EASA
European Aviation Safety Agency

GA Road Map: Working towards

Simpler, lighter, better rules for
General Aviation

CS-23 reorganisation workshop

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28 March 2017

Why we reorganise CS-23....and CS-VLA

- The FAA started this initiative in the US with conclusion from the Certification Process Study (July 2009) and subsequent Part 23 Reorganization ARC (August 2011)
- It is a response to the stagnated certification of new part 23 entry level airplanes and the displacement of certified airplanes by experimental and light sport aircraft.

Why we reorganise CS-23....and CS-VLA

- The charter for the Part 23 Reorganization ARC was to :
  - Reorganize part 23 based on performance and complexity instead of weight and propulsion
  - Create tiering in part 23
    - First tier: low-complexity, low-performance.
    - Next tier: medium-complexity, medium-performance
    - Highest tier: high-complexity, high-performance

The first tier sounds like....

JAR-VLA that in the mean time became CS-VLA

Why we reorganise CS-23....and CS-VLA

- Defining appropriate borders for performance and complexity turned out to be difficult

what we have defined in CS-VLA also creates "border-conflicts"

and

Does not revitalize and modernize entry-level aeroplanes

The “Entry Level Airplane” Challenge

Why we reorganise CS-23....and CS-VLA

Current Certification Specification for fixed wing aeroplanes

CS-23 Amendment 4 (July 2015)
Normal, utility, aerobatic
< 9 PAX, MTOM< 5670 kg (12 500 lb)
Commuter (Propeller driven, twin engine)
< 19 PAX, MTOM < 8618 kg (19 000 lb)

CS-VLA Amendment 1 (March 2009)
Single combustion engine
< 2 seats, MTOM< 750 kg
Stall speed < 83 km/h (45 knots)
Day VFR

The certification basis

- When the CS does not provide adequate or appropriate safety standards, we develop Special Conditions.

Objective of the reorganised CS-23

CS-23 should provide requirements that:

1. bring safe designs for aeroplanes
2. support innovation
3. are proportionate with risks
4. can follow technological developments
5. lower administrative burden

CS-23 should provide requirements that:

1. bring safe designs for aeroplanes

Todays specifications have been build from lessons learned and show an acceptable safety level. That must not be lost. However old requirements also do not properly cover new risks!

2. support innovation

Todays specifications are detailed to specific design solutions. (e.g. crashworthy seats) and don't encourage new solutions. New technology could also bring safety benefits

CS-23 should provide requirements that:

3. are proportionate with risks

CS-VLA as a separate specification is allowing a proportionate approach for simple low performance VFR operated aeroplanes. The border with CS-23 is however too rigid.

4. can follow technological developments

Follow, means the ability to go with changes in technology. The number of amendments (and time it takes to complete amendments)

5. lower administrative burden

An up-to-date and proportionate CS-23 will require less Special Conditions

How the CS-23 and CS-VLA are reorganised

The reorganisation of CS-23 and CS-VLA is initially moving the current information into a new organisational structure. Nothing is lost!

- The safety and performance objectives are provided by the new CS-23 requirements
- The design specific details and means of compliance are captured in the AMC.

CS-23 & CS-VLA New Concept

23.2335 Lightning protection

For operations where the exposure to lightning is likely, the aeroplane must be protected against catastrophic effects from lightning.

CS 23.867 Electrical bonding and protection against lightning and static electricity

(a) The aeroplane must be protected against catastrophic effects from lightning.

(b) For metallic components, compliance with sub-paragraph (a) may be shown by –

(1) Bonding the components properly to the airframe; or

(2) Designing the components so that a strike will not endanger the aeroplane.

(c) For non-metallic components, compliance with sub-paragraph (a) may be shown by –

(1) Designing the components to minimise the effect of a strike; or

(2) Incorporating acceptable means of diverting the resulting electrical current so as not to endanger the aeroplane.

CS-VLA 857 Electrical bonding

(a) Electrical continuity must be provided to prevent the existence of difference of potential between components of the powerplant including fuel and other tanks, and other significant parts of the aeroplane which are electrically conductive.

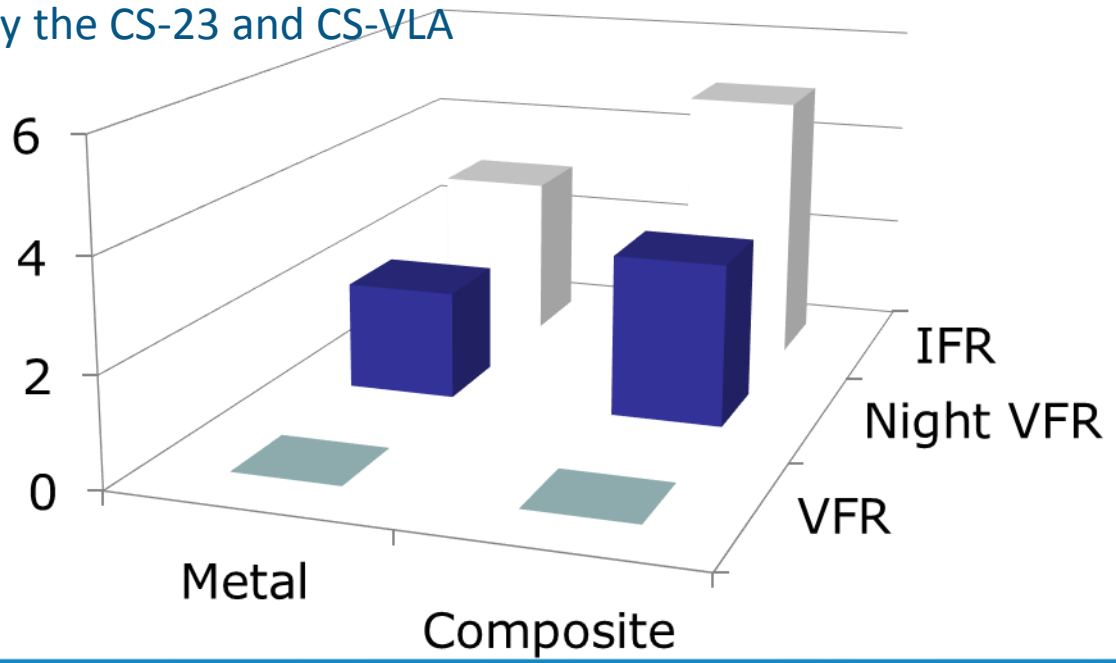
(b) The cross-sectional areas of bonding connectors if made from copper must not be less than 1.3 mm*.

