ASTM INTERNATIONAL
Helping our world work better

F44 General Aviation Aircraft

Standards Briefings

10 June 2021

Christoph Genster
F44 1st Vice-Chair

www.astm.org

REVIEW OF TODAY'S AGENDA

TIME	SUBJECT	PRESENTER
10.30	**Welcome and Opening Remarks**	Christoph Genster
10.40	**Administrative Reports** – ASTM HQ Report – Membership Report – F44.90 Executive Subcommittee Report Out	 Joe Koury Brian Richardet Christoph Genster
11.00	**Technical Subcommittee Reports (10min each)** – F44.10 General – F44.20 Flight – F44.30 Structures – F44.40 Powerplant – F44.50 Systems & Equipment – F44.91 Terminology	 Larry Van Dyke/Dean Boston Marten Bosman Joel Heck Christoph Genster Dave Stevens Larry Van Dyke
12:00	**Cross Cutting Activities (10min each)** – AC433 eVTOL certification – AC377 Autonomy in Aviation – AC478 BVLOS	 Tom Gunnarson Stephen Cook Adam Morrison
12.30	**Liaison Reports** – F44.93 Industry Liaison (10min) – F38 UAS Liaison (20min) – GAMA CS 23 / Part 23 Implementation Report Recommendations (20min)	 Anna Dietrich Phil Kenul/Ajay Sehgal Lowell Foster
13.20	**Future Meetings & Closing Remarks** – 24 June 2021 – Regulatory Briefings – Webex – 4 – 8 October 2021 – Atlanta Marriott Marquis; Atlanta, GA, USA (face to face) o *Workshops 4th-5th and F44 Meetings 6-8th* – 4-8 April 2022 – Prague, Czech Republic (face to face) – Other: **ASTM Aviation Standards Meetings**	Christoph Genster
13.30	**Adjourn**	Christoph Genster

F44 STRUCTURE

F44 General Aviation Aircraft Main Committee

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

Cross-cutting Initiatives

- AC377 Autonomy in Aviation
- AC377 eVTOL Certification

REVIEW OF TODAY'S AGENDA

TIME	SUBJECT	PRESENTER
10.30	**Welcome and Opening Remarks**	Christoph Genster
10.40	**Administrative Reports** – ASTM HQ Report – Membership Report – F44.90 Executive Subcommittee Report Out	 Joe Koury Brian Richardet Christoph Genster
11.00	**Technical Subcommittee Reports (10min each)** – F44.10 General – F44.20 Flight – F44.30 Structures – F44.40 Powerplant – F44.50 Systems & Equipment – F44.91 Terminology	 Larry Van Dyke/Dean Boston Marten Bosman Joel Heck Christoph Genster Dave Stevens Larry Van Dyke
12:00	**Cross Cutting Activities (10min each)** – AC433 eVTOL certification – AC377 Autonomy in Aviation – AC478 BVLOS	 Tom Gunnarson Stephen Cook Adam Morrison
12.30	**Liaison Reports** – F44.93 Industry Liaison (10min) – F38 UAS Liaison (20min) – GAMA CS 23 / Part 23 Implementation Report Recommendations (20min)	 Anna Dietrich Phil Kenul/Ajay Sehgal Lowell Foster
13.20	**Future Meetings & Closing Remarks** – 24 June 2021 – Regulatory Briefings – Webex – 4 – 8 October 2021 – Atlanta Marriott Marquis; Atlanta, GA, USA (face to face) o *Workshops 4th-5th and F44 Meetings 6-8th* – 4-8 April 2022 – Prague, Czech Republic (face to face) – Other: **ASTM Aviation Standards Meetings**	Christoph Genster
13.30	**Adjourn**	Christoph Genster

