

# How many EDS formats do you need to plan a spacecraft? Possible ways towards standardization

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Wissen für Morgen

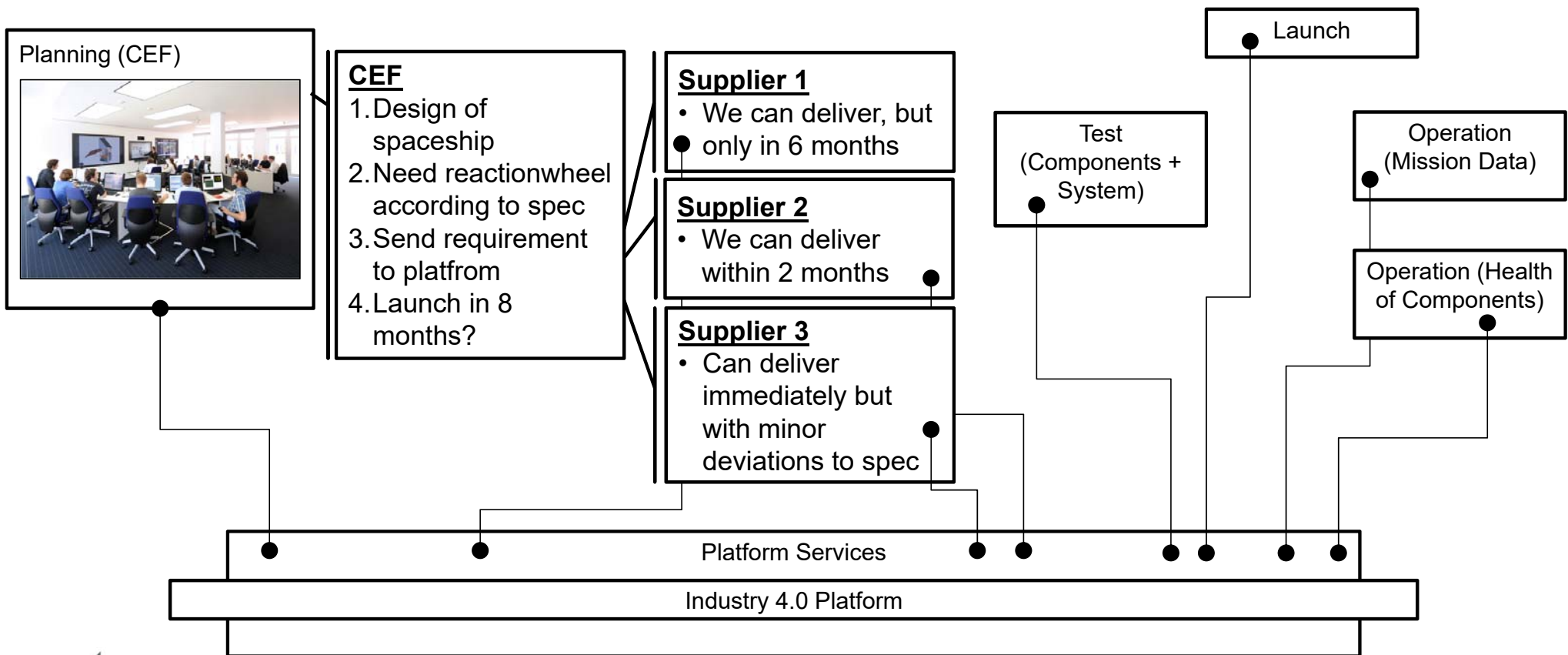


## Jena - DLR Institute Of Data Science

- Datamanagement and Analytics
  - Datamanagement Technologies
  - Climate Informatics
  - Visual Analytics
- Software Systems for Digitalization
  - Digital Production Platforms**
- IT Security
  - Secure Software Engineering
- Citizen Science
  - Citizen Science

