



Ficha:

Nome: Apresentação sobre MBSE 4.0

Local: INPE

Data: 2018-07-16 - 09h30 → 10h30

Público Alvo: Alunos de Graduação - Multidisciplinares

The background of the slide is a photograph of Earth from space, showing the curvature of the planet and a bright horizon. A white shield-shaped logo containing a blue snowflake is positioned in the upper left corner.

Curso de Inverno 2018
Introdução às Tecnologias Espaciais

10 a 26 de julho

<http://www.inpe.br/ci-2018/>



MBSE 4.0

Prof. Dr. Christopher Shneider Cerqueira

Divisão de Engenharia Aeronáutica e Aeroespacial do ITA

christopher@cscerqueira.com.br / cscerqueira.com.br

Resumo

Engenharia de Sistemas? 



Linguagem?

MBSE? 

I4.0 e Games? 

MBSE 4.0 ????

Homunculus de Penfield





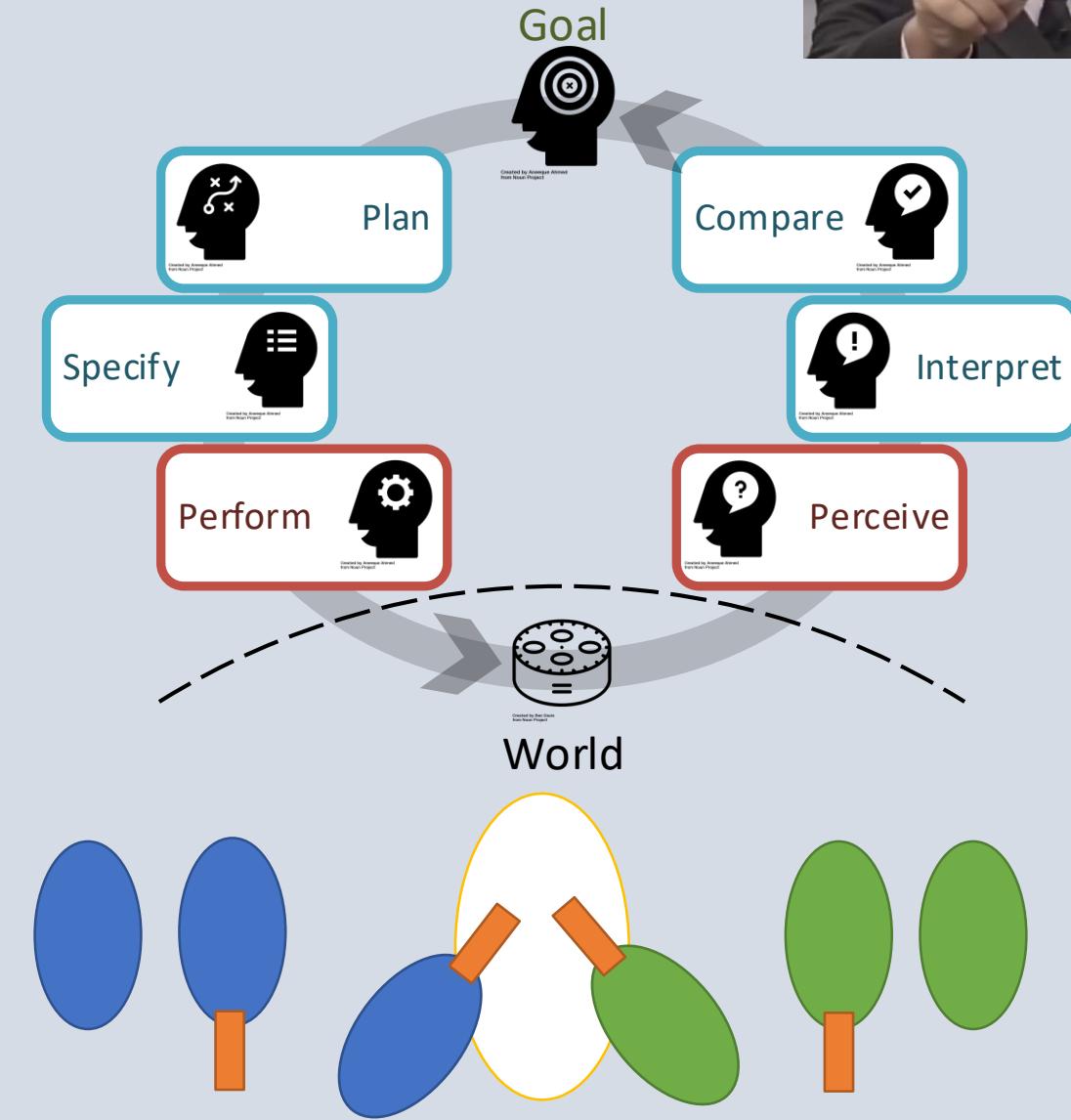
SYSTEMS ENGINEERING

Cognição e Linguagem

Cognition is "*the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses*".

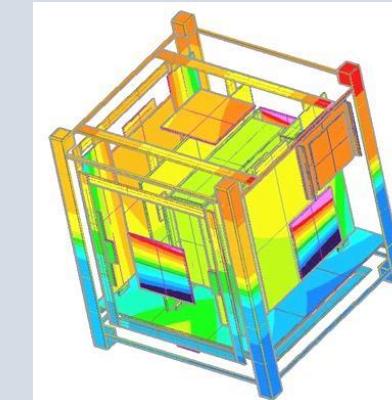
It encompasses processes such as attention, the formation of knowledge, memory and working memory, judgment and evaluation, reasoning and "computation", problem solving and decision making, comprehension and production of language.

Cognitive processes use existing knowledge and generate new knowledge.