(c) There must be provisions for electrically bonding the aeroplane to the ground fuelling equipment.

CS-23 & CS-VLA New Concept

23.2335 Lightning protection
For operations where the exposure to lightning is likely, the aeroplane must be designed to support continued safe flight and landing when subject to the effects from lightning.

Provide AMC for specific application and/or technology, using initially the CS-23 and CS-VLA content



Reorganised CS-23 and CS-VLA Concept

67 NEW objective requirements replace 377 requirements in CS-23 and CS-VLA

Proportionality is created in the AMC taking into account design and operational specific criteria

And if applicable

A proportionate accepted safety level

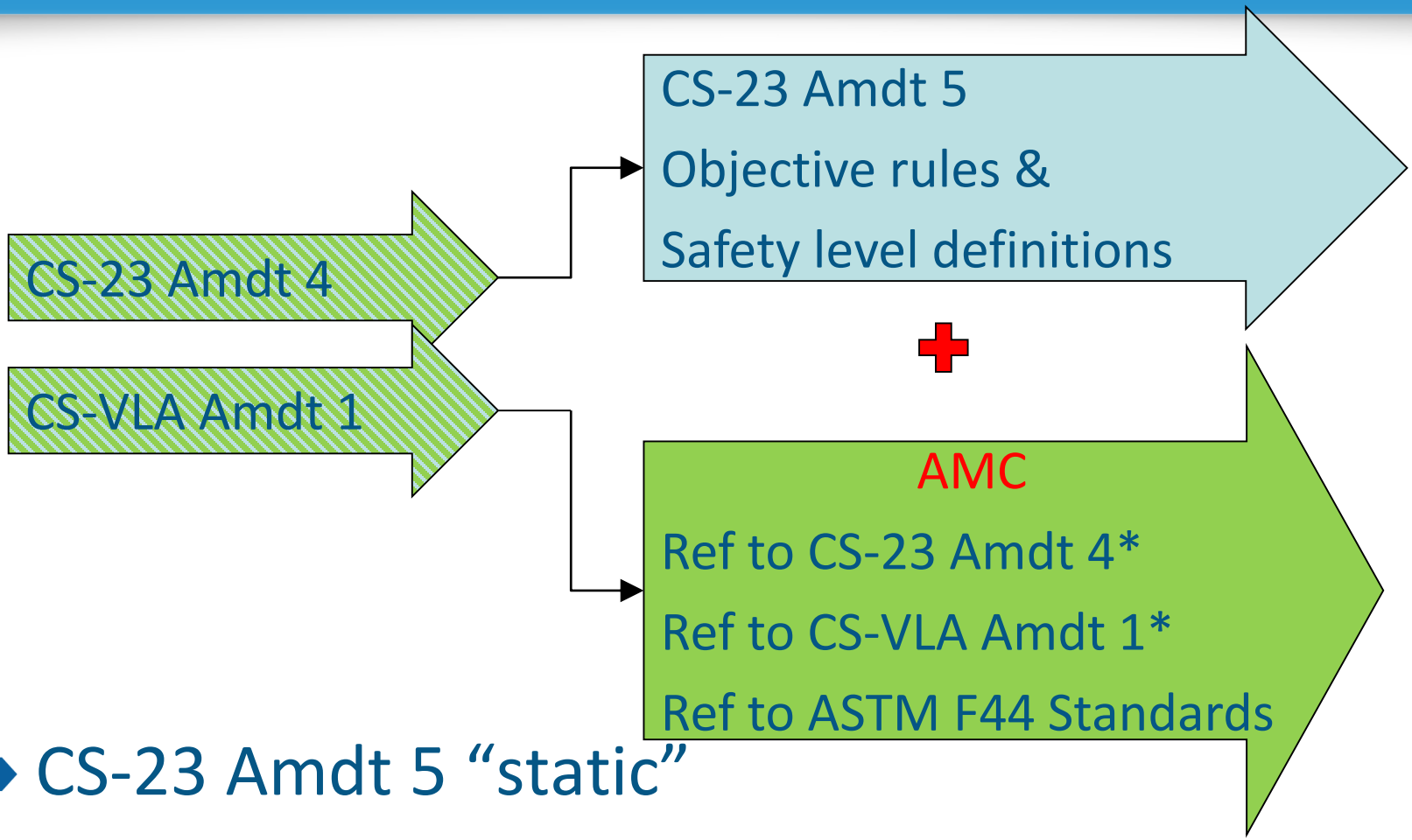
New CS-23 certification levels

- Acceptable safety levels (Risks) were reflected by weight, stall speed, number of people on-board.
- The design specific criteria in the new concept are moved to AMC, while certification levels are defined to capture the risk level associated with the number of people

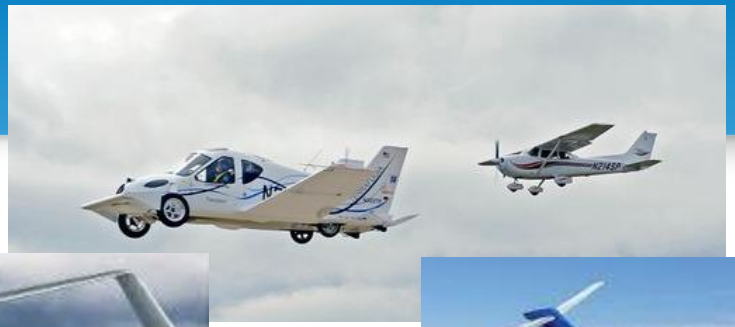
23.2005(b) Aeroplane certification levels

Level 1 — for aeroplanes with a maximum seating configuration of 0 to 1 passengers.
Level 2 — for aeroplanes with a maximum seating configuration of 2 to 6 passengers.
Level 3 — for aeroplanes with a maximum seating configuration of 7 to 9 passengers.
Level 4 — for aeroplanes with a maximum seating configuration of 10 to 19 passengers.