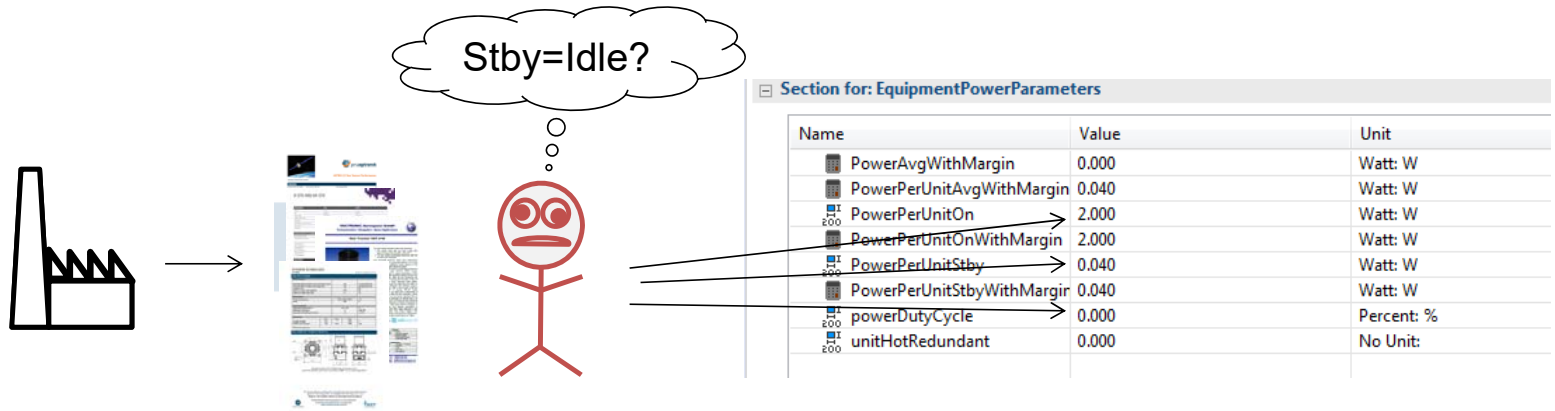


## Platform To Build Spacecraft

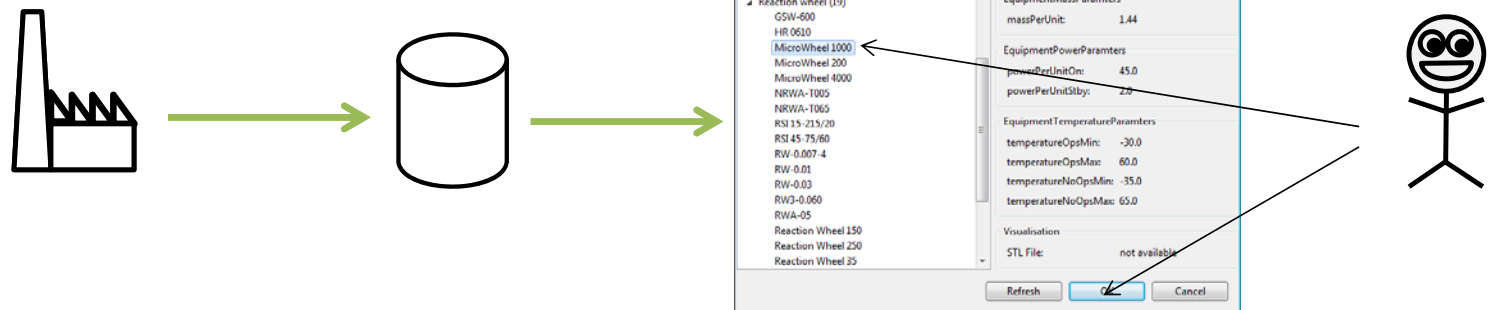


## Supplier Data In MBSE For Concurrent Engineering

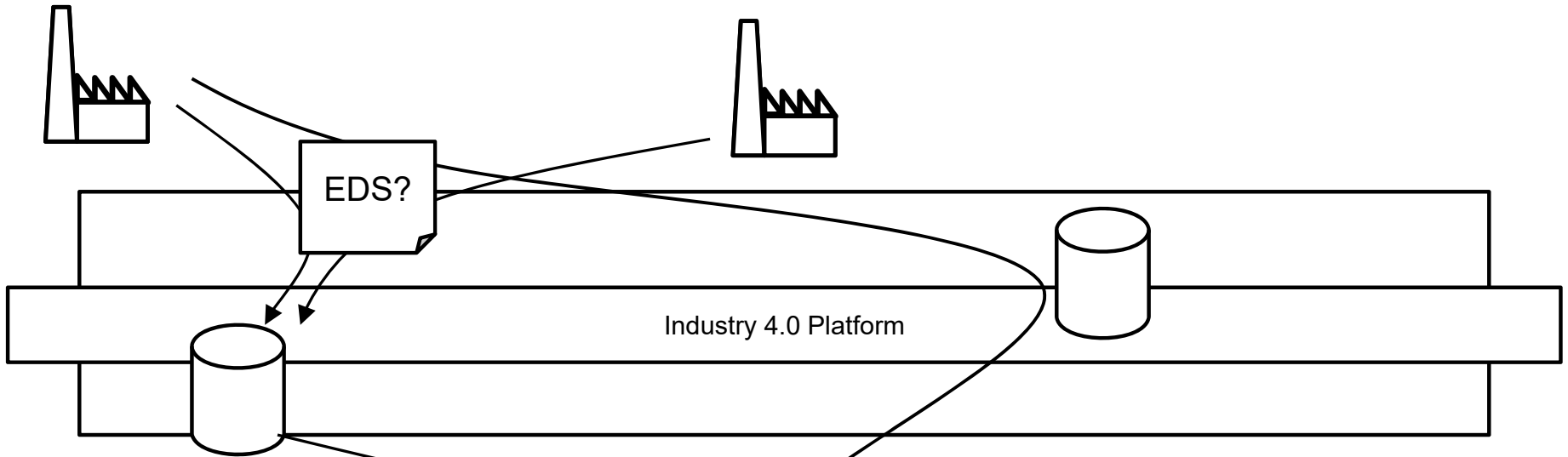
By today supplier information is often transferred manually by a user.



Tomorrow the data transfer process happens automatically – the user only selects a product.

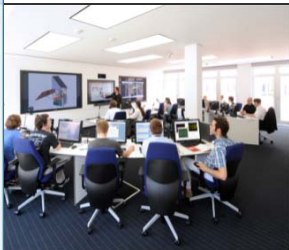
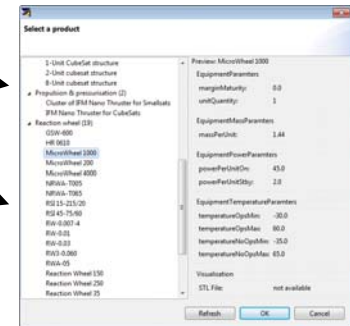


