

AIRWORTHINESS & SAFETY: ARE WE MISSING A LINK?

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Conference

Athens, 1st June 2017

CREATING TOMORROW



CURRENT SITUATION

- Airworthiness in overall is controlled through various regulations and standards worldwide.
- In the European Union, we regulate:
 - Design Organisations (EASA Part 21)
 - Continuing Airworthiness Management Organisations (EASA Part M)
 - Aircraft Maintenance Organisations (EASA Part 145)
 - Maintenance Training Organisations (EASA Part 147)
 - Certification of maintenance staff (EASA Part 66)



NOTE THAT...

EASA is a safety agency, meaning that all regulations and relevant directives have the scope **to ensure maximum safety levels.**



HOWEVER...

- **We still get surprised** by safety occurrences not anticipated in terms of:
- **technology behaviour,** and
- **human performance**





WHAT WE MUST DO

- **Understand our socio-technical systems** and move beyond linear thinking.
- **Simplify/decouple our systems** when those tend to become highly complicated or complex.
- **Enrich our educational and training programs** with topics that foster critical thinking and resilience.
- **Focus on performance** rather than merely on compliance: decentralize and trust .

A DEEPER LOOK

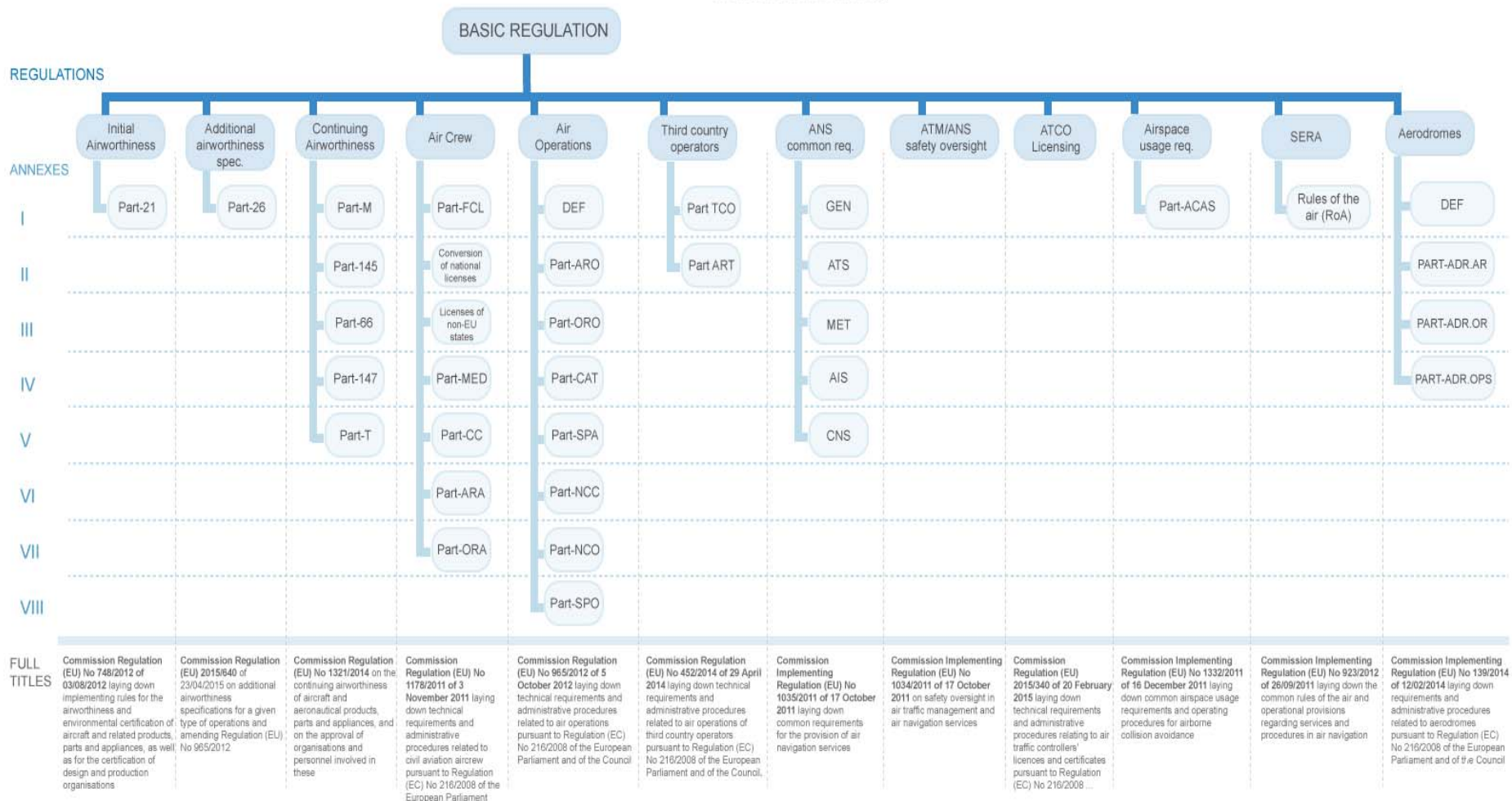
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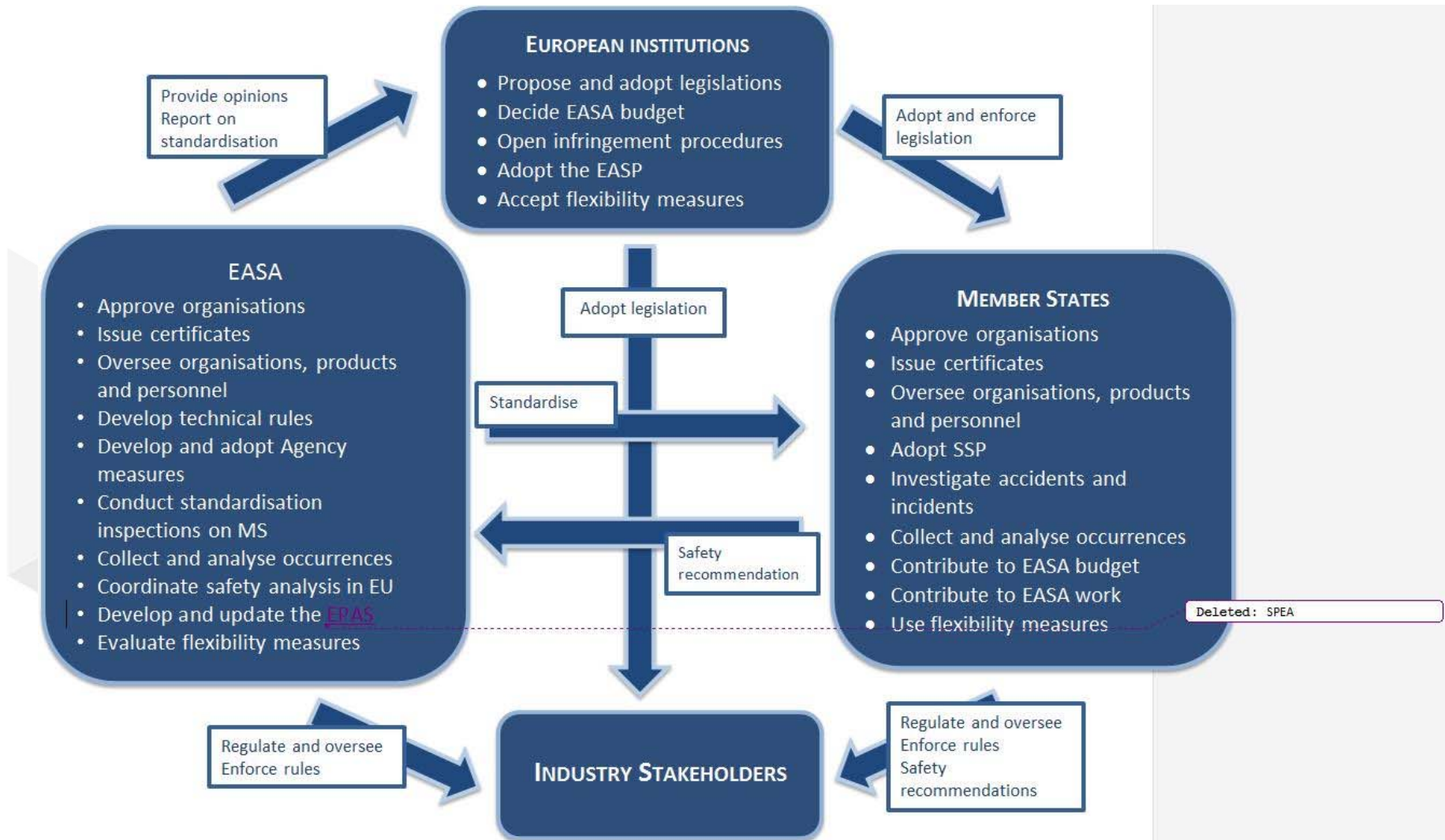


Regulations Structure

Each Part to each implementing regulation has its own **Acceptable Means of Compliance and Guidance Material (AMC/GM)**. These AMC and GM are amended along with the amendments of the regulations. These AMC/GM are so-called 'soft law' (non-binding rules), and put down in form of EASA Decisions. A comprehensive explanation on AMC in form of questions and answers can be found on the FAQ section of the EASA website.

Furthermore, **Certification Specifications** are also related to the implementing regulations, respectively their parts. Like AMC/GM they are put down as Decisions and are non-binding.