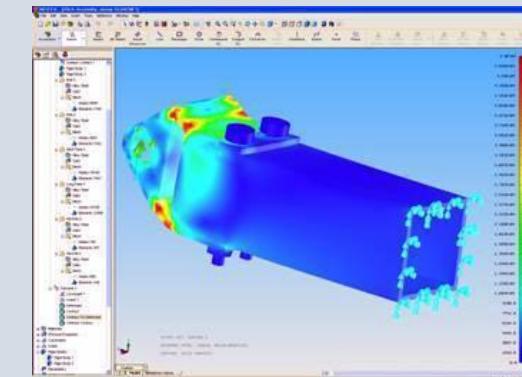


Linguagem possui uma estrutura lógica e semânticas significativas → Modelo

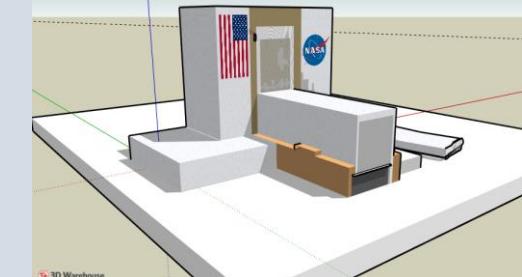
Engenharia Mecânica



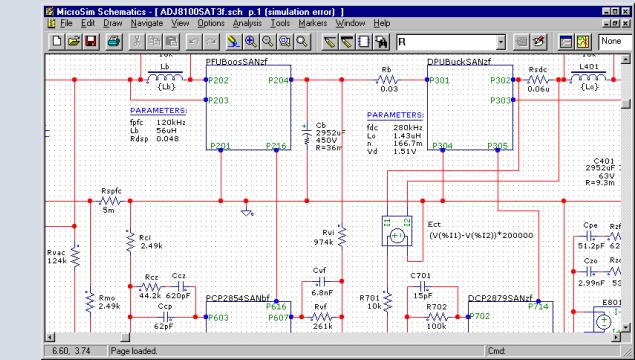
Engenharia Mecânica



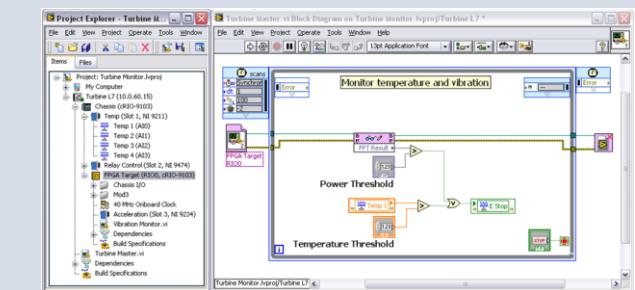
Engenharia Civil



Engenharia Elétrica



Engenharia Automação



Engenharia de Sistemas



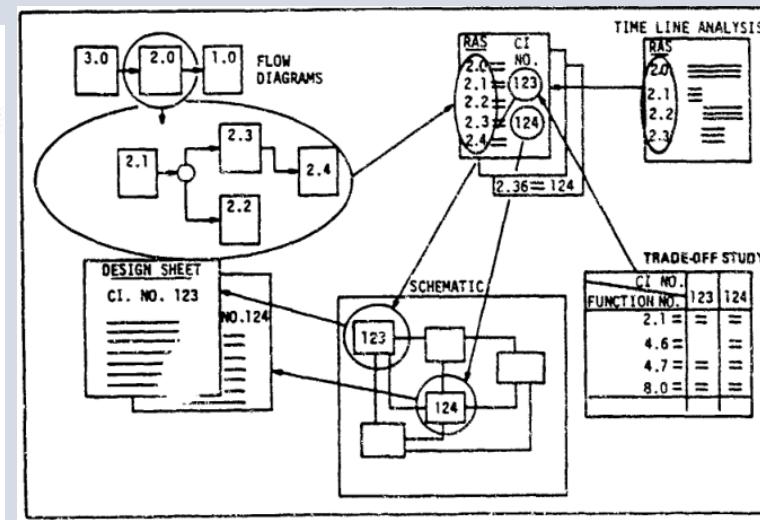
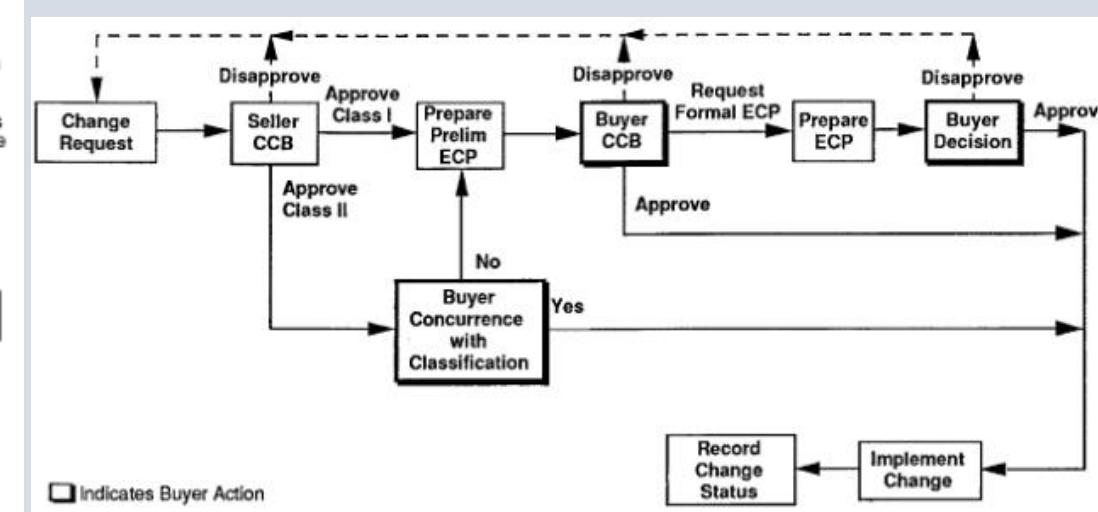
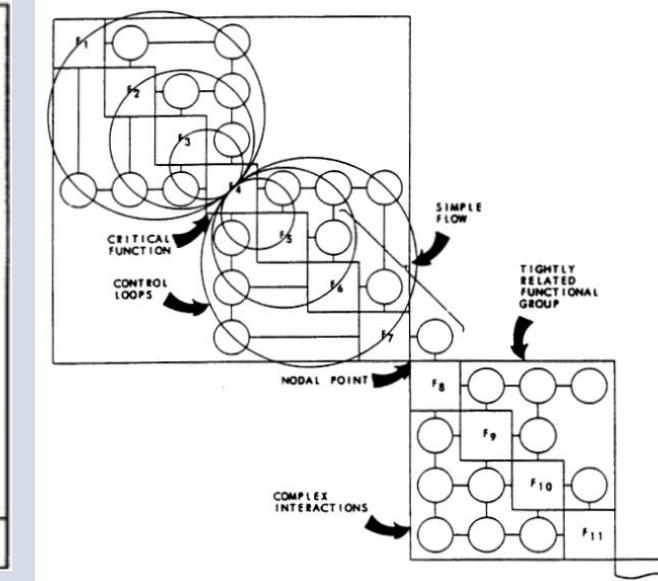
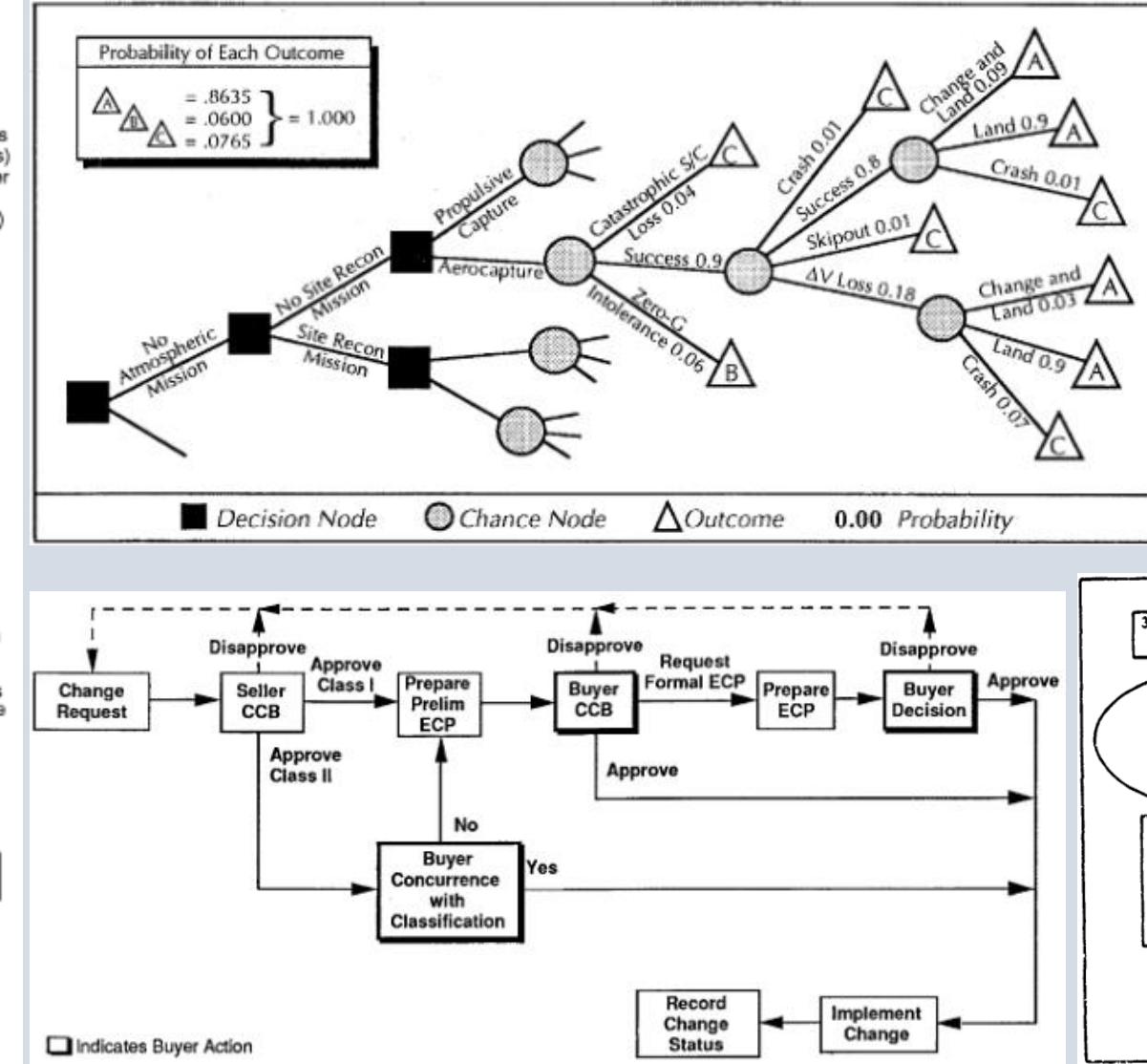
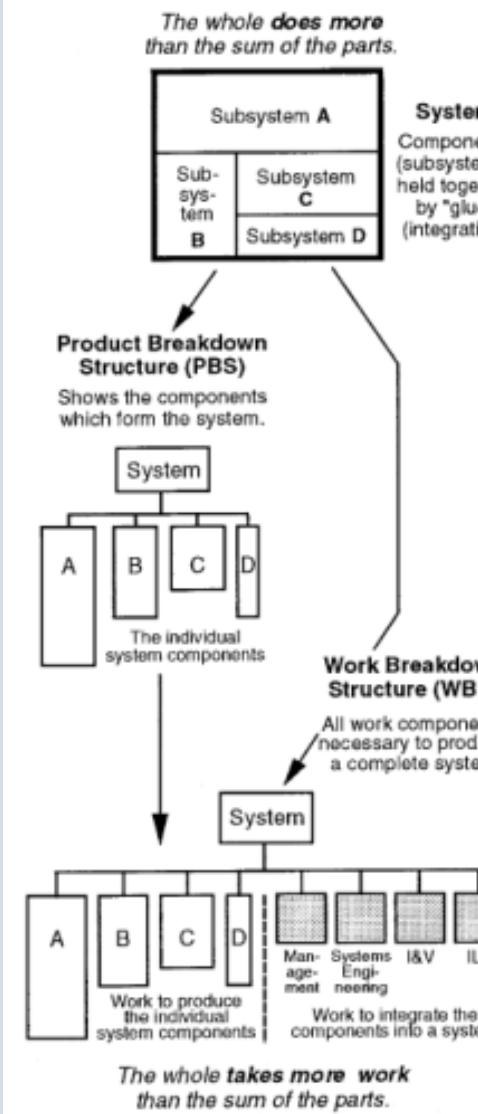
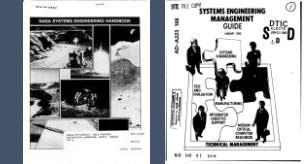
<https://www.biography.com/news/hidden-figures-movie-real-women>



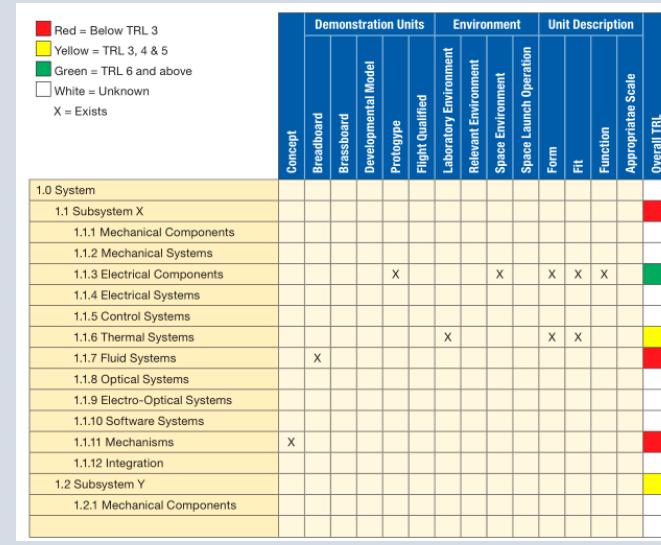
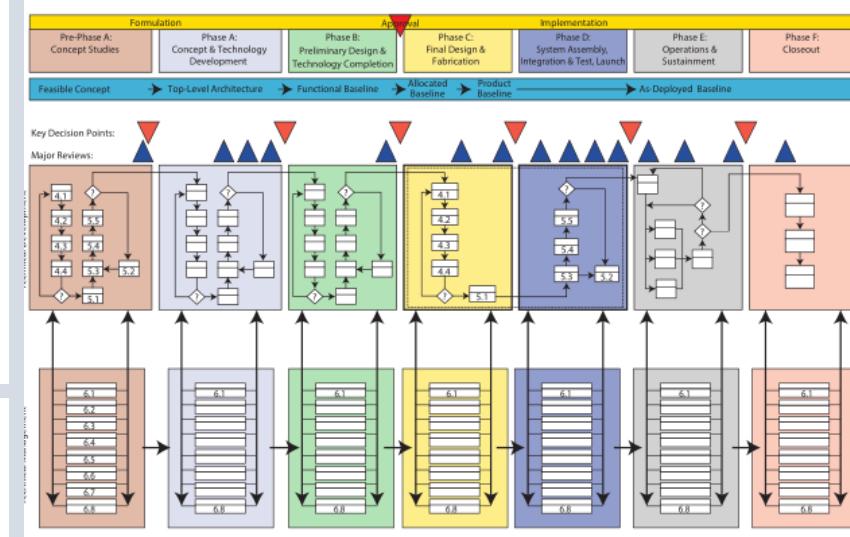
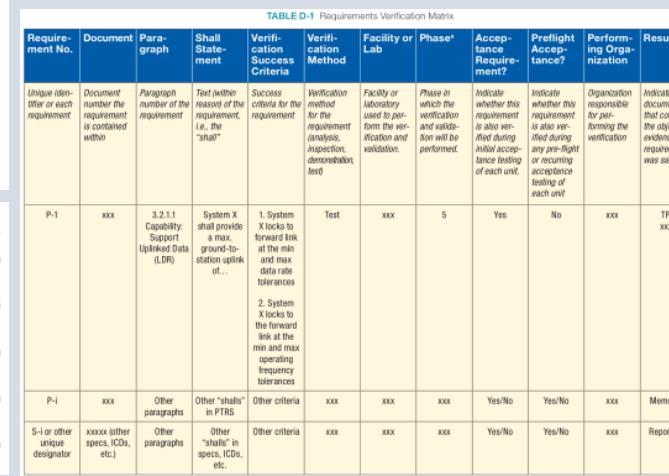
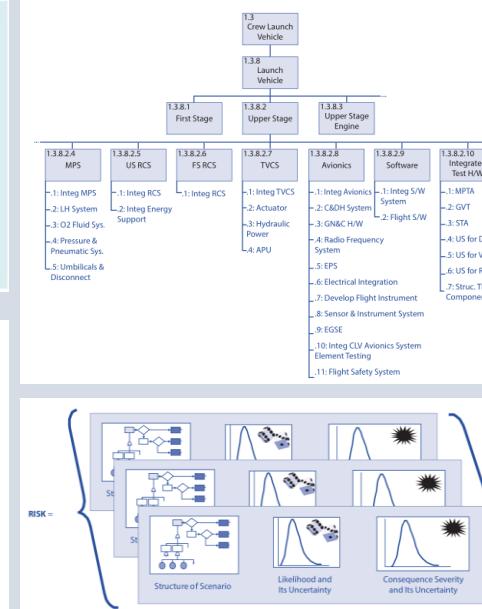
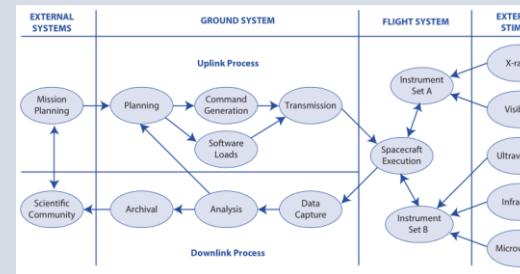
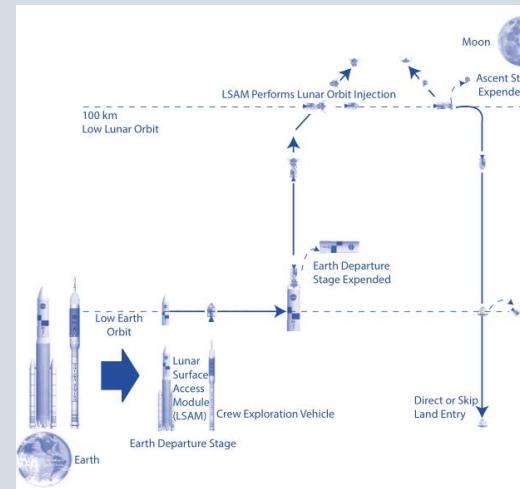
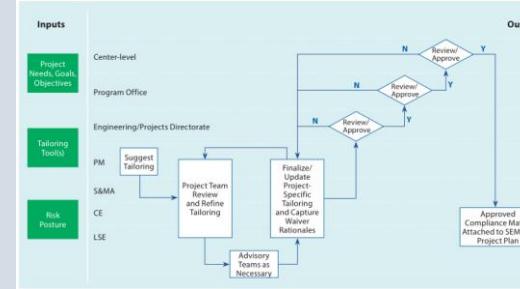
<https://www.hq.nasa.gov/office/pao/History/taskgrp.html>