The CS-23/CS-VLA New Concept



- CS-23 Amdt 5 “static”
- AMC Regular updates with innovation

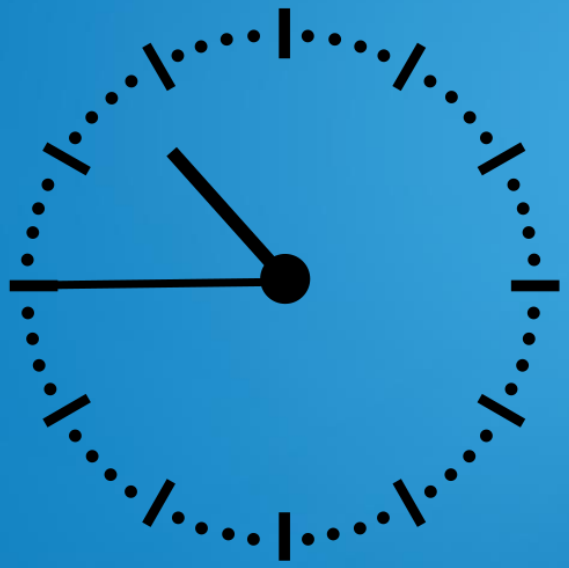


CS-23

Tailored to fit now and in the future

EASA
European Aviation Safety Agency

Questions on the concept



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An agency of the European Union

CS-23 reorganisation workshop Harmoniszzation

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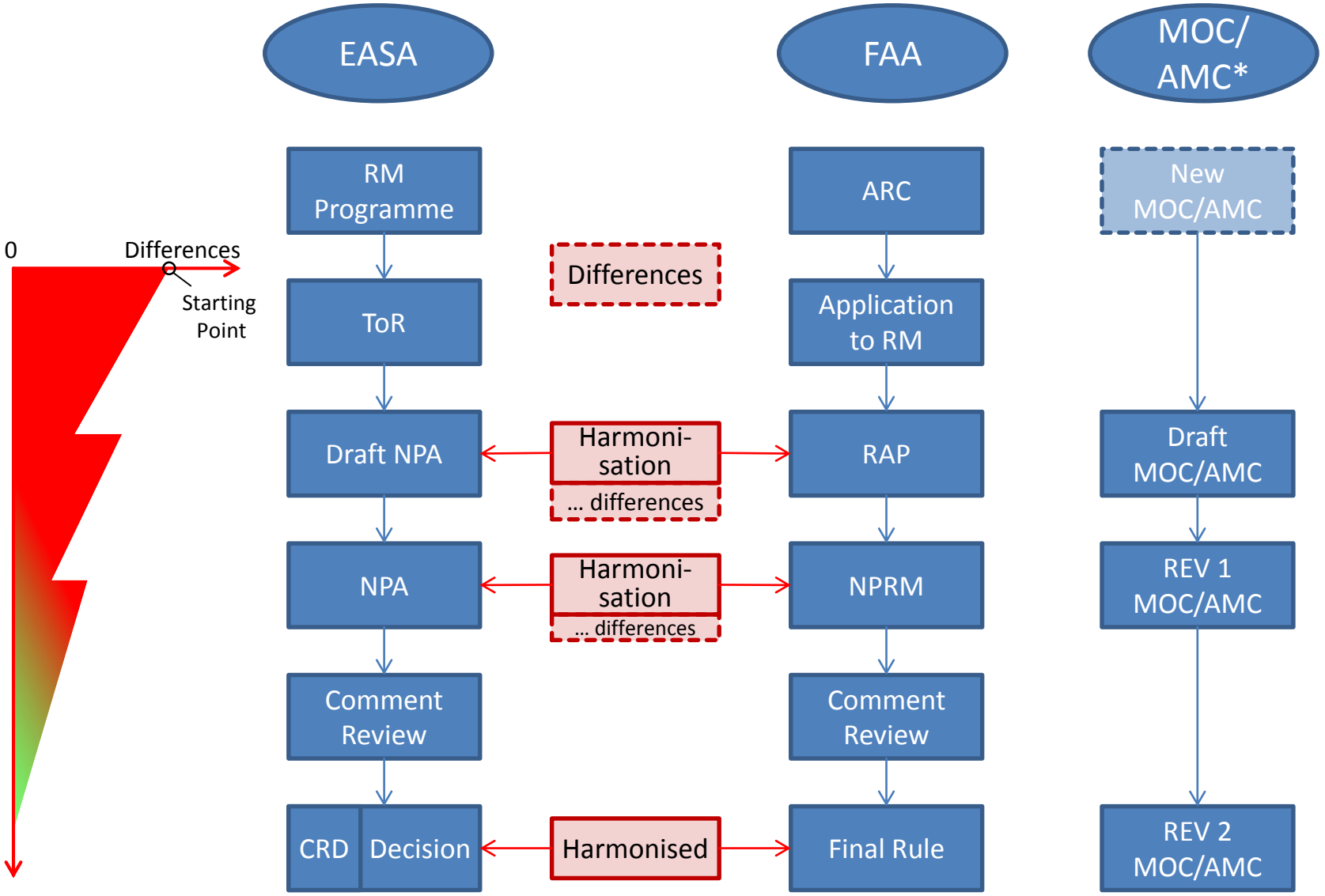
28 March 2017

Harmonisation of CS-23 and Part 23

- EASA and FAA working on a similar change to CS-23/Part 23 in rulemaking tasks that are a pilot project in EASA/FAA rulemaking cooperation
  - objective based rules
  - Supported by consensus standards providing technical details
  - aiming to reach harmonisation

- How important are objective and harmonised rules?
  - Future technology is evolving too fast for the current detailed rulemaking
  - The rules therefore need to provide the common objectives for future technology to be safely applied
  - Harmonisation of the rules and AMC are a cornerstone for easier validation or future acceptance of EASA/FAA certificates
  - This is an example concept for other regulated area

Rulemaking Cooperation Process - Pilot Project Part 23 / CS-23 Reorganisation



* MOC/AMC (means of showing compliance) consists of existing and/or reorganised means of showing compliance to the rules

CS-23/Part 23 harmonisation status

FAA Part 23

FAA published the Part 23 Amendment 64 final rule that will become effective on 30 August 2017

8 Month after the publication date, in order for the FAA to:

- introduce change management. This will allow training of FAA staff and industry engineers,
- development of guidance material and new means of compliance
- and further harmonisation.