## We Need: Replacement For PDF & Others



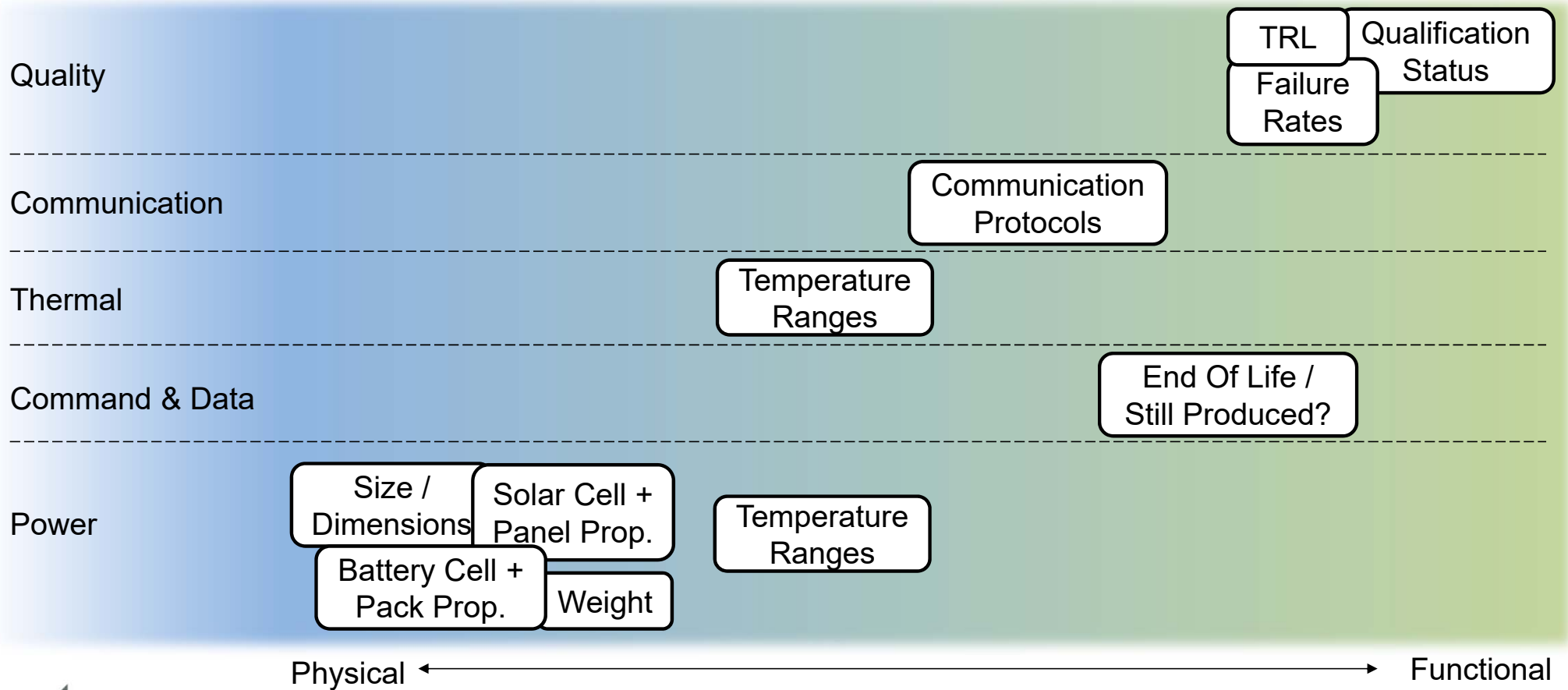
## Requirements for exchange over platform:

- Machine readable
- Standardized / universal
- Automatically comparable
- All relevant parameters for one product