Movie: Hidden Figures (2016)
Portraits NASA's Mercury Program (~50s)

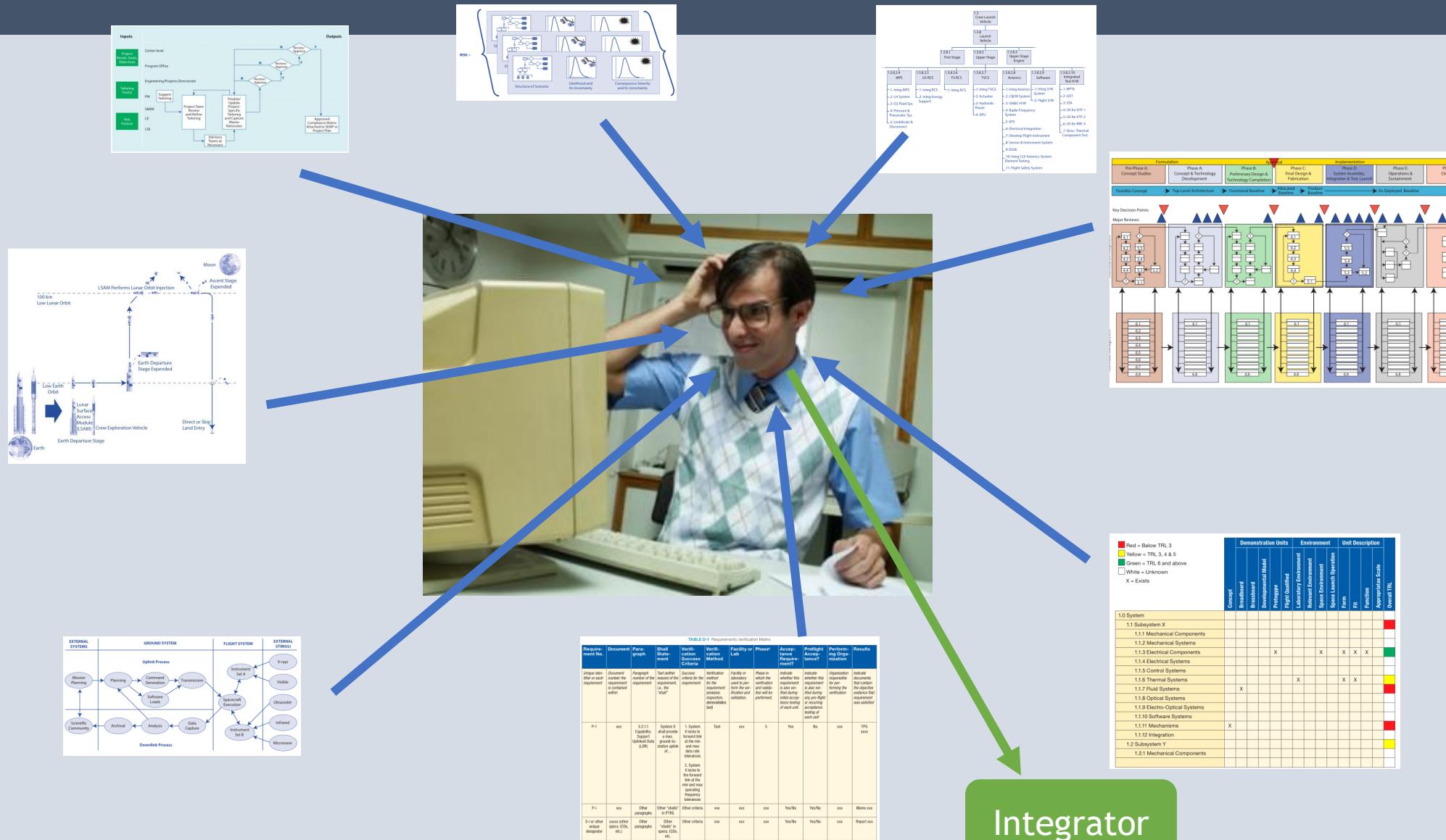
Qual a Linguagem da Engenharia de Sistemas?



Com o tempo ... Digitalização da linguagem...



Modelo >>>>>>>>>>> Diagramas





Paige Bailey @DynamicWebPaige · 9 de jul

- 1) Pick an industry
- 2) Ask people in that industry what they use spreadsheets for
- 3) Build something better

 Traduzir do inglês



54



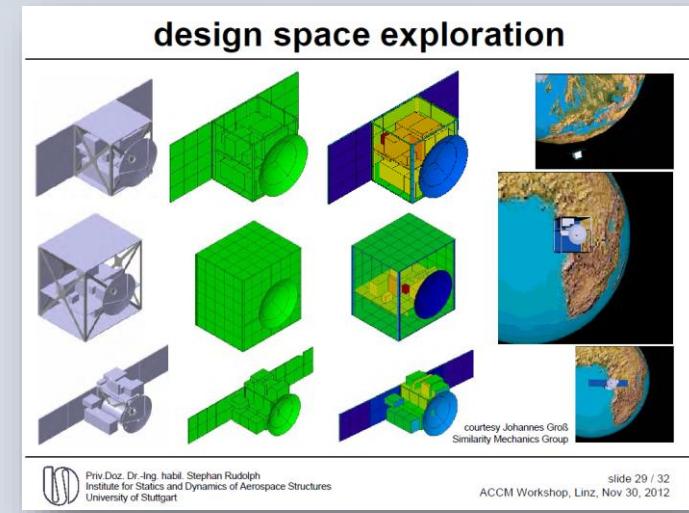
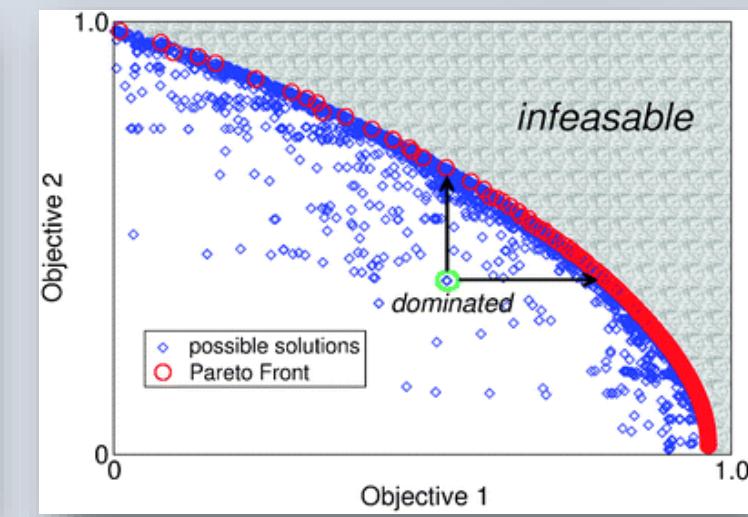
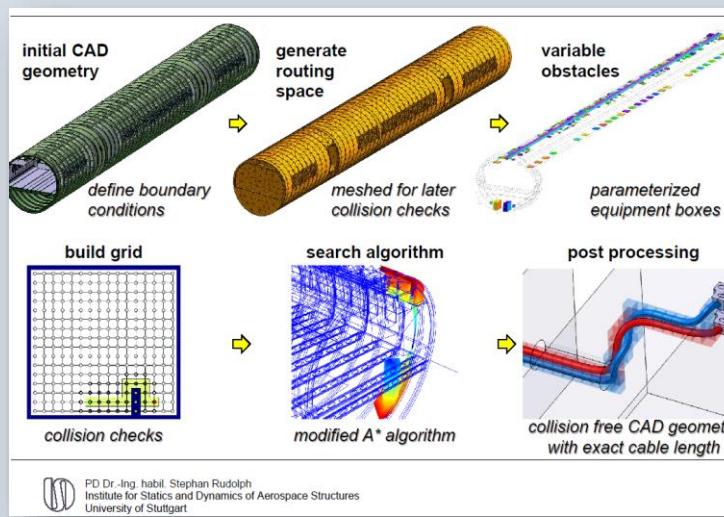
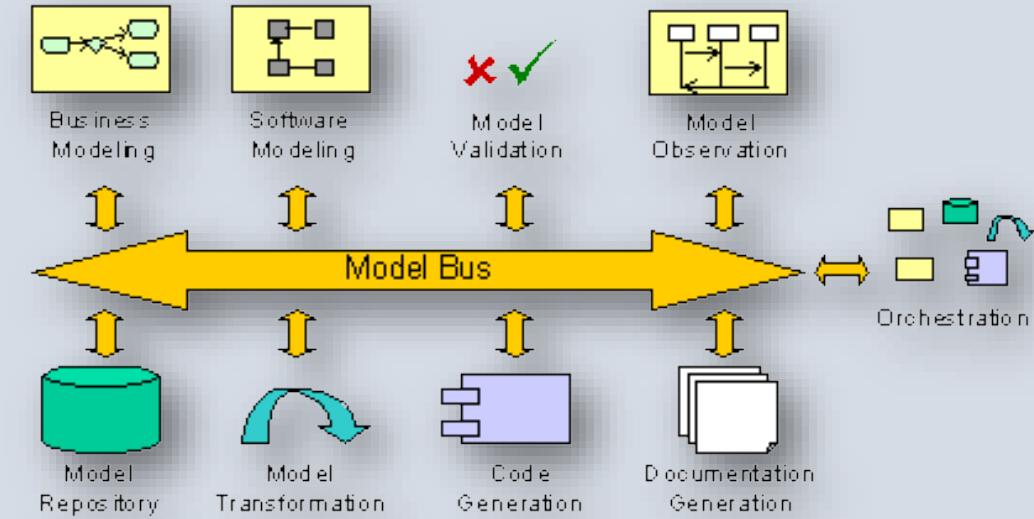
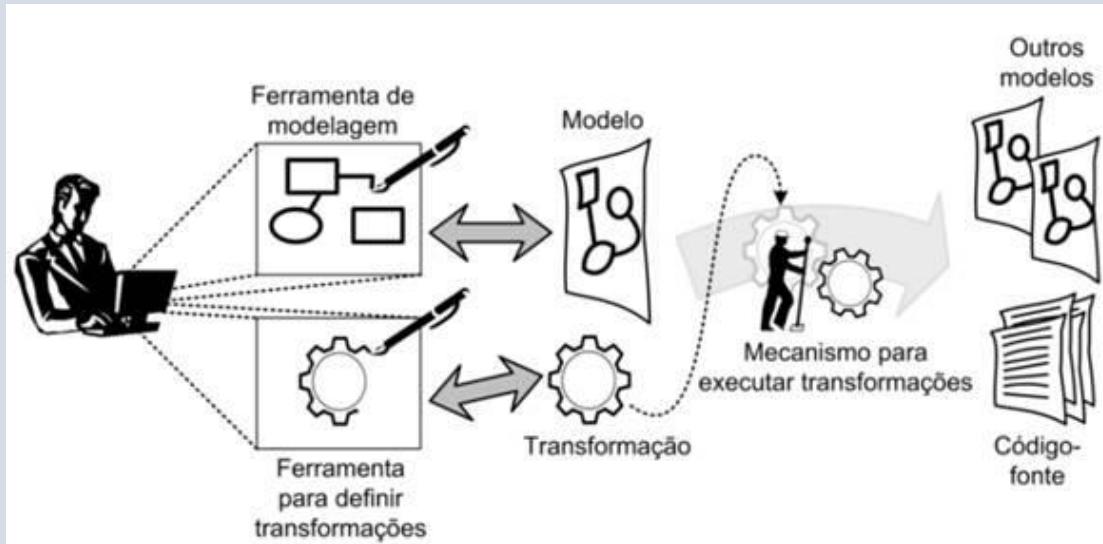
825