ASTM HQ Report - Joe Koury

F44 Standards Statistics

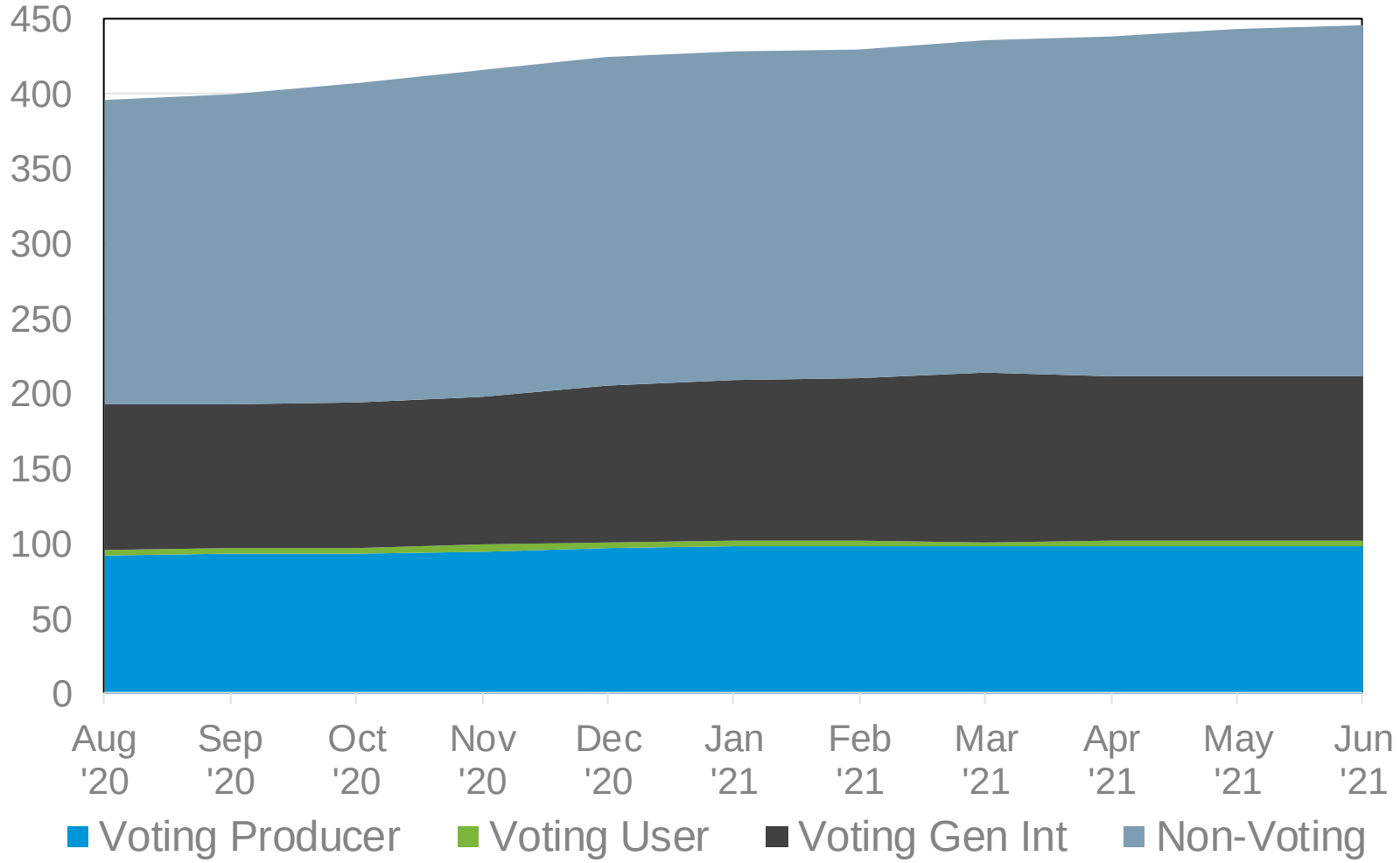
- Approved Standards - 43
- Standards Currently Under Revision - 36
- Proposed New Standards Under Development – 22

