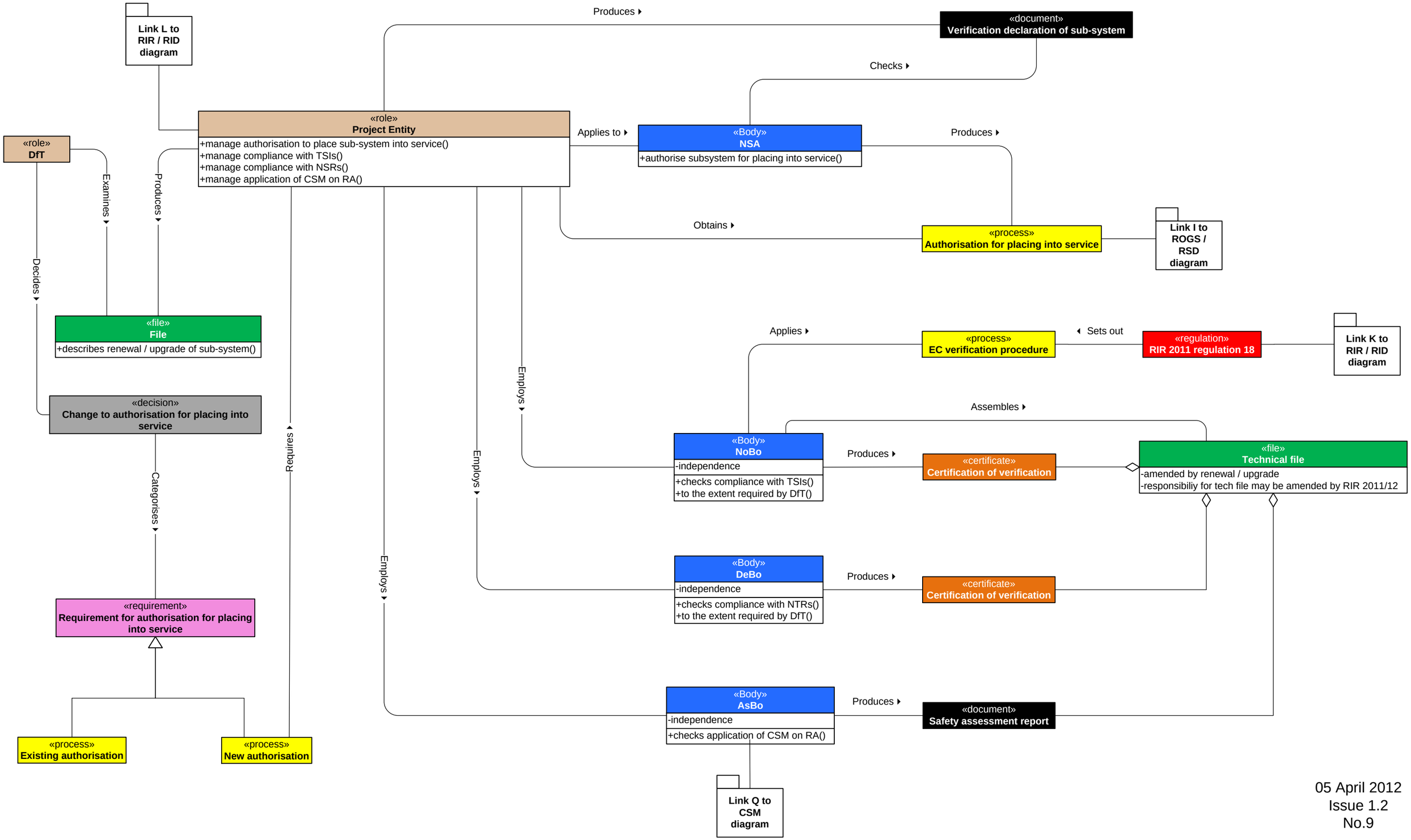
# Component assessment process - not interoperability constituents, novel



# Sub-system authorisation process – first authorisation (of a <u>new</u> sub-system)