Due to the ex parte restrictions it has not been possible for the FAA to discuss, share or elaborate on the various inputs during the rulemaking process which unavoidably has led to an uncoordinated interpretation of comments and conclusion.

EASA CS-23

- NPA 2016-05 published on 23 June 2016
- Consultation ended 30-09-2016
- 25 entities provided 318 comments
- CS-23 Amendment 5 issued 1 April 2017

Are we harmonised? CS-23 Amendment 5/Part 23 Amendment 64

- Distinguish between harmonisation of:
  - rule/requirements
  - Acceptable Means of Compliance

Status of rule/requirement harmonisation:

+ Coordination between EASA and FAA is ongoing
+ Numbering & titles close to full harmonisation

Main structural differences

- 23.2555 Installation of recorders
- 23.2625 Instructions for continued airworthiness
- Establishing **which** information in each subpart (e.g. 23.2170 Operating limitations) and define **how** to present the information in crew interface (23.2605 Installation and operational information)

- Objective:
  - Aim for a common intent that allows the use of the same AMC
  - Allow innovation

Are we harmonised? CS-23 Amendment 5/Part 23 Amendment 64

Status of AMC harmonisation:

- Coordination between stakeholders, including EASA and FAA is ongoing
- Three AMC anticipated:
  1. Referring back to CS-VLA Amendment 1 (To avoid disconnect with existing Cert. basis)
  2. Referring back to CS-23 Amendment 4 (To avoid disconnect with existing Cert. basis)
  3. Referring to ASTM International F44 standards (Living documents)

The initial list of acceptable ASTM F44 standards is build from combining Part-23 Amendment 62, CS-23 Amendment 4 and CS-VLA Amendment 1.

These consensus standards are intended to provide therefore the “building blocks” with proportionality from the current CS-23 and CS-VLA.... and future innovations

Concept conclusion and way forward

- We have a new CS-23 that covers an even wider range than before
- Objective and performance based requirements that are close to harmonisation with the new Part 23
- Harmonisation efforts continue, rule, AMC and also via training module coordination
- The CS-23 will enter into force on August 15th and at that time the first set of AMC will be made available
- The time until entry into force will be used to:
  - Enhance harmonisation
  - Develop and accept AMC
  - Run example test cases

CS-23 reorganisation workshop AMC/ ASTM overview

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Regulations and policy officer
28 March 2017

Use of Consensus Standards as AMC

- The proposed Basic Regulation Principles state:
- The objectives set out in paragraphs 1 and 2 shall be achieved by
  - the development, with the involvement of standardisation and other industry bodies, of detailed technical standards to be used as means of compliance with this Regulation and the delegated and implementing acts adopted on the basis thereof, where appropriate;
- Using standards not at all new!
  - SAE
  - EUROCAE/RTCA
  - ASTM
  - CS-ETSO
  - CS-LSA
  - CS-STAN

ASTM International

- ASTM meets criteria that are beneficial for the acceptance process by EASA:
  - Collaboration and consensus of those affected
  - Openness
  - Balance among competing interests
  - Transparency
  - Due process
  - Timeliness
  - Global relevance

Clearing Up Common Misconceptions

- ASTM does NOT have personnel on staff writing standards for CS-23 use (or any other industry)
- Knowledgeable and experienced volunteer members from around the world across industry, government, academia, etc. create ASTM standards
- ASTM is NOT becoming the “keeper” of CS-23 certification requirements
- ASTM publishing a standard does NOT mean that standard is accepted for CS-23
- CS-23 framework ≠ light-sport aircraft framework

CS-23 Amendment 5

- As explained, the amended CS-23 largely removes prescriptive aspects of the rules, facilitating the introduction of safety enhancing technology by allowing for more options in how compliance is shown
- CS-23.2010 requires an applicant to comply with either AMC issued by EASA or use another means of compliance accepted by EASA. The means of compliance may include consensus standards.
- Industry groups identified ASTM International as the appropriate organization to initiate development of consensus standards

Future Part 23 (cont'd)

- ASTM used the prescriptive requirements of part 23 (Amdt 62), CS-23 (Amdt 4), and CS-VLA (Amdt 1) as the foundation for initial versions of F44 standards
- Like any means of compliance under the proposed amendment, ASTM standards would need to first be accepted by EASA in order to be used in showing compliance with CS-23

ASTM F44 on GA Aircraft

- 230 members / 9 subcommittees
- Multinational effort
  - FAA, EASA, TCCA, CAAC, ANAC, NZ-CAA, CASA
  - Textron, Diamond, Flight Design, Embry Riddle, Pipistrel, Garmin, GAMA, AOPA, NASA, AEA, etc.
- Total of 29 standards needed initially
  - 19 are now published (Additional 10 are parsed out from systems)
  - **None have been officially accepted by EASA for use as means of compliance with CS-23**

ASTM F44 Subcommittees

- F44.10 General
- F44.20 Flight
- F44.30 Structures
- F44.40 Powerplant
- F44.50 Systems and Equipment
- F44.90 Executive
- F44.91 Terminology
- F44.92 Regulatory Liaisons
- F44.93 Industry Liaison

ASTM F44 Published Standards

- General
  - F3060-16 Standard Terminology for Aircraft
  - F3117-15 Standard Specification for Crew Interface in Aircraft
  - F3120/F3120M-15 Standard Specification for Ice Protection for General Aviation Aircraft