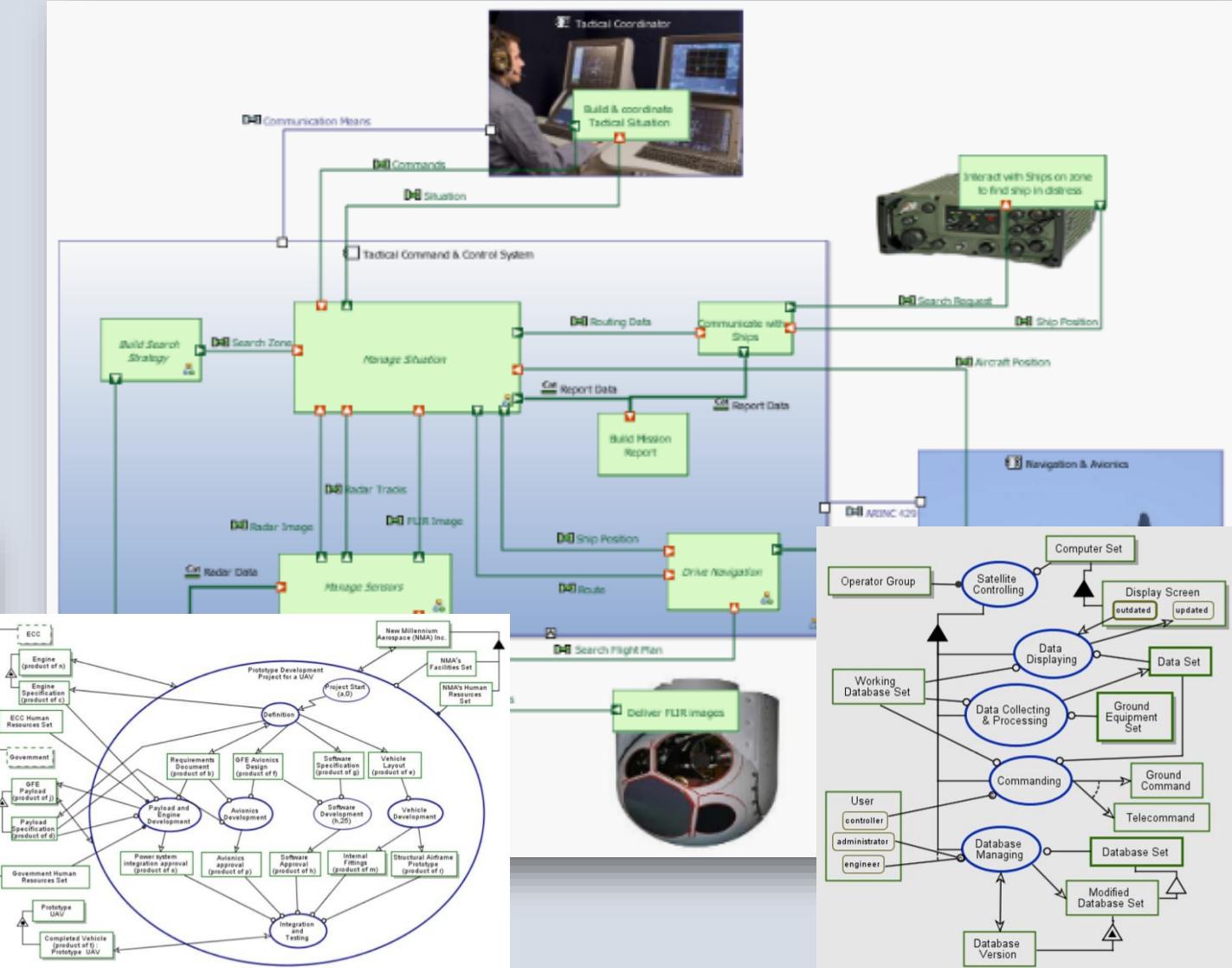
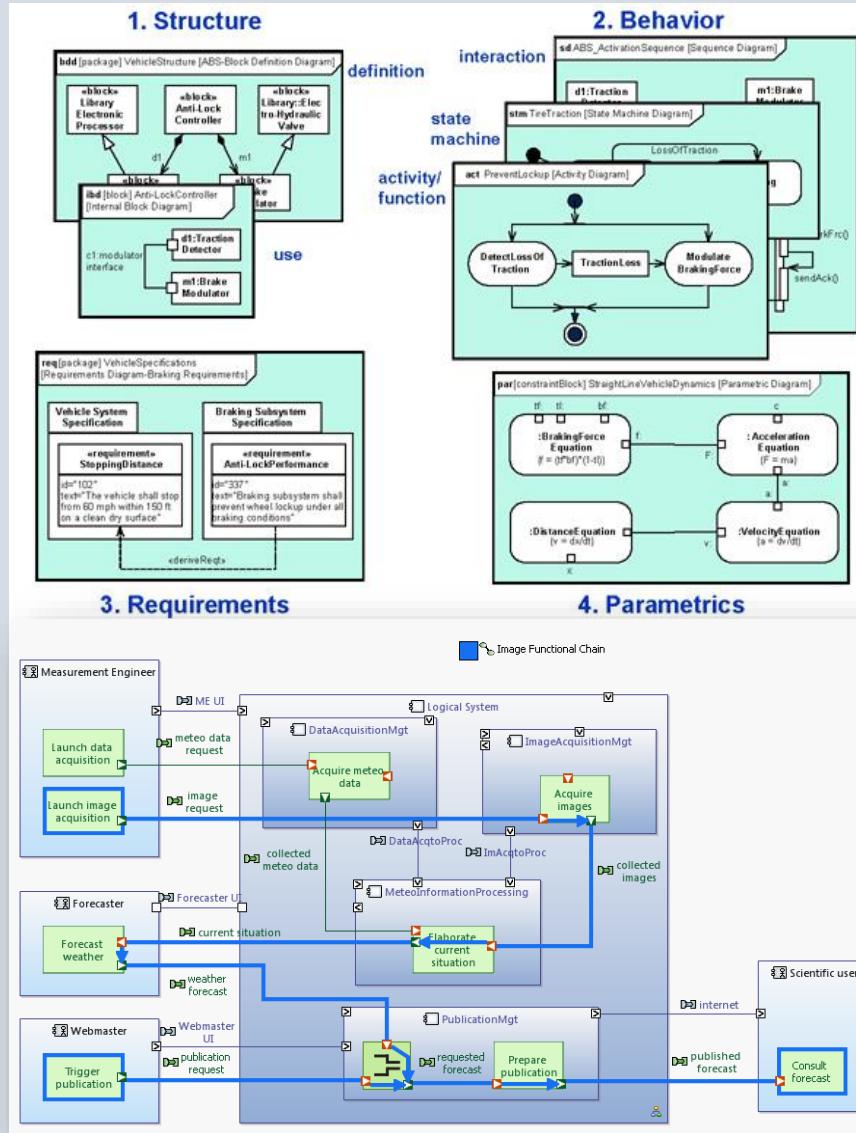
2,2 mil