# Sub-system authorisation process – renewal & upgrading

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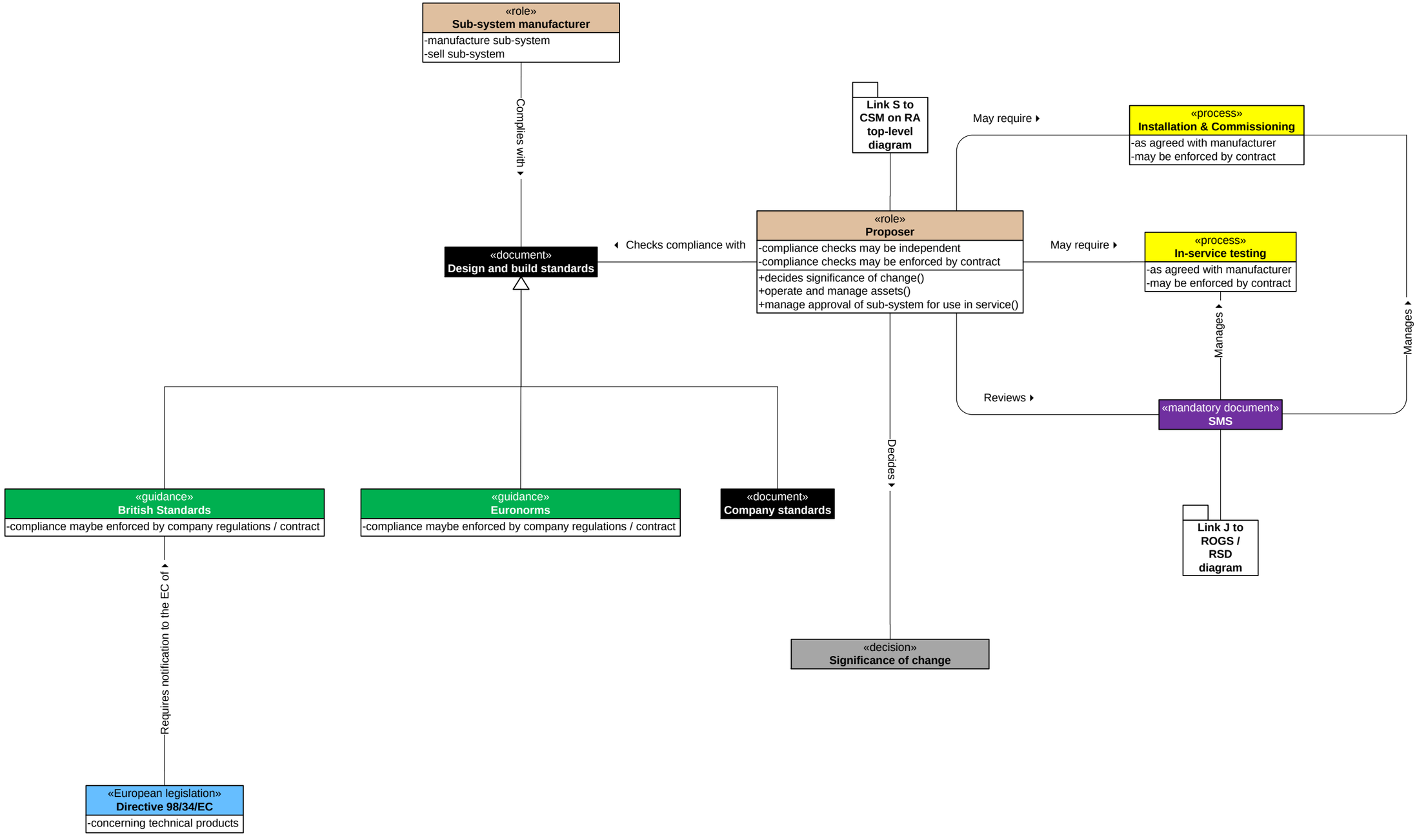
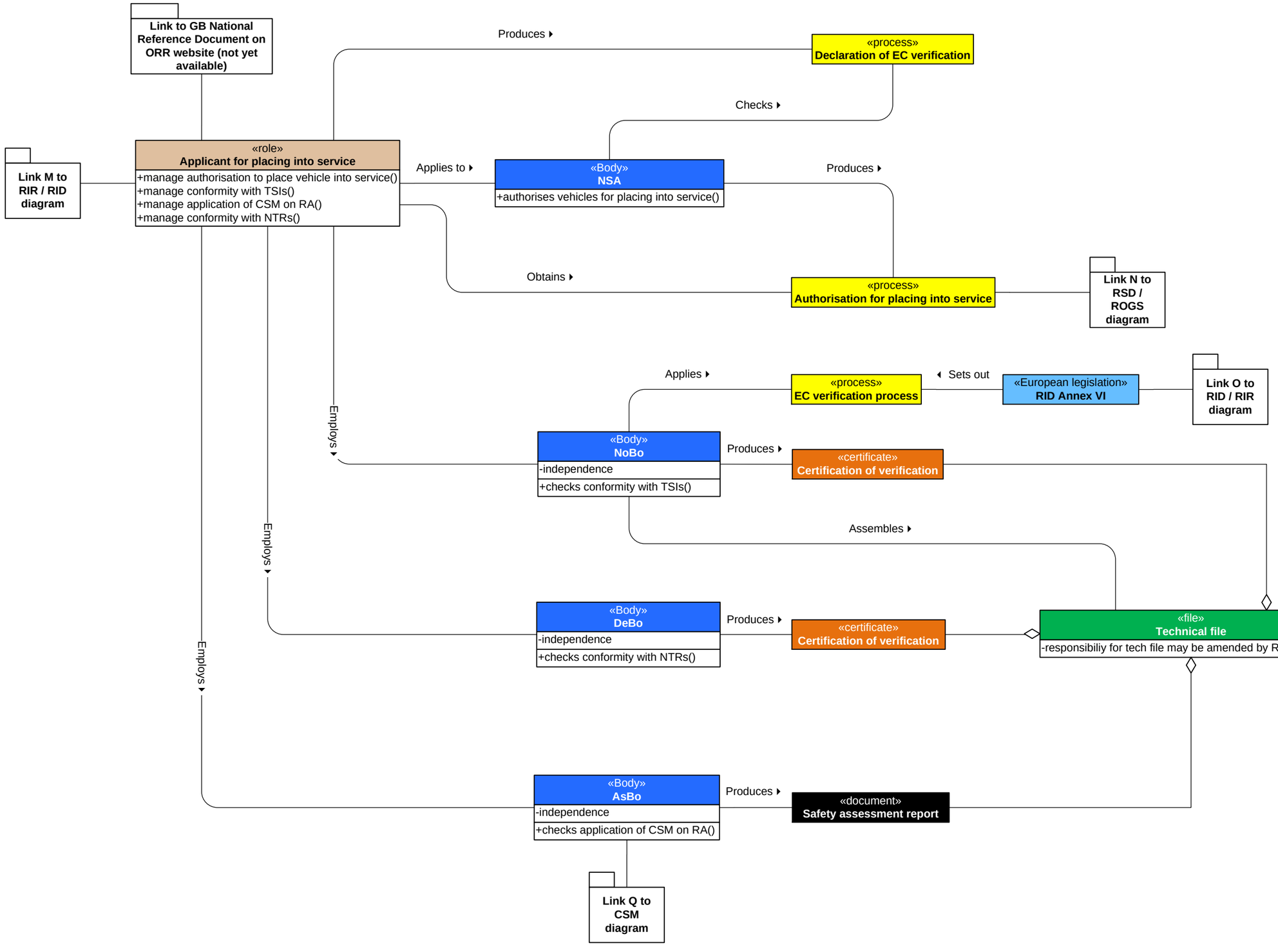