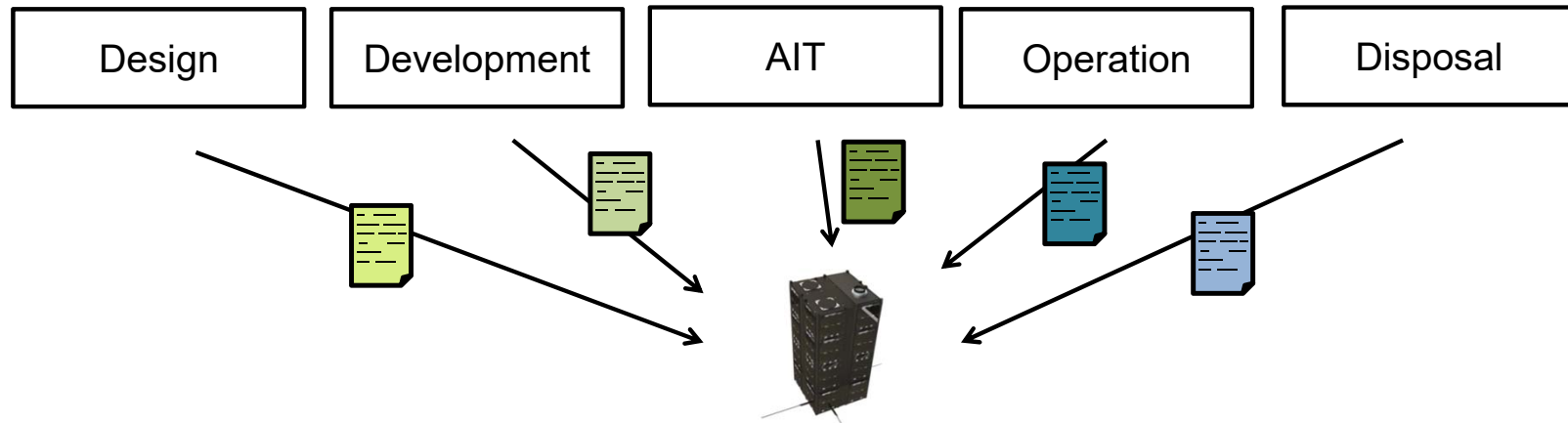




## Relevant Parameters For Domains - Examples From Discussions



## Relevant Parameters Along The Lifecycle



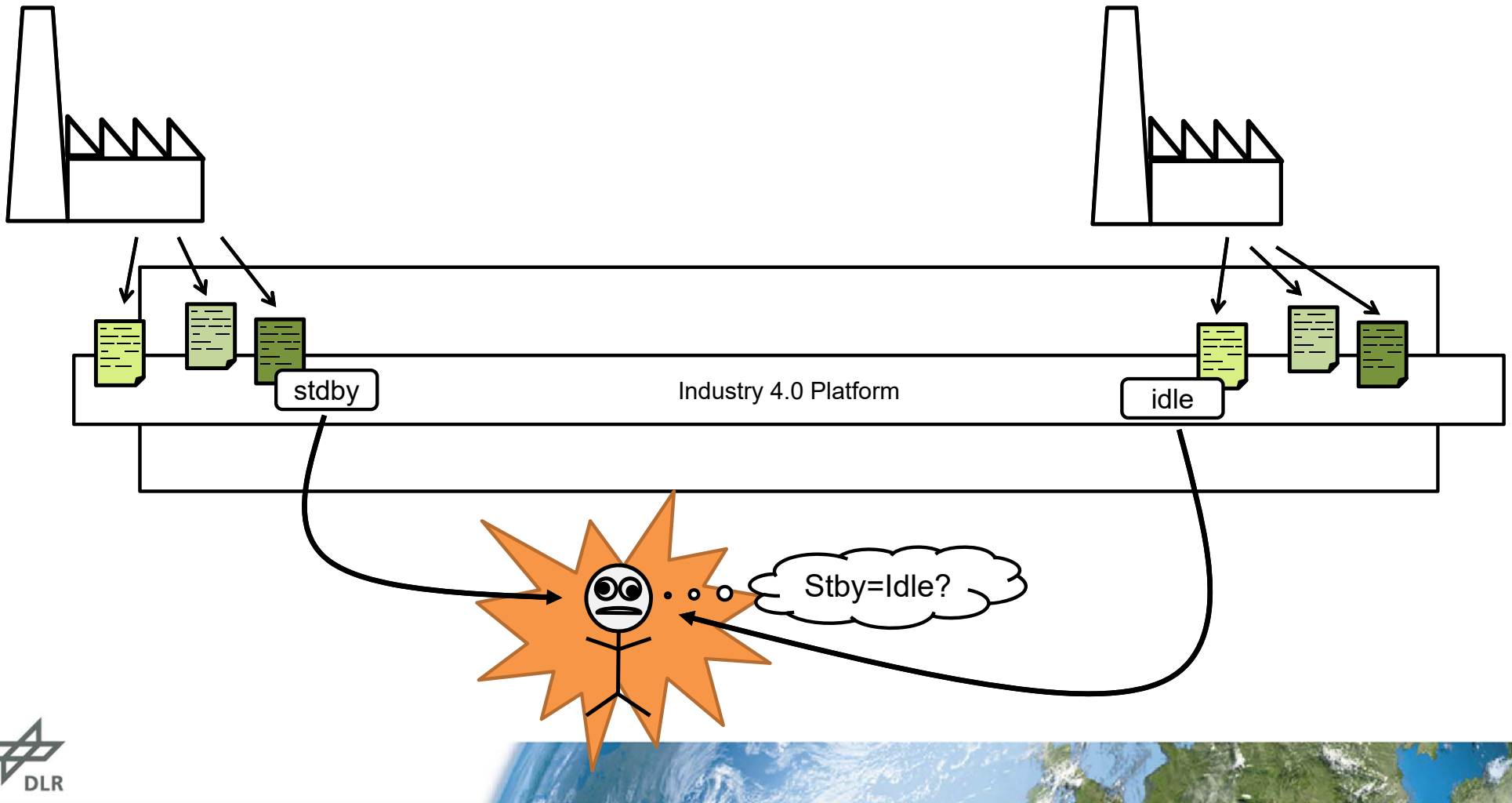
- Design: Mission Concept parameters for OCDT, VirSat, etc.
- Development: Preliminary PUS
- AIT and Operations with EGS-CC: TMTC, PUS, MIB, XTCE, CCSDS