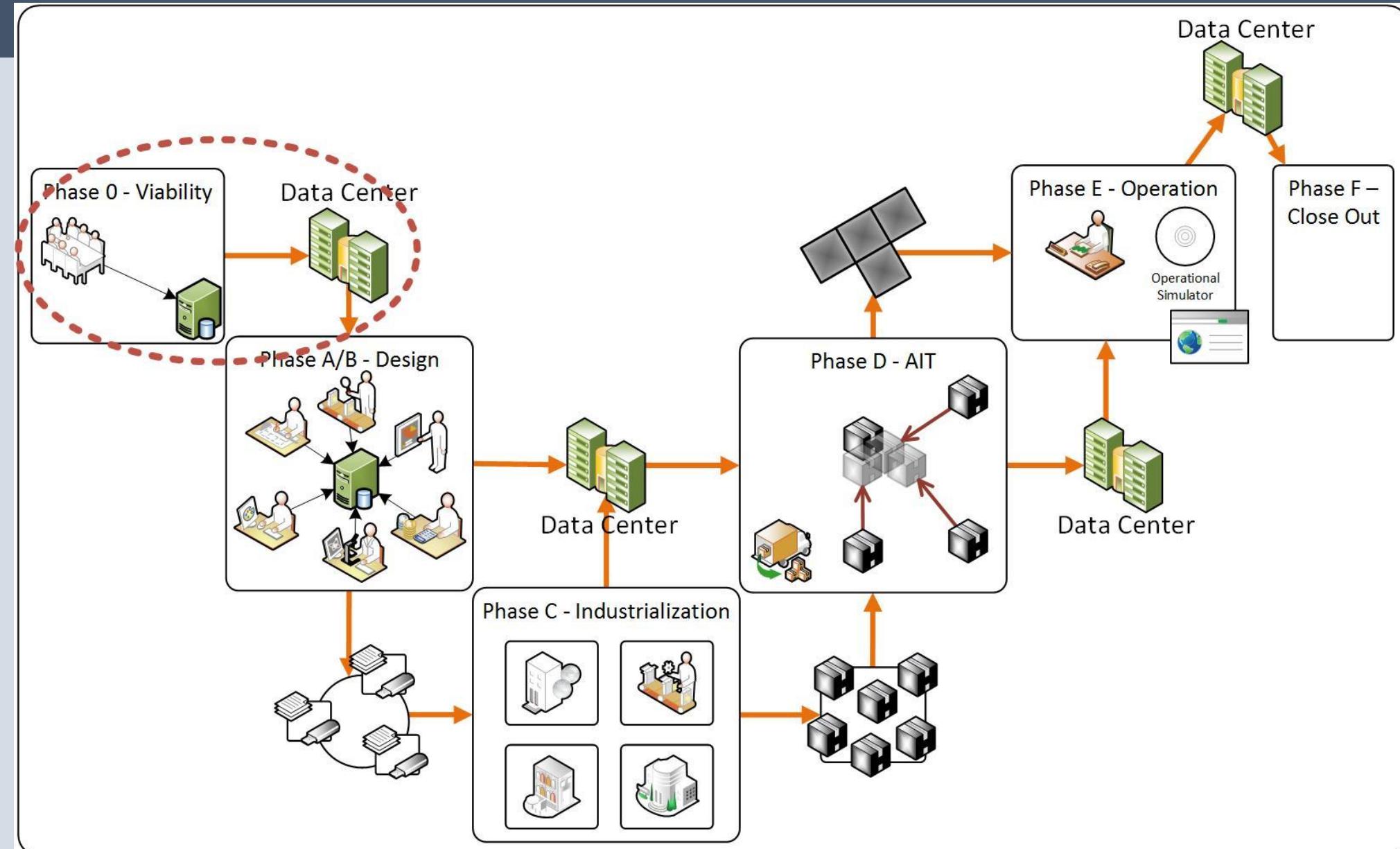
Model Driven Development



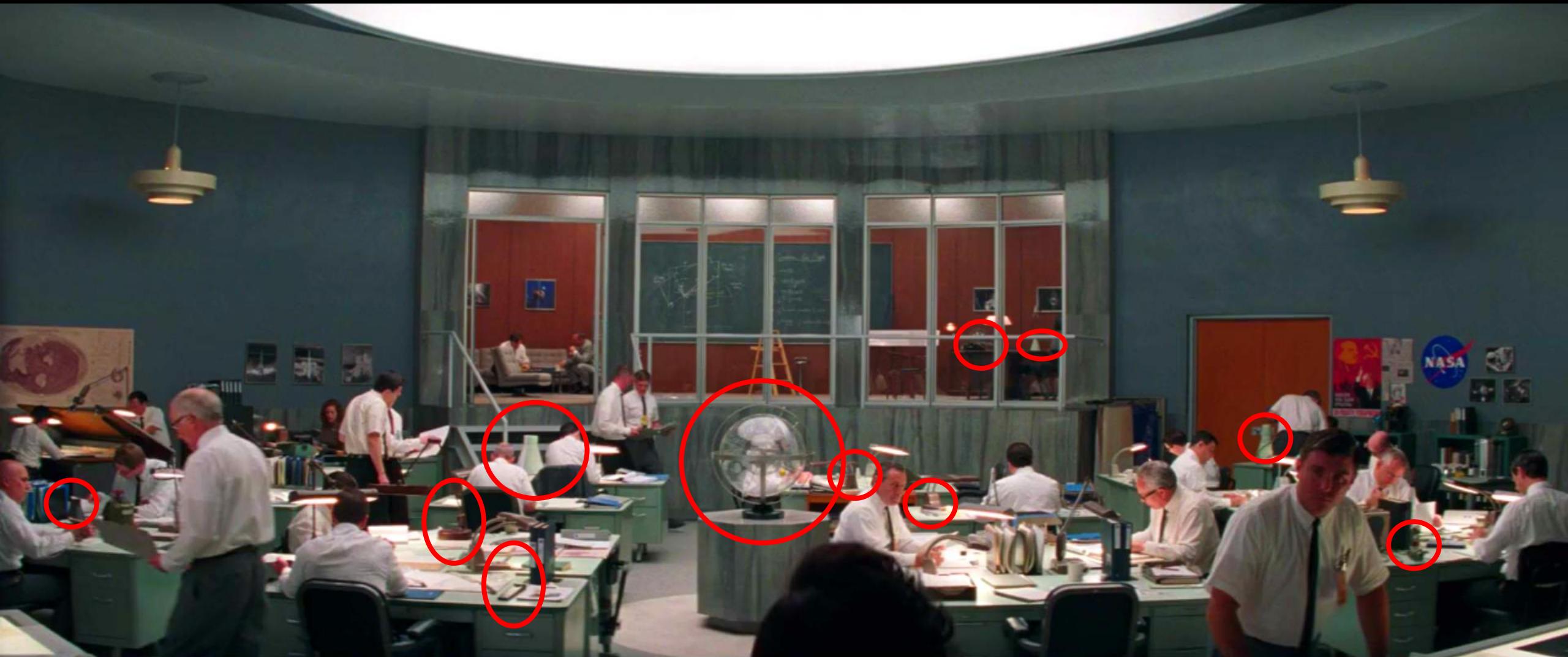
Model Based System Engineering (MBSE)