# Sub-system approval process - not covered by RIR



# Rail vehicle authorisation process –
# First authorisation (of a <u>new</u> vehicle)

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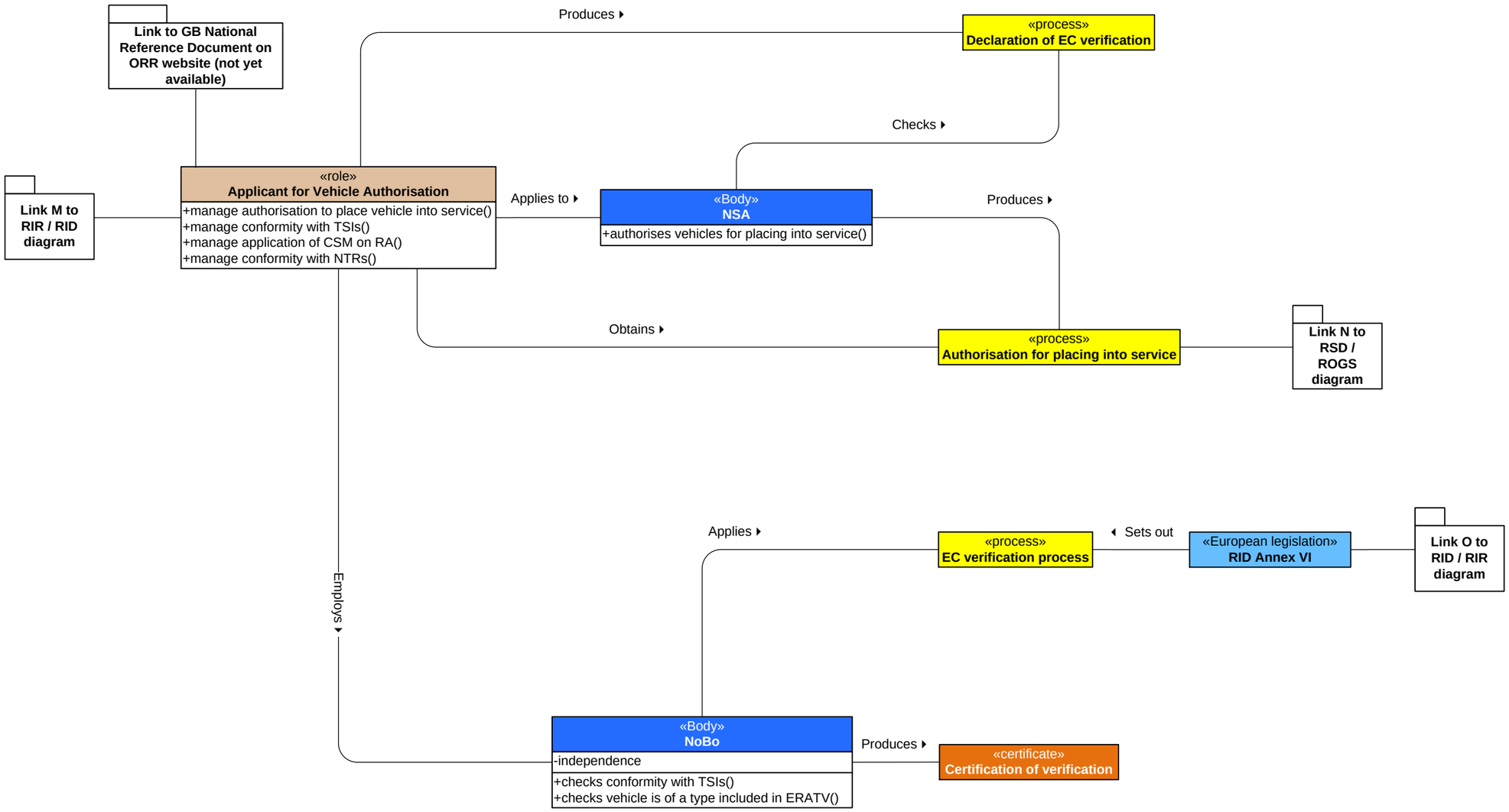