A STORY FROM THE WORK FLOOR



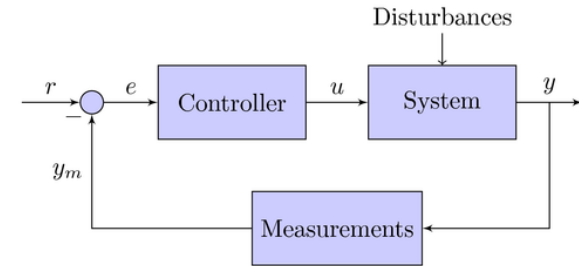
ISN'T THIS A SYSTEM WITH “RELIABLE” COMPONENTS?



The system includes:

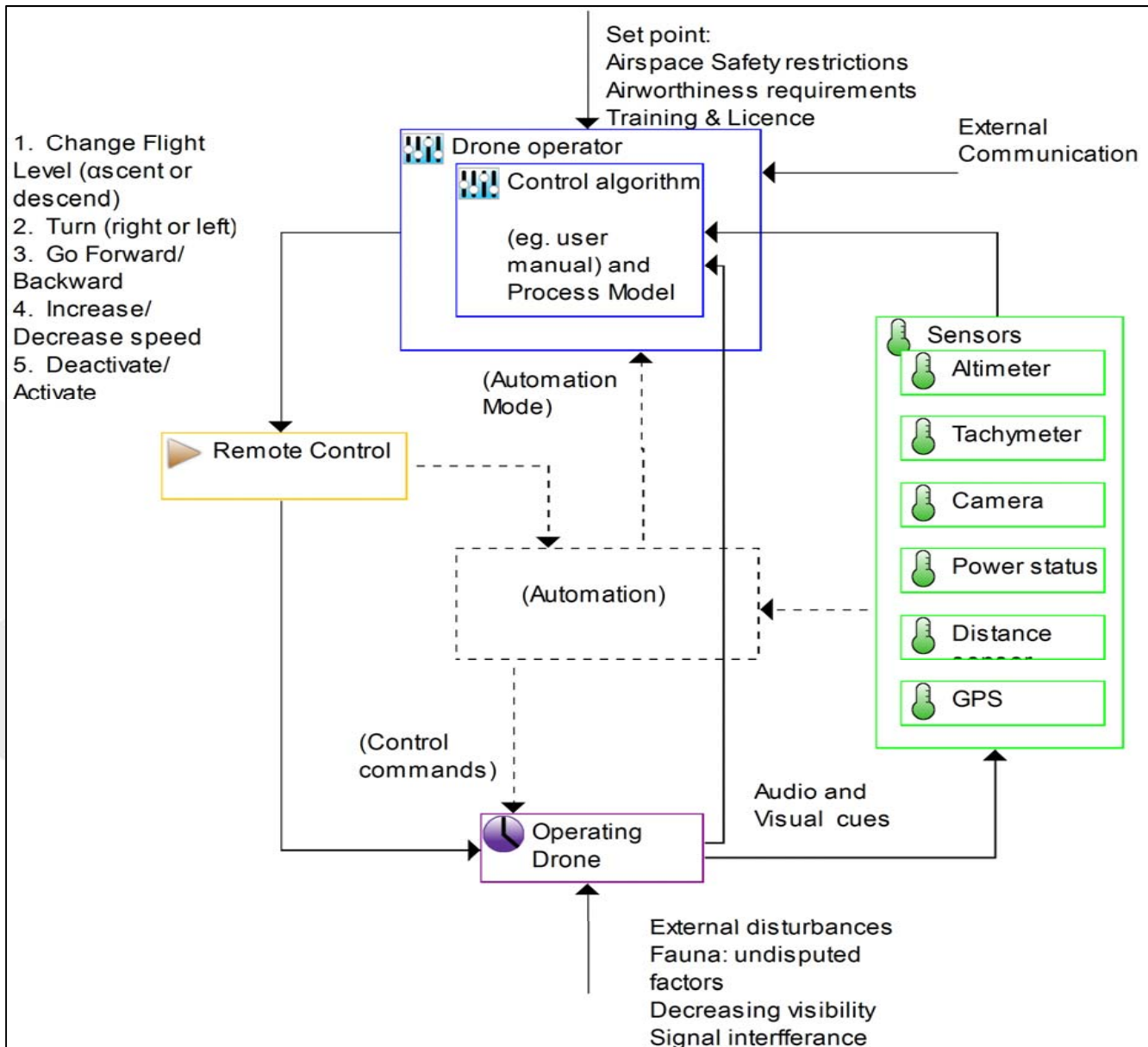
- Reliable vehicles (e.g., periodical mandatory checks)
- Reliable drivers (i.e. licenced!)
- Reliable traffic signalling
- Reliable pedestrians (e.g., educated and trained)

Yet, road incidents and accidents occur.