EGS-CC: data from AIT should be reused for utilization

-> need to refer to the same product across different phases



## One Common Semantic Understanding of Supplier Information





## Potential Misinterpretation by Example: TWV640

### Electrical ICD

“The TWV640 camera supports 30Hz and 60Hz frame rates. The 30Hz and 60Hz mode can be offered as a switchable operating mode [...]”

Table 7-2 8-bit YCbCr signal descriptions

Timing Parameter	30 Hz			60 Hz	
	min	typ	max	min	typ
T <sub>frame_active</sub>		30.507			15.253
T <sub>frame_blank</sub>		2.860			1.430
T <sub>frame_total</sub>		33.367			16.683

### Software ICD

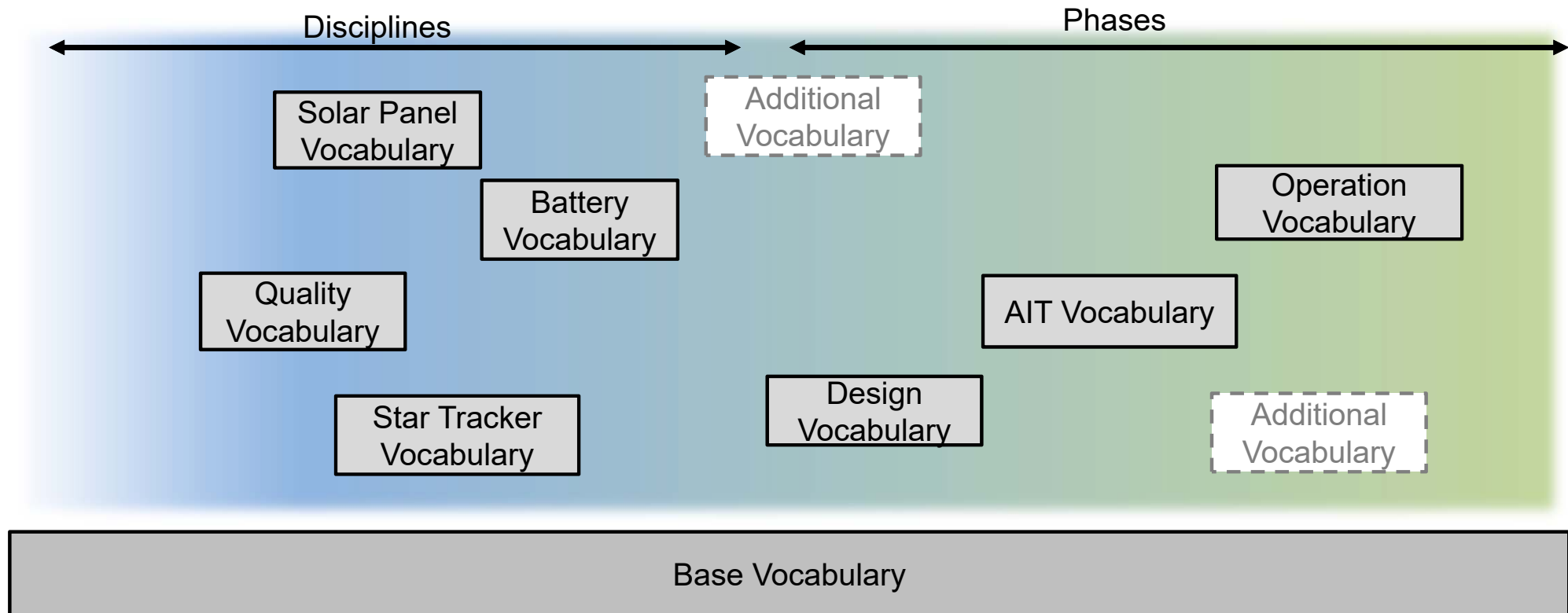
“The TWV640 supports 30 and 60 Hz frame rates [...]”