# Rail vehicle authorisation process – Subsequent authorisation (of vehicles conforming to an authorised vehicle type)

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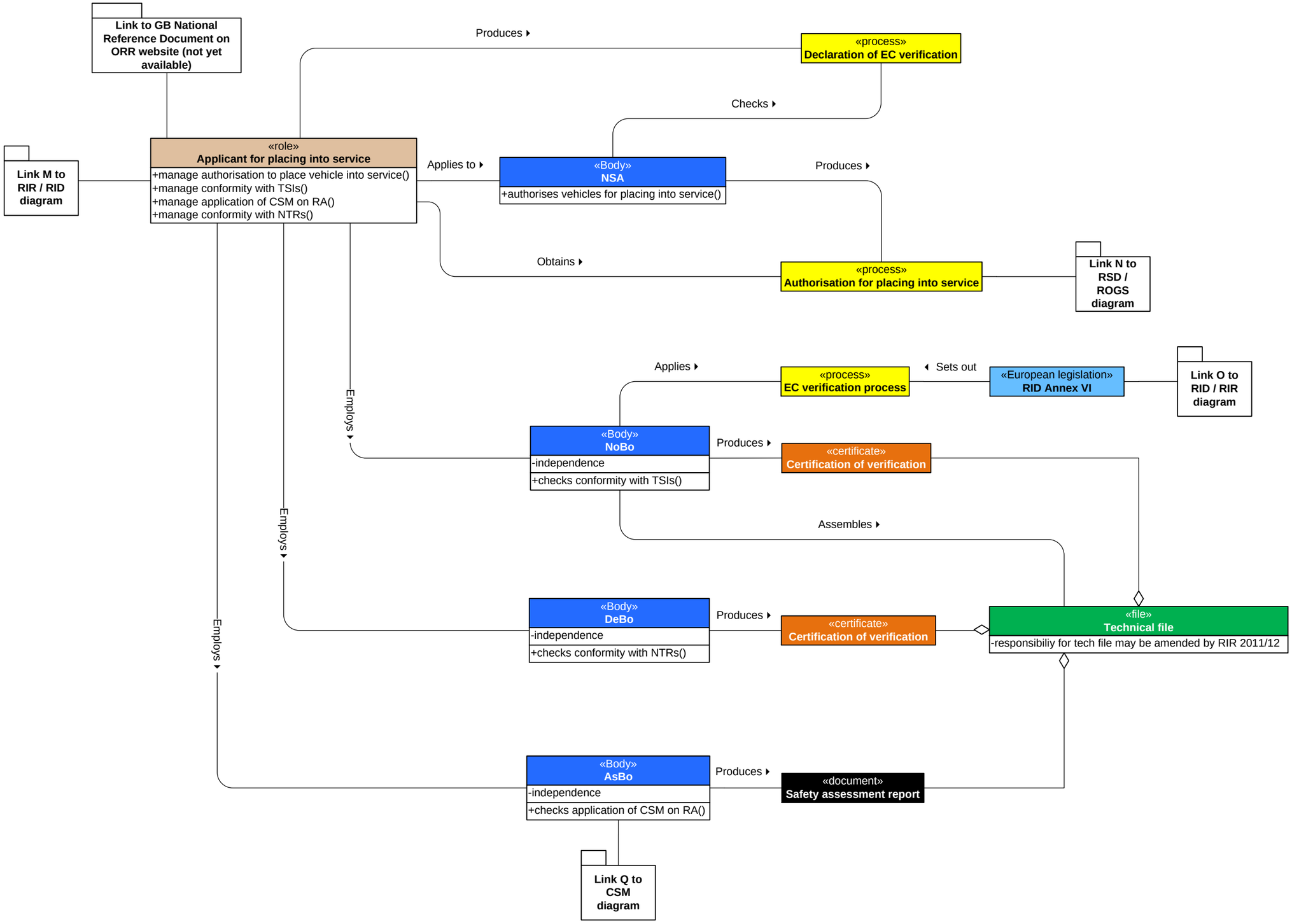