ASTM F44 Published Standards

- Flight
  - F3082/F3082M-16 Standard Specification for Flight for General Aviation Aeroplanes
  - F3173/F3173M-15 Standard Specification for Handling Characteristics of Aeroplanes
  - F3174/F3174M-15 Standard Specification for Establishing Operating Limitations and Information for Aeroplanes
  - F3179/F3179M-16 Standard Specification for Performance of Aeroplanes
  - F3180/F3180M-16 Standard Specification for Low-Speed Flight Characteristics of Aeroplanes

ASTM F44 Published Standards

- Structures
  - F3083/F3083M-16 Standard Specification for Emergency Conditions, Occupant Safety and Accommodations
  - F3093/F3093M-15 Standard Specification for Aeroelasticity Requirements
  - F3114-15 Standard Specification for Structures
  - F3115/F3115M-15 Standard Specification for Structural Durability for Small Airplanes
  - F3116/F3116M-15 Standard Specification for Design Loads and Conditions

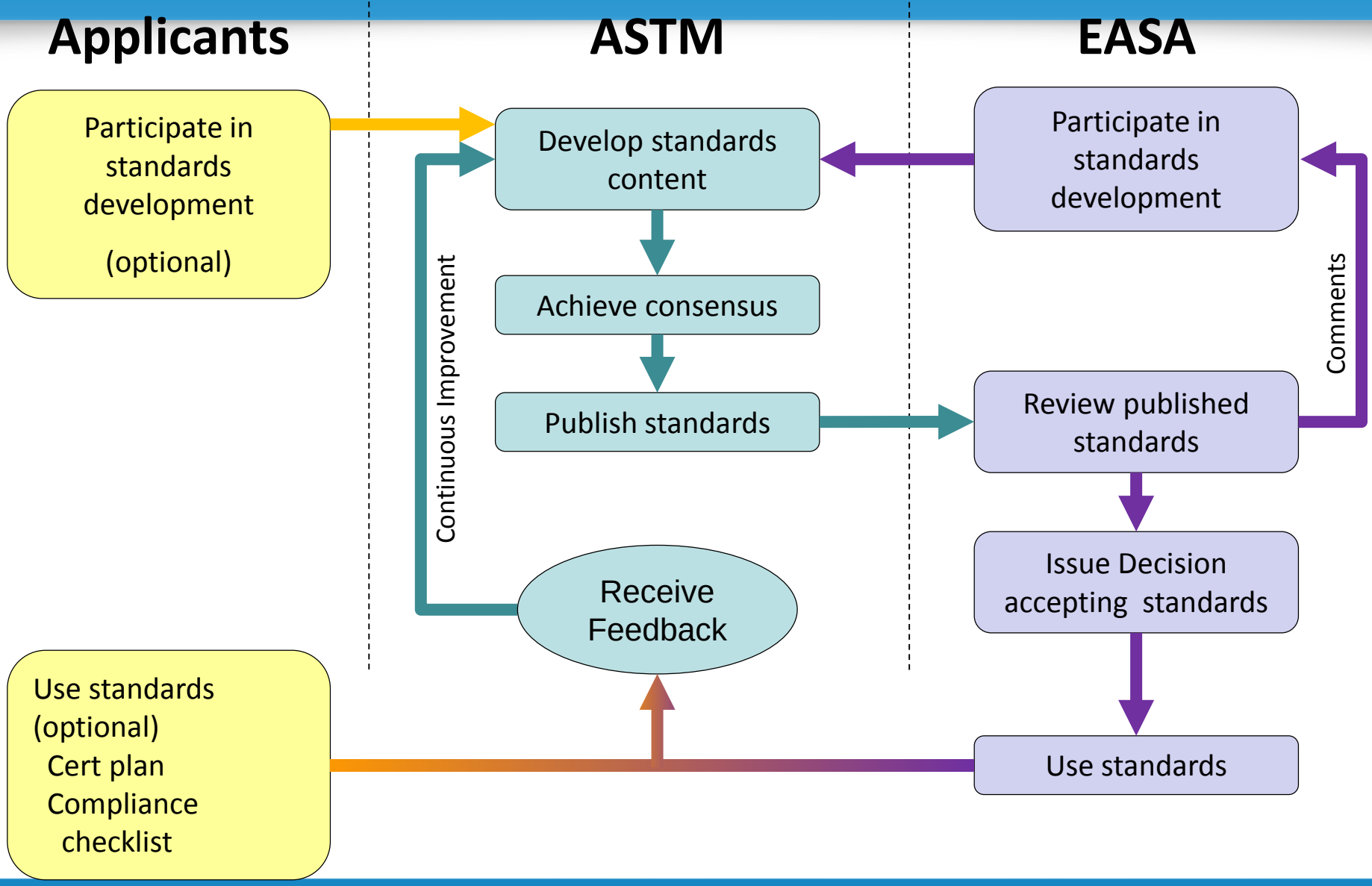
ASTM F44 Published Standards

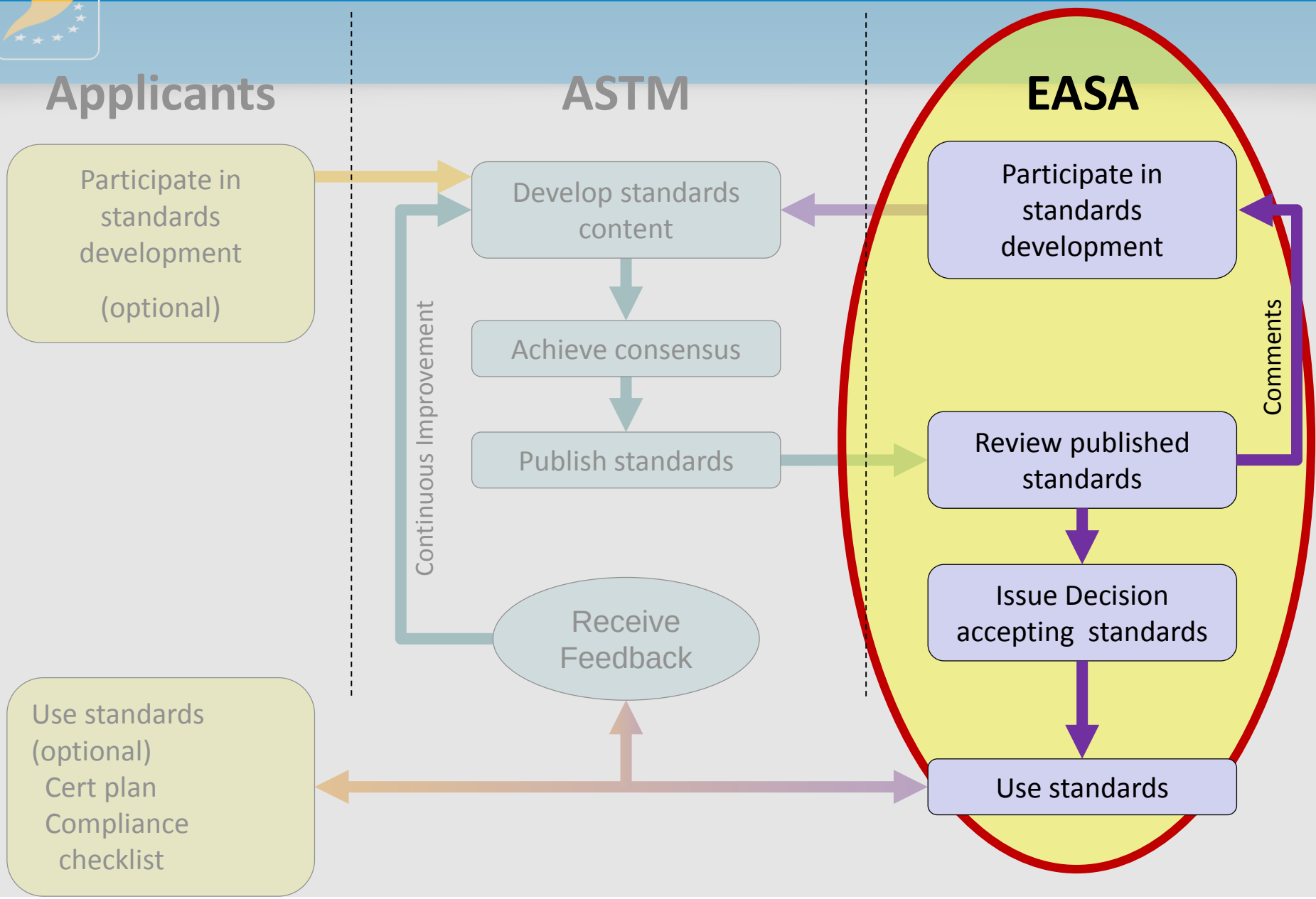
- Powerplant
  - F3062/F3062M-15 Standard Specification for Installation of Powerplant Systems
  - F3063/F3063M-16 Standard Specification for Design and Integration of Fuel/Energy Storage and Delivery System Installations for Aeroplanes
  - F3064/F3064M-15 Standard Specification for Control, Operational Characteristics and Installation of Instruments and Sensors of Propulsion Systems
  - F3065/F3065M-15 Standard Specification for Installation and Integration of Propeller Systems
  - F3066/F3066M-15 Standard Specification for Powerplant Systems Specific Hazard Mitigation

ASTM F44 Published Standards

- Systems and Equipment
  - F3061/F3061M-16 Standard Specification for Systems and Equipment in Small Aircraft
  - F3227* Standard Specification for Environmental Systems in Small Aircraft
  - F3228* Standard Specification for Flight Data and Voice Recording in Small Aircraft
  - F3229* Standard Practice for Static Pressure System Tests in Small Aircraft
  - F3230* Standard Practice for Safety Assessment of Systems and Equipment in Small Aircraft
  - F3231* Standard Specification for Electrical System in Small Aircraft
  - F3232* Standard Specification for Flight Controls in Small Aircraft
  - F3233* Standard Specification for Instrumentation in Small Aircraft
  - F3234* Standard Specification for Exterior Lighting in Small Aircraft
  - F3235* Standard Specification for Electrical Storage Batteries in Small Aircraft
  - F3236* Standard Specification for HIRF Protection in Small Aircraft