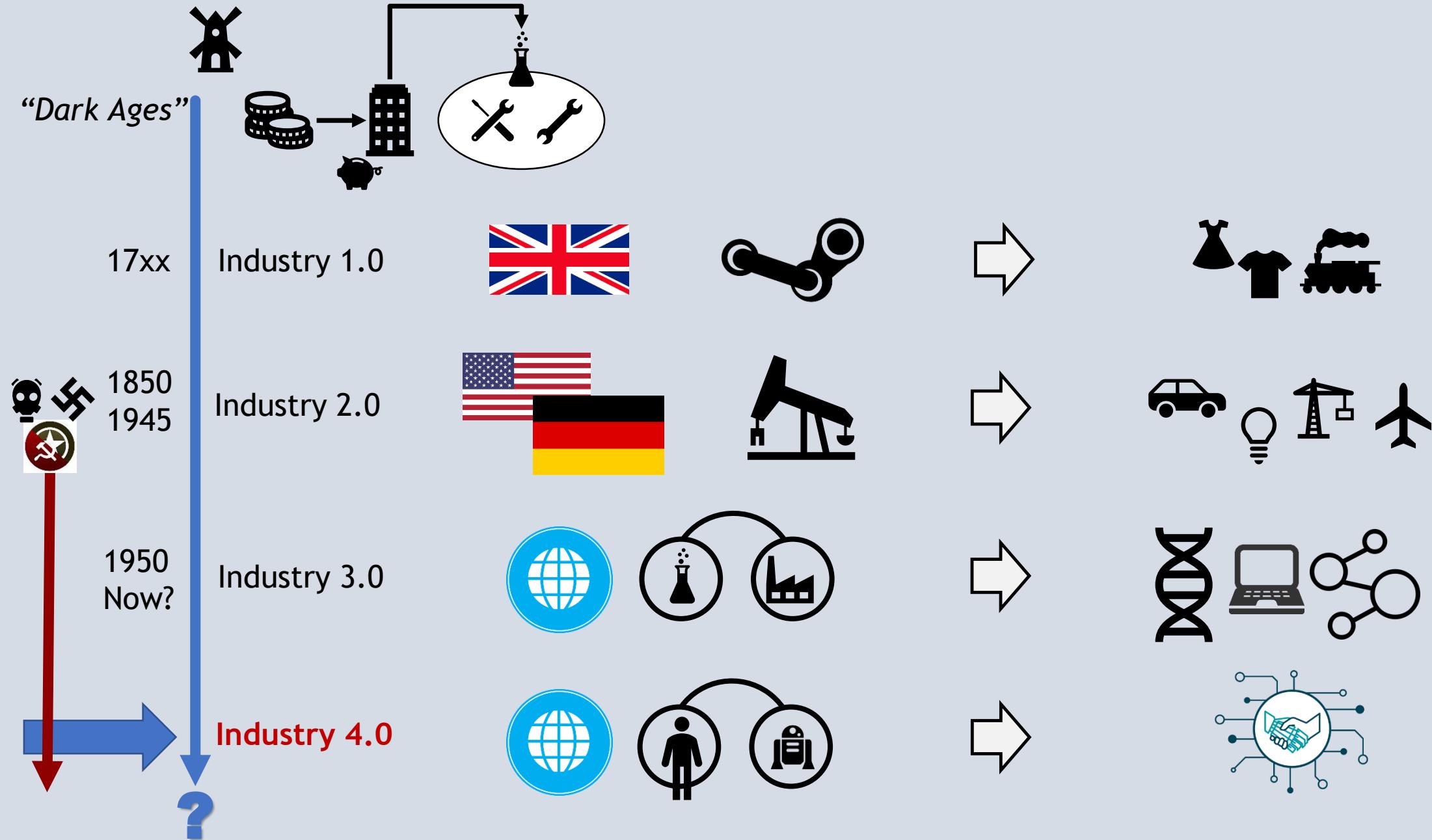
Model Information Artefacts



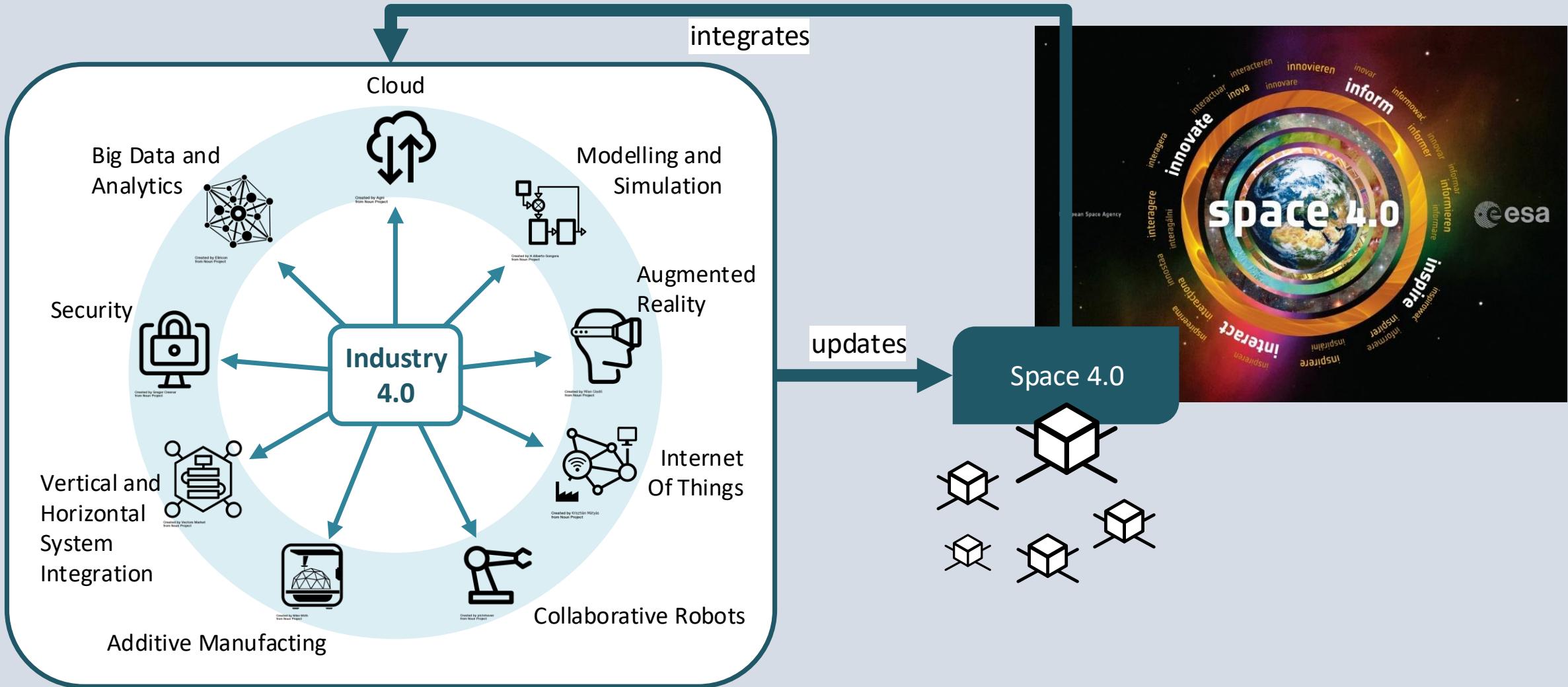




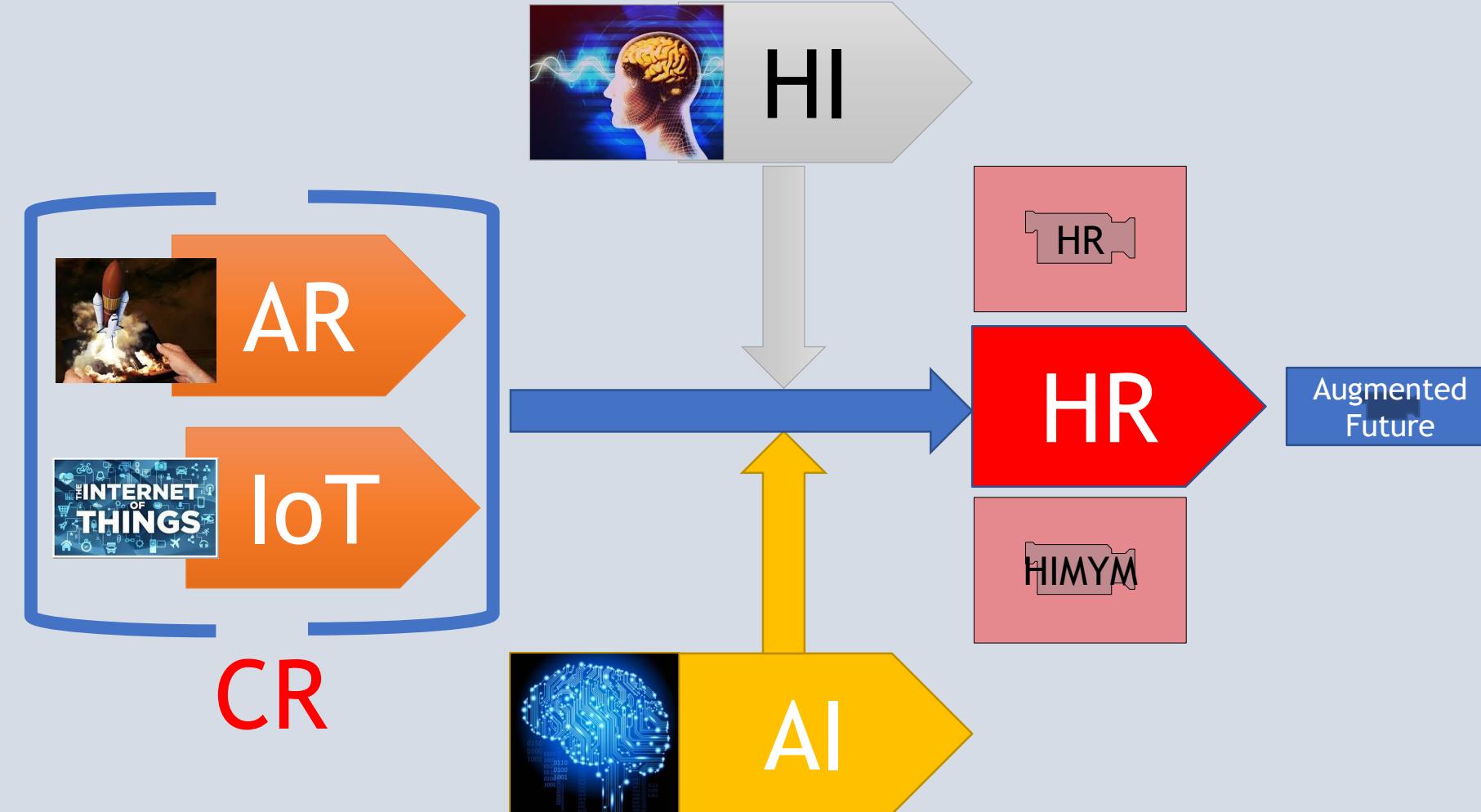




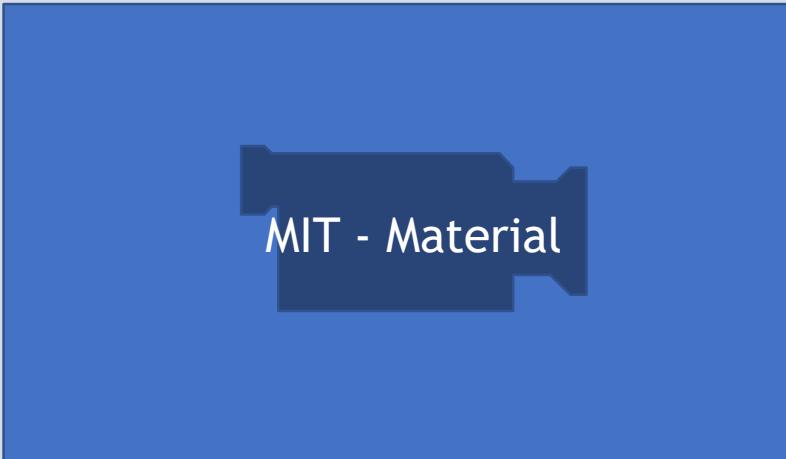
Future Motto: Creative Work Interconnection (INCOSE)



Realidades



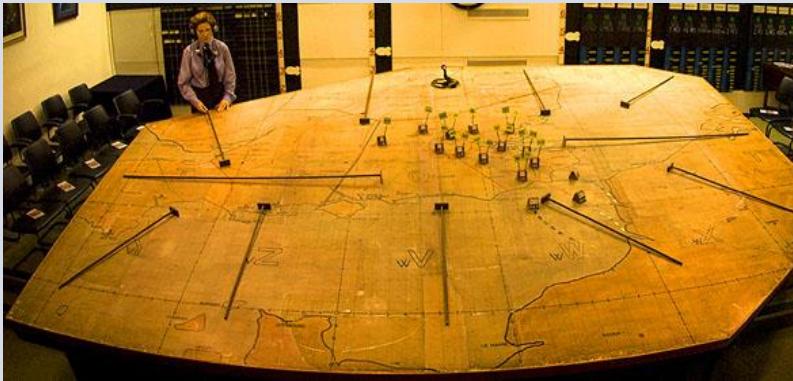
Artefatos Tangíveis



Board game



Sand Table



Tactical Table



Trade Analysis
Algorithm

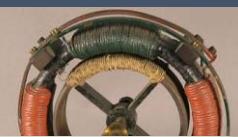


https://en.wikipedia.org/wiki/Dungeons_%26_Dragons

Nintendo Labo



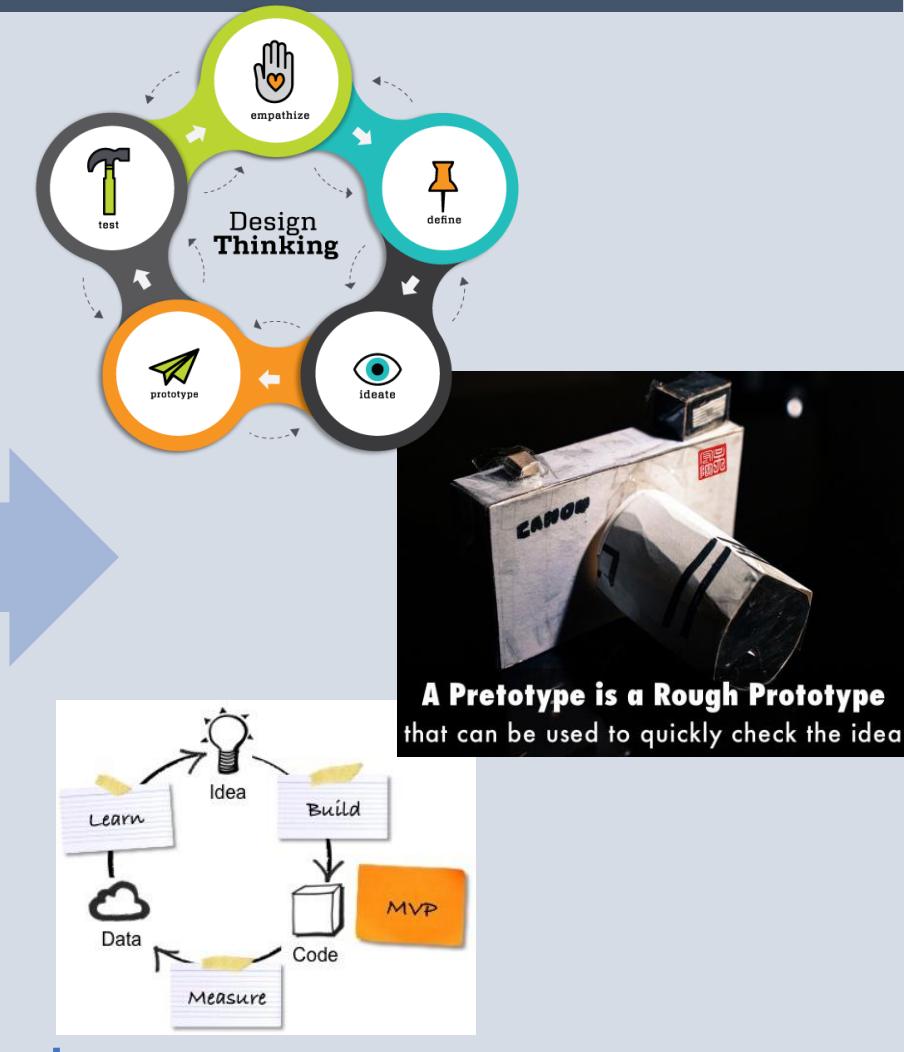
Na Engenharia sempre foram utilizados artefatos físicos para manusear um modelo