# Rail vehicle authorisation process – Renewed authorisation (of a type authorisation that is not valid anymore)

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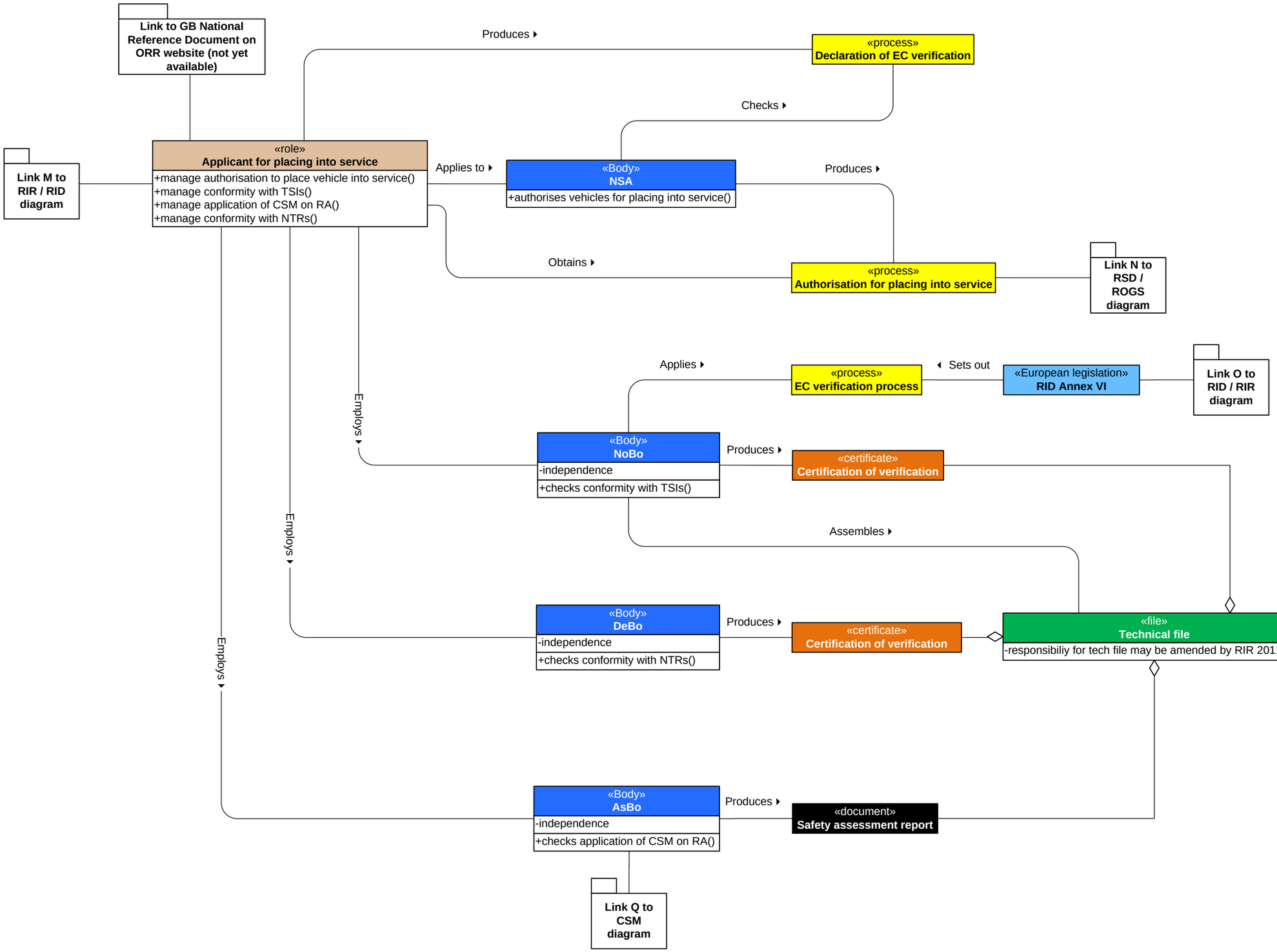