Root Command: framerate

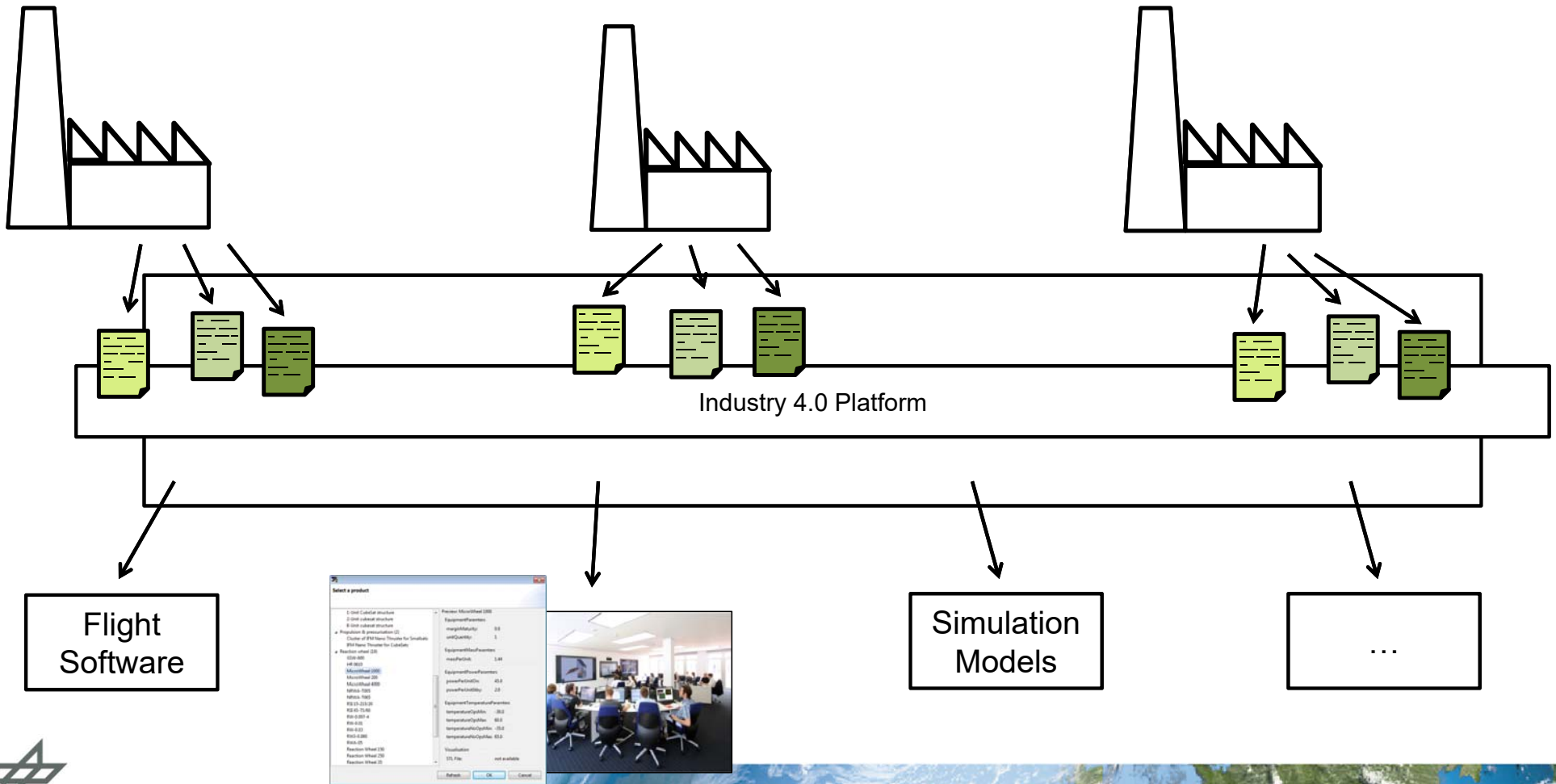
Subcommand	Argument	Description
default*	30   60*	Sets camera default frame rate to either 30 frames per second or 60 frames per second, does not change the current frame rate