0 - Christ

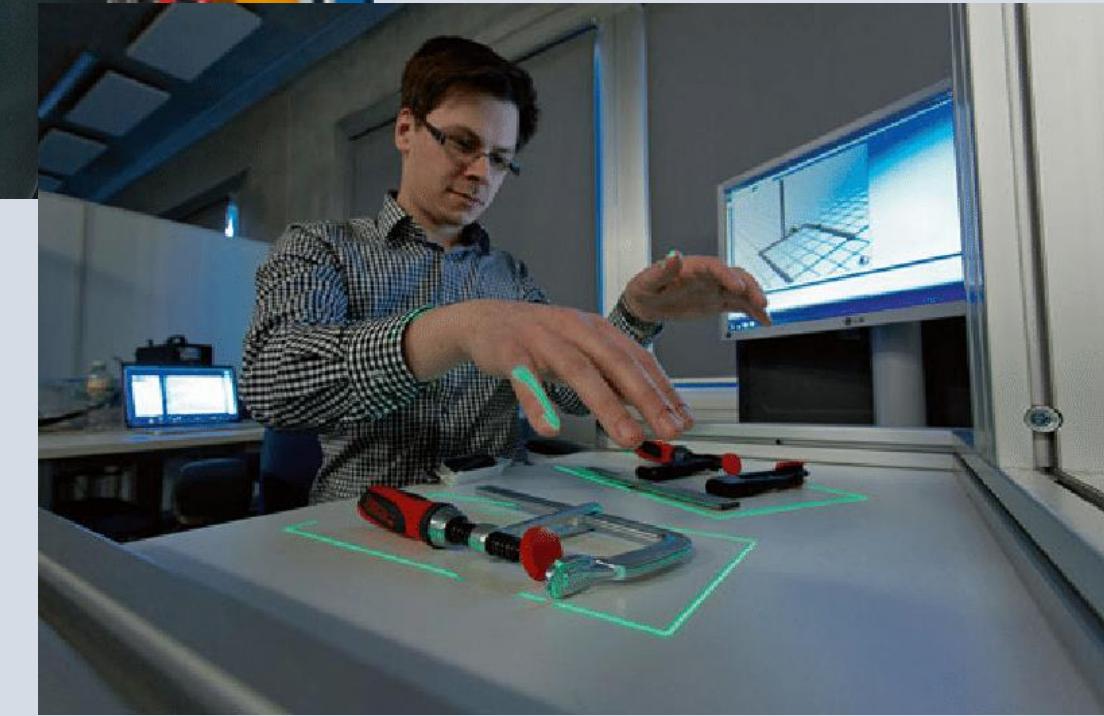
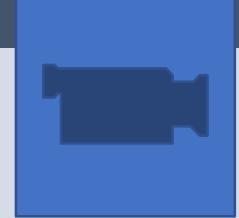
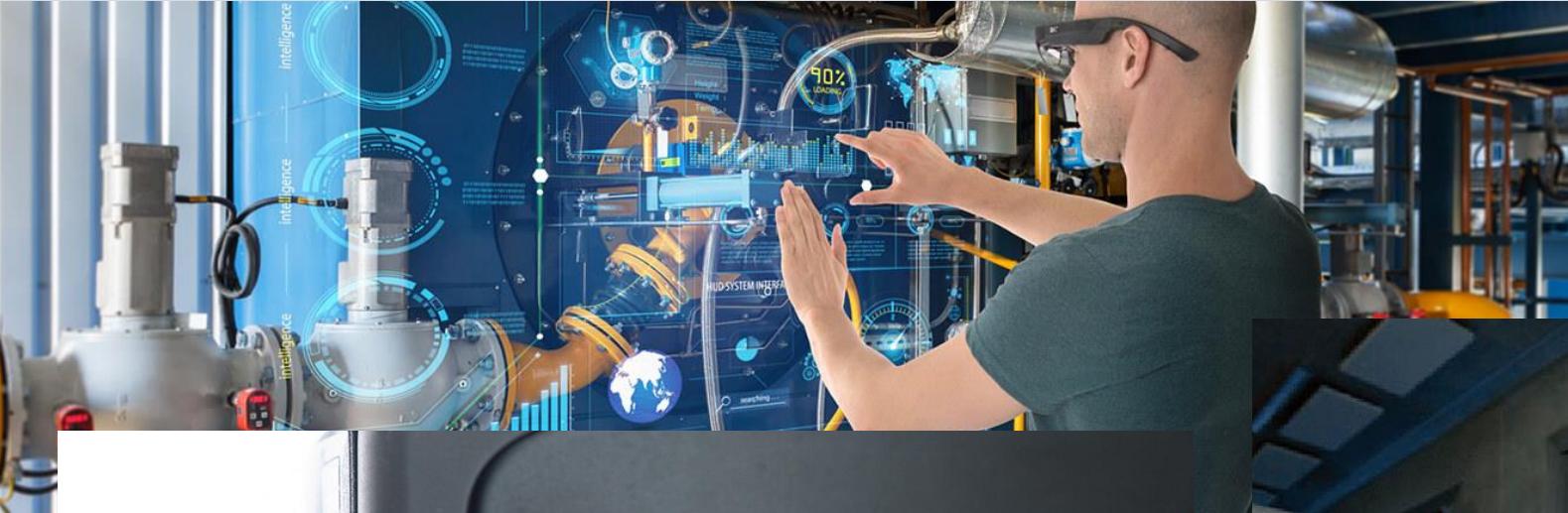


08:12



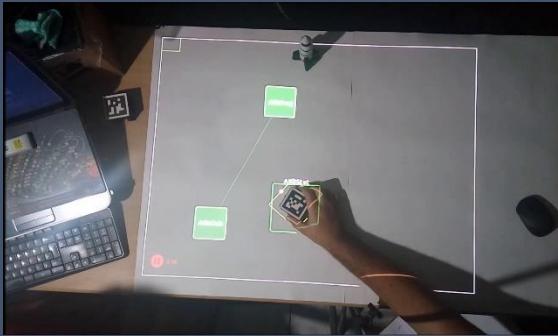
Nomes “modinha”

Com a computação estes artefatos se tornam inteligentes

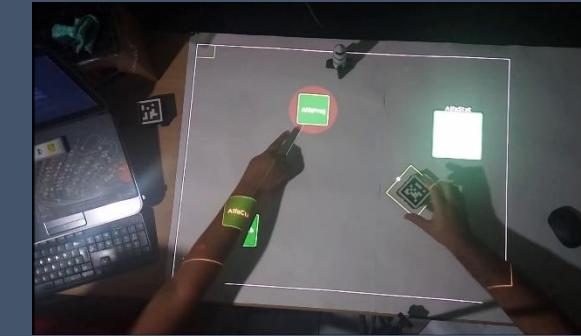


Capacitando artefatos como fontes de interações “naturais” para modelos

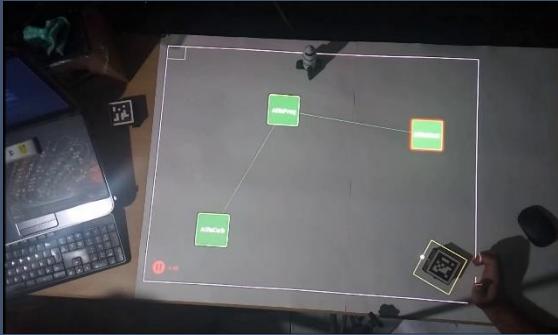
(a) Specialist placing an aura that represents a model to perform discussion



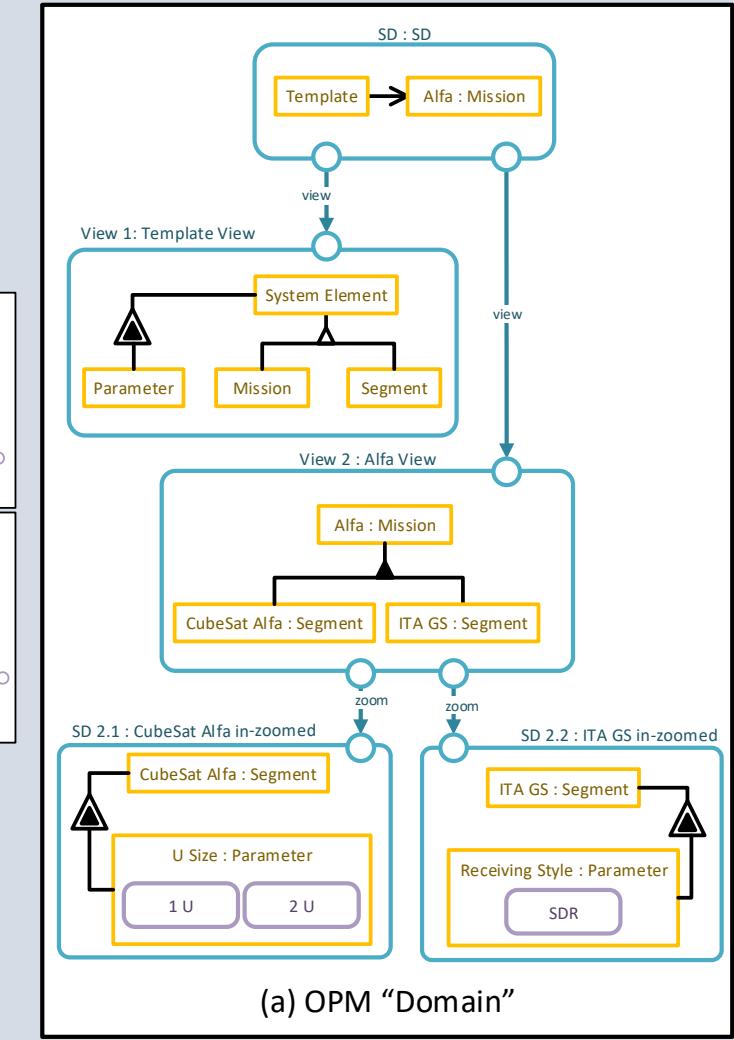
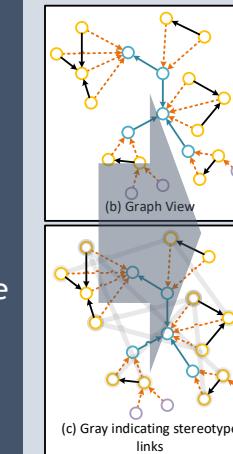
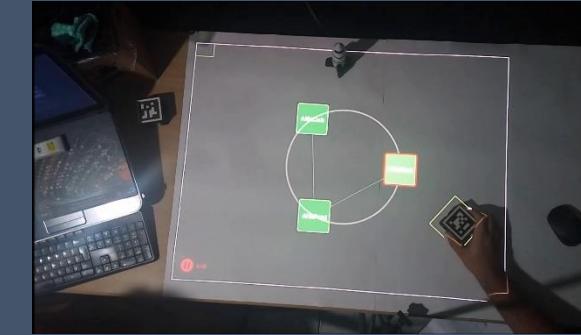
(b) Two specialists discuss the models to decide the coupling



(c) View of the three models coupled.

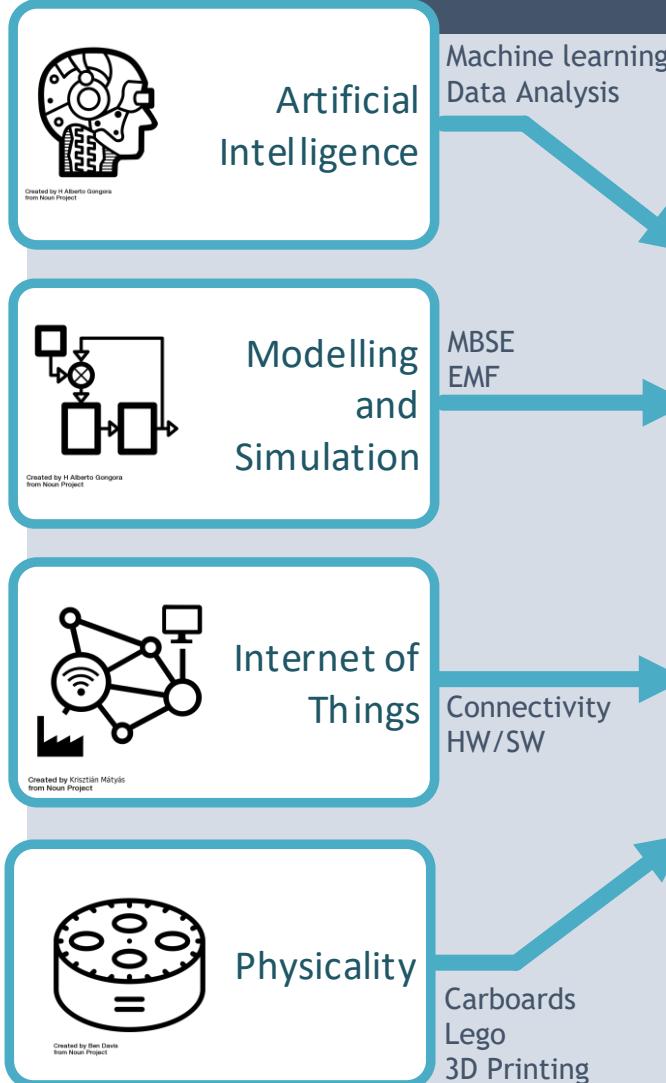


(d) A disc arrangement view to show the connected models.