# Rail vehicle authorisation process –
# Additional authorisation (of vehicles already authorised in another EU MS)

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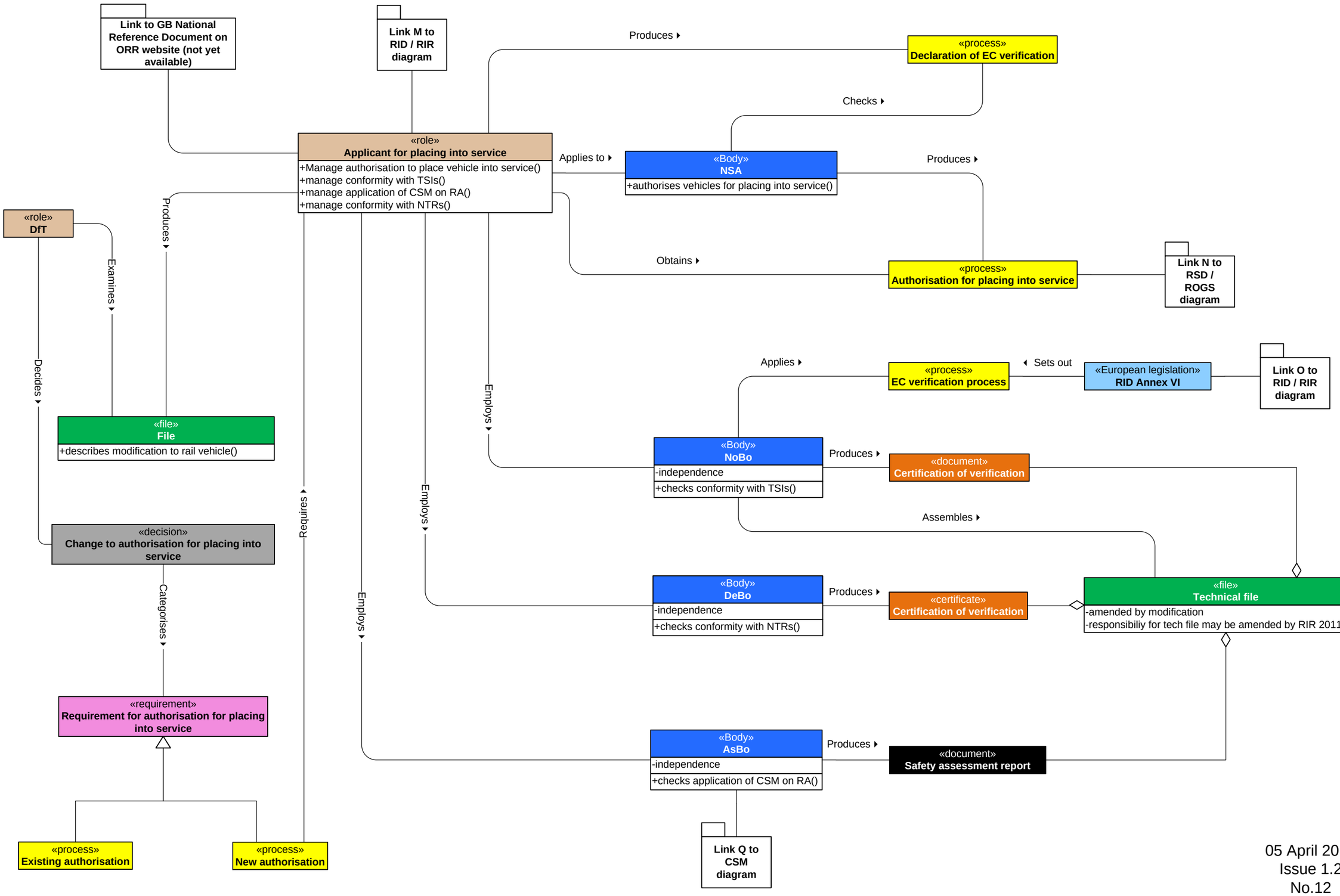
# Rail vehicle authorisation process –
# ‘New’ authorisation (of a modified vehicle or vehicle type)

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# Rail vehicle approval process – not covered by RIR