ASTM Meeting Update

- July 2021 – committees can begin meeting face-to-face
- May 2021 – survey sent to all F44 members regarding Oct 2021 meeting
- Oct 2021 – F44 to hold face-to-face meeting in Atlanta, Georgia USA
- April 2022 – F44 to meet in Prague, Czech Republic

F44 Membership Report - Brian Richardet

Membership By Month



F44 Membership Report - Brian Richardet

Membership Balance as of June 3, 2021

	Producer	User	General Interest	Total Members
Voting Members	98	4	110	212
Non-Voting Members	127	3	104	234
Total Members	225	7	214	446

- 16 Producer votes available
- +50 Total Members (+19 voting) since Aug '20 Standards Activity Briefing
  - +25 Producer (+6 voting)
  - -1 User (+0 voting)
  - +26 General Interest (+13 voting)

F44.90 Executive Subcommittee Updates

2021 Efforts

Regulatory Cross-References Project

- Assist users to identify linkages to rules
- Validated links through balloting process
- Increase opportunity for authority recognition
- Making baseline information public/Increase visibility on search engines

F44 Standards Management Table

- Created to track & report standards progress
- Efficiently plan TLS inclusions and TLS recognition proposals to EASA & FAA
- Reviewed by F44.90 each January and July

F44.93 Industry Liaison Subcommittee

- F44.90 has revisited the scope of activities of this subcommittee
- We have a revised plan in place
- Update will be presented on Standards Briefings later today

ASTM Aviation Committee Coordination

- Chairs and Vice-Chairs of ASTM F37, F38, F39, F44 and F46 meeting
- Increase coordination and communications

REVIEW OF TODAY'S AGENDA

TIME	SUBJECT	PRESENTER
10.30	**Welcome and Opening Remarks**	Christoph Genster
10.40	**Administrative Reports** – ASTM HQ Report – Membership Report – F44.90 Executive Subcommittee Report Out	 Joe Koury Brian Richardet Christoph Genster
11.00	**Technical Subcommittee Reports (10min each)** – F44.10 General – F44.20 Flight – F44.30 Structures – F44.40 Powerplant – F44.50 Systems & Equipment – F44.91 Terminology	 Larry Van Dyke/Dean Boston Marten Bosman Joel Heck Christoph Genster Dave Stevens Larry Van Dyke
12:00	**Cross Cutting Activities (10min each)** – AC433 eVTOL certification – AC377 Autonomy in Aviation – AC478 BVLOS	 Tom Gunnarson Stephen Cook Adam Morrison
12.30	**Liaison Reports** – F44.93 Industry Liaison (10min) – F38 UAS Liaison (20min) – GAMA CS 23 / Part 23 Implementation Report Recommendations (20min)	 Anna Dietrich Phil Kenul/Ajay Sehgal Lowell Foster
13.20	**Future Meetings & Closing Remarks** – 24 June 2021 – Regulatory Briefings – Webex – 4 – 8 October 2021 – Atlanta Marriott Marquis; Atlanta, GA, USA (face to face) o *Workshops 4th-5th and F44 Meetings 6-8th* – 4-8 April 2022 – Prague, Czech Republic (face to face) – Other: **ASTM Aviation Standards Meetings**	Christoph Genster
13.30	**Adjourn**	Christoph Genster

ASTM INTERNATIONAL
Helping our world work better

ASTM F44.10
General Subcommittee

Greg Bowles
Subcommittee Chair

F44.10 Activities

Standards

- F3264-19 Standard Specification for Normal Category Aeroplanes Certification (TLS)
- 58 Changes to -21 Revision
  - 28 Passed, 20 more in ballot process
  - Expect Completion in July with late July early August Publish

Annexes for Correlation Tables

-- 4 Standards Published with Annex Tables

- 9 Standards in Balloting Process with Annex Tables

- F3117/F3117M-19 Standard Specification for Crew Interface in Aircraft
  - Meets virtually
  - Multiple revisions balloted Jan; 3 revisions passed
  - 2 Practices (stall warning, enhanced indications) and several improvements in process for ballot prior to Oct 2021 meeting
- F3120/F3120M-19 Standard Specification for Ice Protection for General Aviation Aircraft
  - Turbine engine requirements
- F3310-18 Standard Specification for Non-Essential Ice Detectors for Aircraft
  - Current