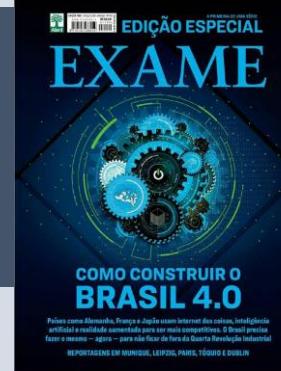




Minha Pesquisa:



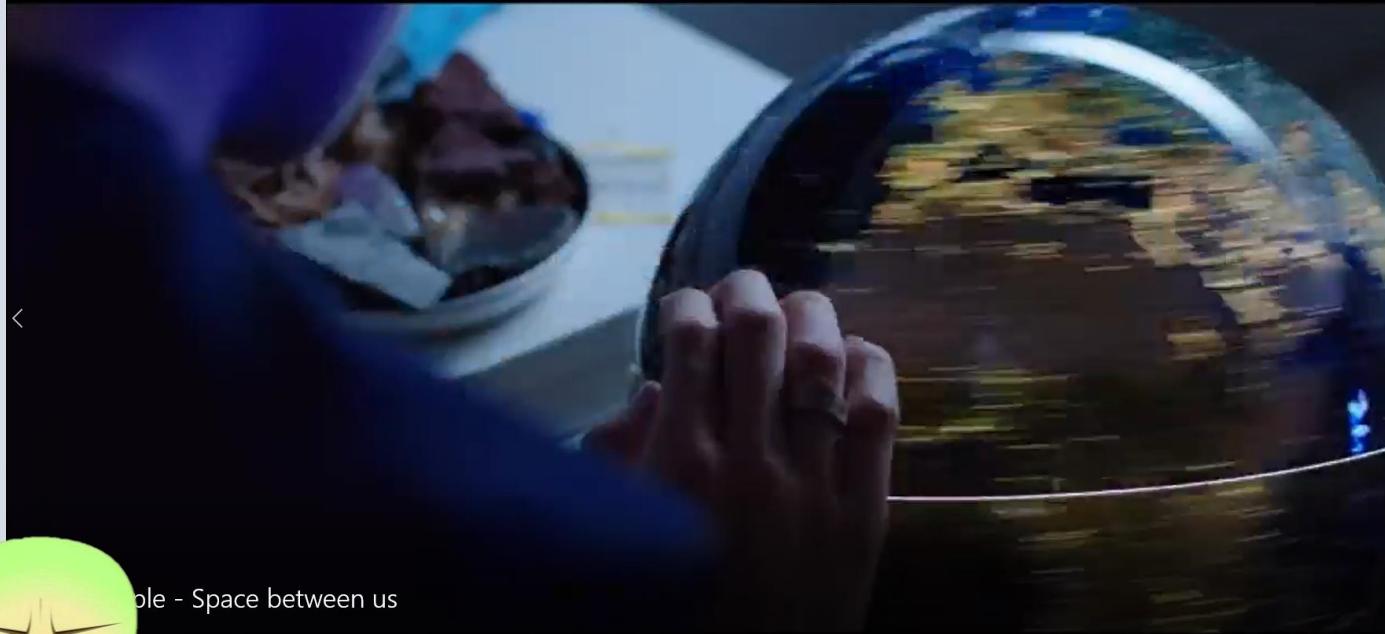
Desenvolvimento de novos vocabulários de interação para buscar alternativas para tornar **mais natural a linguagem de modelagem da Engenharia de Sistemas**

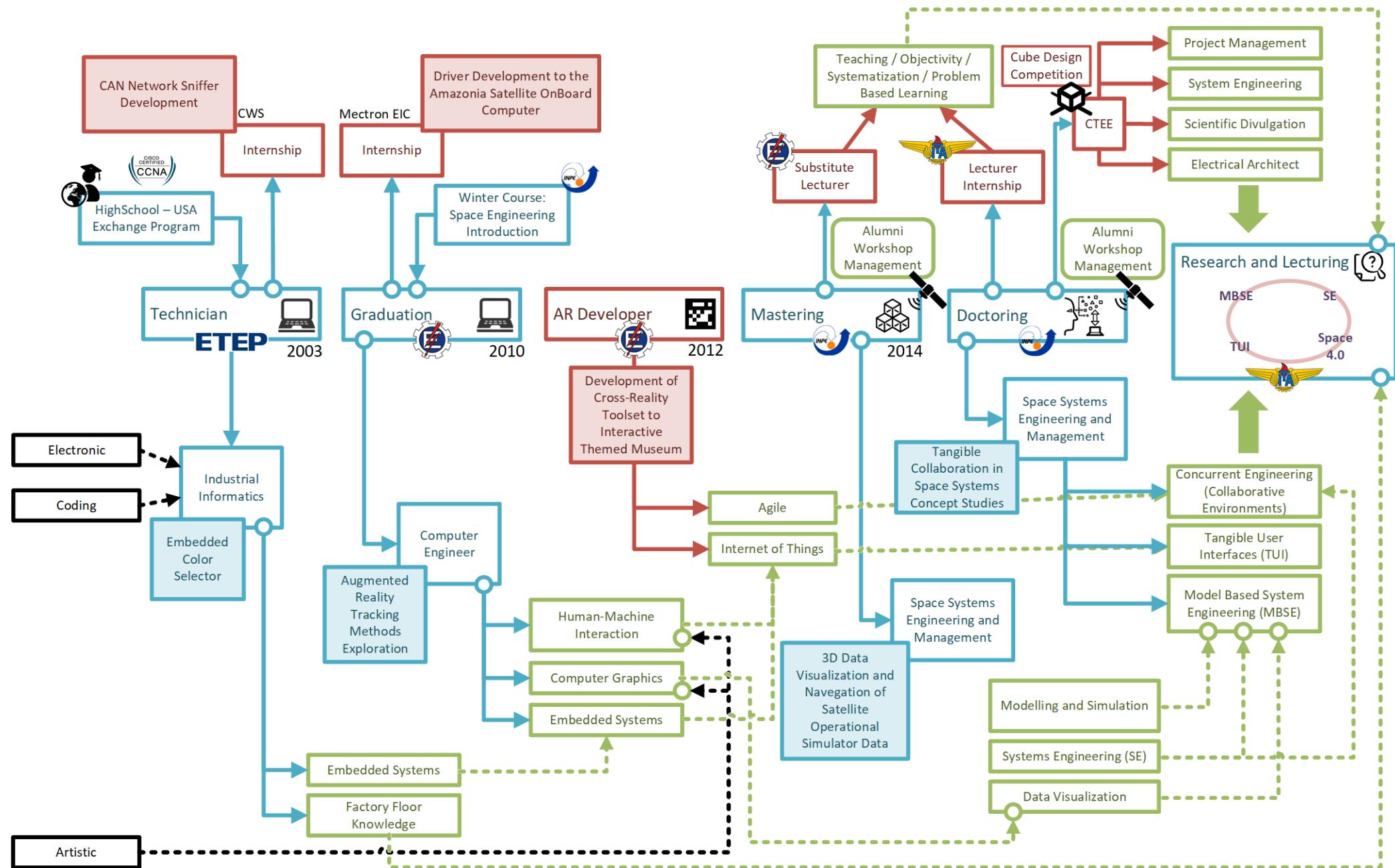


MBSE 4.0



Pode-se ver “testes” de aceitação nos filmes...





When your boss says you
can leave early if you want:







Prof. Dr. Christopher Schneider Cerqueira

Divisão de Engenharia Aeronáutica e Aeroespacial do ITA
christopher@cscerqueira.com.br / cscerqueira.com.br

“With the **passage of time**, the psychology of people **stays the same**, but the **tools and objects in the world change**. Cultures change. **Technologies change**. The principles of design still hold, but the way they get applied **needs to be modified** to account for new activities, new technologies, **new methods of communication and interaction**.”

Don Norman

“The DESIGN of EVERYDAY THINGS, Revised and Expanded 2013’s Edition”



Prof. Dr. Christopher Schneider Cerqueira

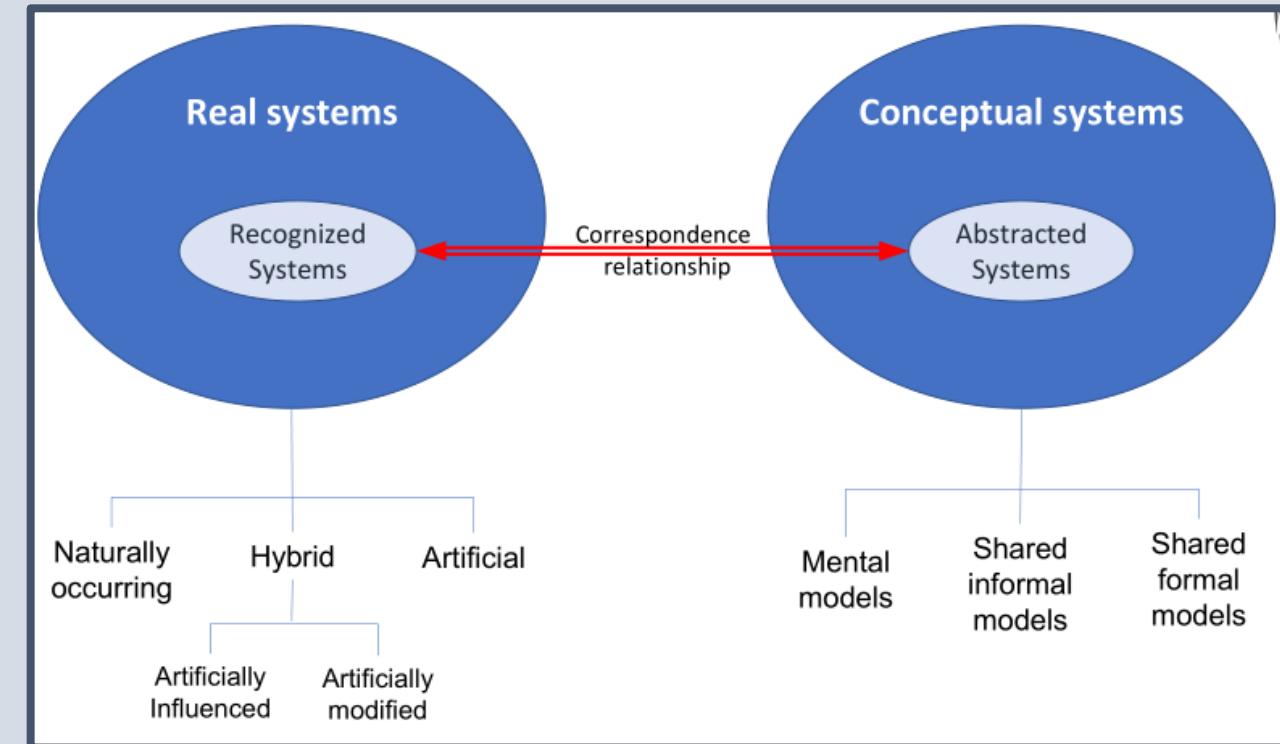
Divisão de Engenharia Aeronáutica e Aeroespacial do ITA
christopher@cscerqueira.com.br / cscerqueira.com.br

Backup

O que é um sistema?

A system is a

- <set, combination, group, collection, configuration, arrangement, organization, assemblage, assembly, ensemble [10]>
- of
- <parts, components, elements, objects, subsystems, entities [6]>
- <combined, integrated, organised, configured, arranged [5]>
- in a way that
- <creates, enables, motivates [3]>
- <properties, functions, processes, capabilities, behaviors, dimensions [6]>
- not
- <possessed, exhibited, presented [3]>
- by the
- <separate, individual, single [3]>
- <parts, components, elements, objects, subsystems, entities [6]>



O que é a Engenharia de Sistemas?!

Systems Engineering is a **transdisciplinary approach and means**, based on systems principles and concepts, to enable the successful realization, use and retirement of engineered systems.

It focuses on

- establishing stakeholders' **purpose and success criteria**, and defining actual or anticipated customer needs and required functionality early in the development cycle,
- establishing an **appropriate lifecycle model** and process approach considering the levels of complexity, uncertainty and change
- documenting and **modelling requirements and solution architecture** for each phase of the endeavour
- proceeding with **design synthesis and system validation**
- while considering the **complete problem and all necessary enabling systems and services**.

Systems Engineering provides facilitation, guidance and leadership to integrate all the disciplines and specialty groups into a team effort forming an appropriately structured development process that proceeds from concept to production to operation, evolution and eventual disposal.

Systems Engineering considers both the business and the technical needs of all customers with the goal of providing a quality solution that meets the needs of users and other stakeholders and is fit for the intended purpose in real-world operation, and avoids or minimizes adverse unintended consequences.

Linguagem

Language is a system that consists of the development, acquisition, maintenance and use of complex systems of communication.