* Parsed out from F3061, not yet published


Applicants
ASTM
EASA
Participate in standards development
(optional)
Develop standards content
Achieve consensus
Publish standards
Continuous Improvement
Receive Feedback
Participate in standards development
Comments
Review published standards
Issue Decision accepting standards
Use standards
Use standards (optional)
Cert plan
Compliance checklist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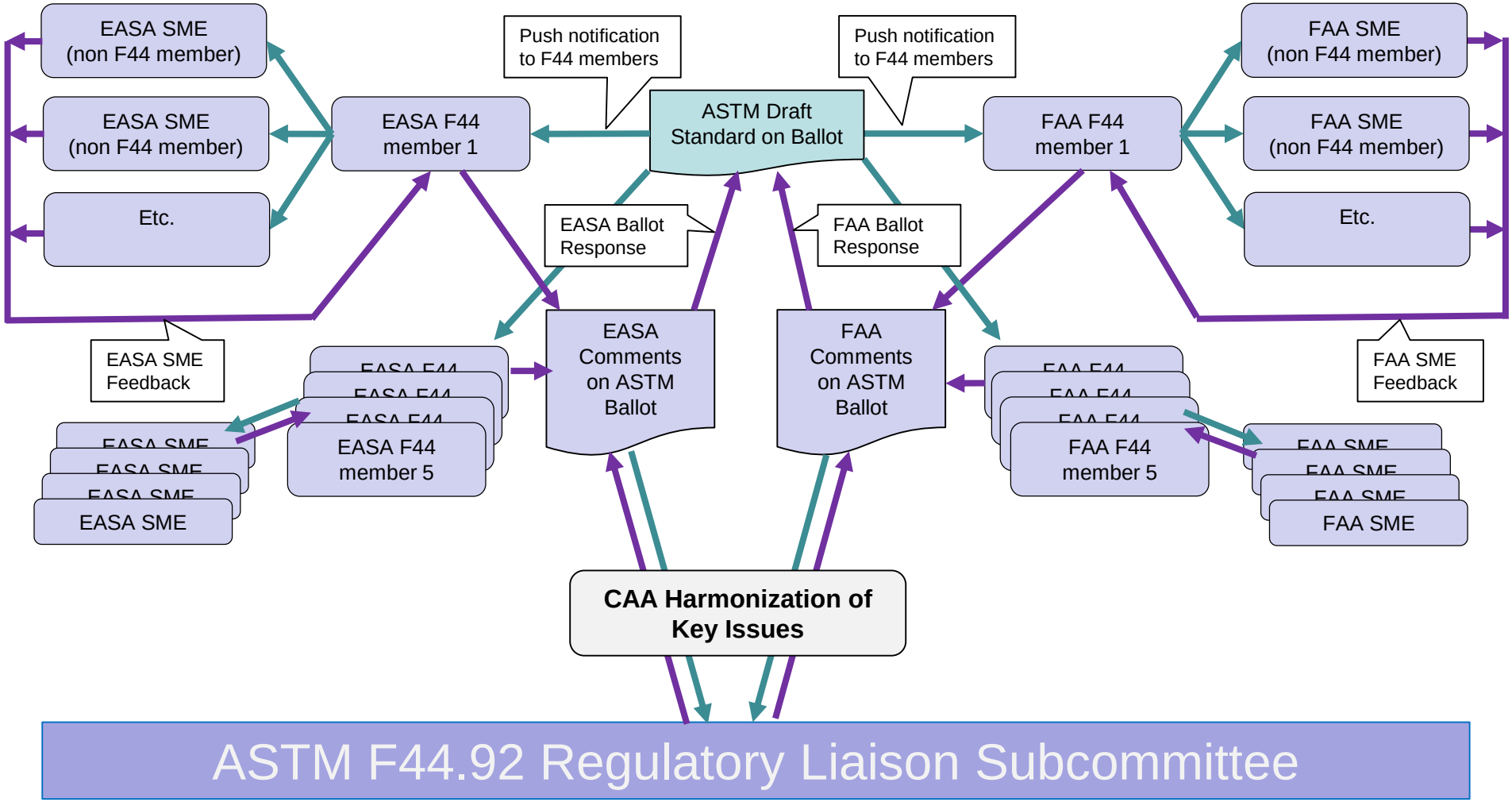
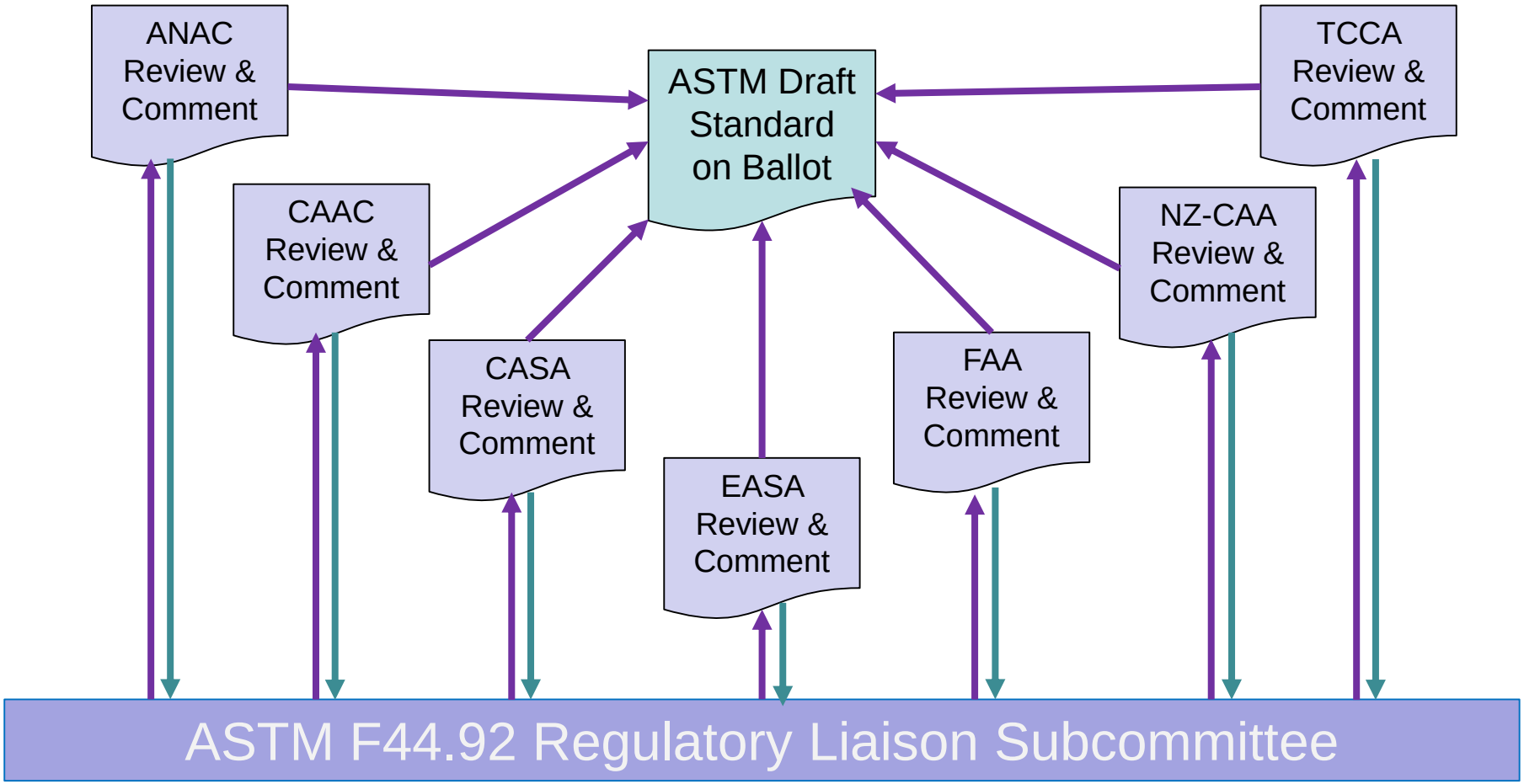
Harmonized Rule Effort