How to bring T<sub>frame\_active</sub> and the command *framerate* together? Is that even correct?

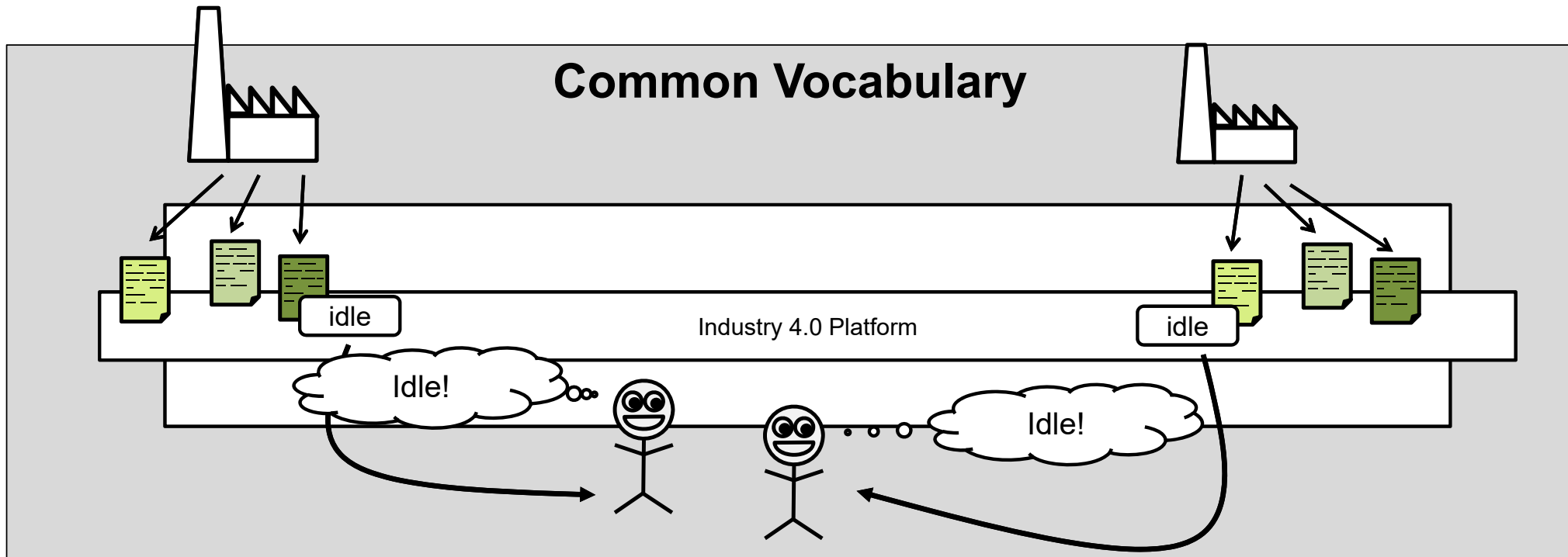
## One Common Understanding Based on Modular Vocabularies



## This is Also Applicable for Simulation, OBSW Development and Many More



## How Many EDS Formats Do You Need To Plan Build A Spacecraft?



What is needed:

- Domain knowledge for capturing relevant parameters, units, ...
- Technical solution requires a serious progress on ontologies in spacecraft design.
- There are probably more / **YOUR** use cases!



Thank you for your attention!  
Questions?

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