THE REALITY IS THAT...

- Socio-technical and complex systems **are not just sums of components** put together to execute processes.
- Systems include **also interactions**, and have:
 - **inherent properties** (carried from design - manufacturing)
 - **emergent properties** (visible during operation and maintenance).
- An adequate understanding of the **connections, roles and variability of human and technical components**, will allow us to comprehend:
 - the criticality of roles
 - which parts they affect
 - by what parts they are affected



WHAT FOLLOWS UNDERSTANDING OF SYSTEM STRUCTURE ...

- Hazard analyses based on **top-down approaches** and not merely on probabilistic and deterministic methods focusing on individual behaviours.
- Management of **human and technical variability** under various conditions.
- Explicit **documentation of assumptions** which are inevitable in every stage of systems lifecycle.
- Periodical **validation of assumptions** and not only measurement of system outcomes and compliance with, inevitably, **imperfect requirements**.

THE HUMAN ELEMENT

- **We** design, manufacture, test, use and maintain our systems.
- Talking about 70-80% of human error in safety events is meaningless...**human error is present 100%** but not immediately visible.
- The **same deviations** that lead to successes, sometimes lead to failures.



THE REASONS FOR SAFETY DEGRADATION?

- We become **surprised** by unforeseen and undocumented system states
- We did **not adequately understand** the systems we operate
- We are confronted with **conflicting goals**
- We **lack the resources** required to accomplish all tasks as prescribed
- We had undergone **insufficient training and education**
- We cannot successfully deal with external **distracting and impeding factors**



CALL TO ACTION

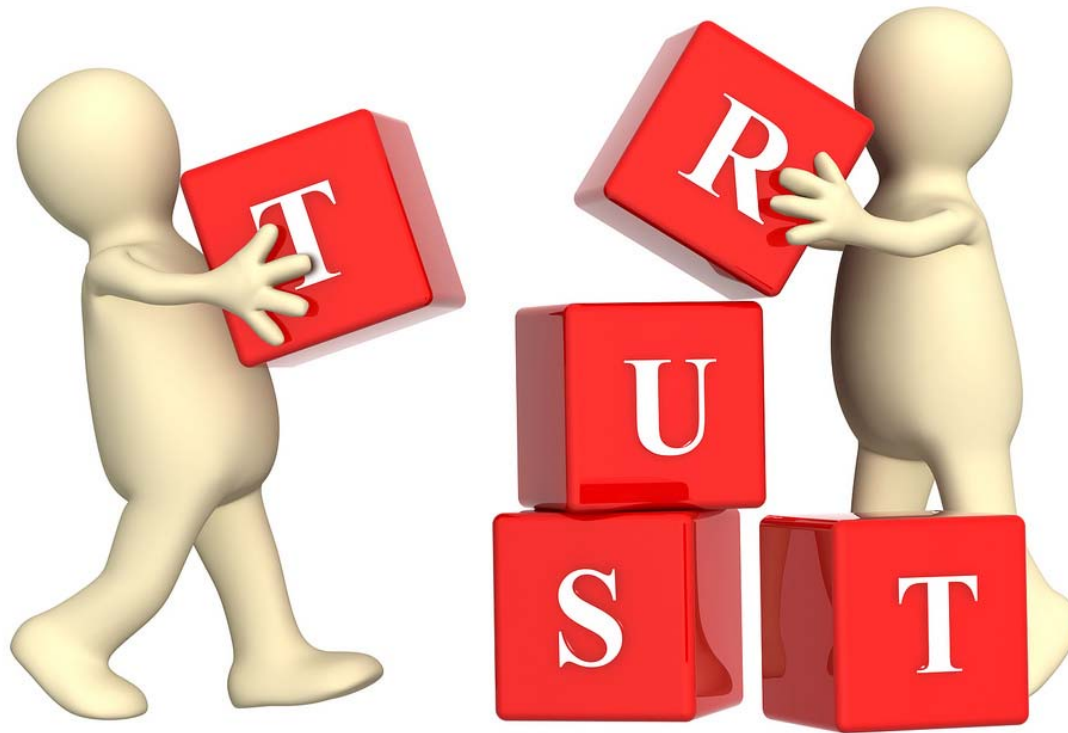
- Let's convert the “human problem” to a “**human solution**”.
- We must foster **understanding of socio-technical systems** as part of education and training. Prescription does not suffice.
- We need to share **experiences and lessons how to balance** between compliance and flexibility.



CALL TO ACTION

- We need **critical thinkers and experts**; people who know when and how much they can deviate from system design.
- We shall **feel free to bidirectionally communicate** (invalid) assumptions and use this information for improving our socio-technical systems.

WHAT IS SAFETY ABOUT AFTER ALL?



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