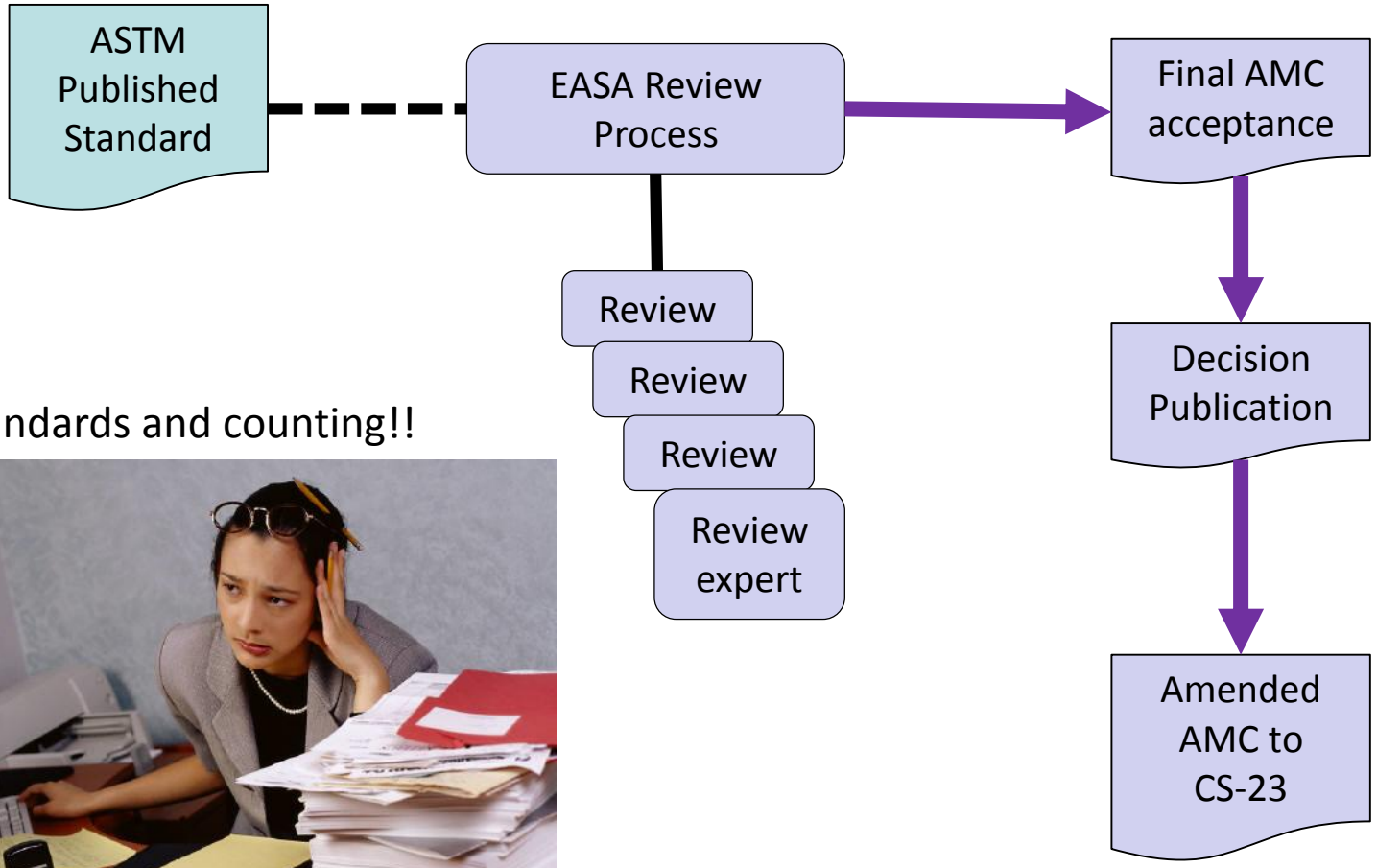
CAA Role in Standards Development



CAA Harmonization



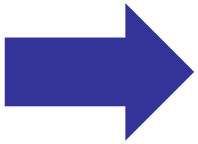
EASA in Standards Acceptance



29 standards and counting!!

Top Level Specification (TLS)

- F44 is developing a Top Level Specification to:
  - Organize the suite of F44 standards
  - Provide a “bridge” between F44 standards content and CAA regulatory requirements
  - Facilitate global CAA harmonization and acceptance of standards
- TLS is not yet finalized or published
- Goal is for coordinated CAA acceptance of TLS



A formal acceptance may specify exceptions or deviations to the published standard(s), but CAAs are striving to minimize these through F44 collaboration

Top Level Specification Concept

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5. Means of Compliance to Subpart B – Flight

5.1 Weight and Centre of Gravity
5.2.1 F3082-15 Standard Specification for Weight and Center of Gravity

5.2 Performance
5.2.1 F3082-15 Standard Specification for Small Aeroplane Performance
5.2.1.1 F5101-16 Standard Specification for…
5.2.1.2 F5102-15 Standard Practice for…
5.2.1.3 F5103-13 Standard Test Method for…

5.3 Stall Speed
5.3.1 F3180-15 Standard Specification for Stall Speed

5.4 Takeoff Performance
5.4.1 F3179-15 Standard Specification for Performance of Aeroplanes
5.4.1.1 F5401-15 Standard Test Method for
5.4.1.2 F5402-14 Standard Practice for…
Note: This Standard is…

5.5 Climb
5.5.1 F3179-15 Standard Specification for Performance of Aeroplanes
5.5.1.1 F5401-15 Standard Test Method for…
5.5.1.2 F5402-14 Standard Practice for…

5.6 Landing
5.6.1 F3179-15 Standard Specification for Performance of Aeroplanes
5.6.1.1 F5401-15 Standard Test Method for…**5.6.1.2** F5402-14 Standard Practice for…

Conclusion

Additional details on ASTM's methods for standards development are available:

- ASTM online training opportunities
  - http://www.astm.org/MEMBER_TRAINING/#NewMember
  - Membership in ASTM is not required to participate in this training
  - Training material is available as 1-hour modules covering fundamentals of standards development

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To be continued....

Technical changes
Impact on the certification process
Open discussion

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