Guidance

- Editorial Guidelines
  - Cross-reference table development

ASTM INTERNATIONAL
Helping our world work better

ASTM F44.20
Flight Subcommittee

Marten Bosman
Subcommittee Chair

F3082 Weight and Center of Gravity

Task lead: Marten Bosman

- Current version is -17
- Split in Specification and Practice balloted in 2019
- Persuasive negatives received
- Revision developed and discussed in subcommittee,

- Work-items lost due timeout, in process of recovery
- Expected to go for ballot again asap (by July 2021?)

- WK 63579 lost
- WK 68849 lost
- WK 73010 (*cross reference table)* closed
- Proposed new standard under development: WK65205

F3173 Aircraft Handling Characteristics

Task Lead: Kurt Laurie

- Current version is -21
- Several modifications to better match rule language
- Cross reference table included
- WK 73011 (*cross reference table*) can be closed

F3174 Operating Limitations and Information

Task Lead: Robert Kremnitzer

- Current version is -19
- Cross reference table made
- Future integration of AC material anticipated but method under discussion
- No ballot foreseen in 2021
- WK 73012 (*cross reference table)* closed

F3179 Performance of Aircraft

Task Lead: Paulo Turetta

- Current version is -20
- Split in Specification and Practice in preparation
- Climb paragraph revision under discussion
- Cross reference table made
- Expect ballot July 2021
- WKs open: 63580; 68838;
- WK 73013 (*cross reference table)* closed
- Proposed new standards under development: WK65230

F3180 Low-Speed Flight Characteristics of Aircraft

Task Lead: Ron Blum and Nick Borer

- Current version is -19
- Several editorial modifications made and in ballot
- Adaptation for aerobatic aircraft made and in ballot

- Roadmap under development, but temporarily stalled
- Roadmap expected to go for ballot in July 2021

- Future split into Specification and Practice anticipated

- WK 70924 ballot items approved for publication.
- WK 73014 (*cross reference table)* closed

ASTM INTERNATIONAL
Helping our world work better

ASTM F44.30
Structures Subcommittee

Joel Heck
Subcommittee Chair

ASTM F44.30 Leadership Team

Committee Officers
Joel Heck – Chair Matt Kenner – Vice Chair Terry Ercolani - Secretary

Task Leads
John Baldessari – Aeroelasticity Tom Christy – Finite Element Analysis Validation Terry Ercolani – Durability / Low Stress Akm Haque – Simplified Fatigue Spectra / Scatter Factors Joel Heck – Overall Structures Matt Kenner – Occupant Safety Rich Manwell – Design Loads Eric Nottorf – VTOL Incorporation Wael Nour - Aeroelasticity Jason Thomas – VTOL Aeroelasticity Compliance Demonstration Larry Van Dyke – Cross-References / Liaison Jay Yeakle – Emergency Parachute / Simplified Loads

None of this would be possible without the hard work, dedication, and leadership of these individuals! We've got a great team, and there is always room for more!

Accomplishments

- F3498-21 Developing Simplified Fatigue Load Spectra (new)
  - Published Jan 1, 2021
  - Largely based on AC 23-13A
  - Additional guidance regarding maneuver load factor determination
  - A correction to the maneuver load spectra tabular data for twin engine unpressurized general usage
  - Allowance for cycle counting methods instead of ground-air-ground cycle when assembling flight spectra
  - Guidance regarding aerodynamic effects for fuselage pressure load determination
  - Additional guidance regarding severe usage
- F3115 Structural Durability (revision)
  - Incorporation of cross-reference table
  - Published Nov 1, 2020
- F3114 Structures (revision)
  - Incorporation of old 23.775(e)
  - Passed ballot, Apr 19, 2021

Accomplishments

- F3093 Aeroelasticity (revision)
  - Incorporation of cross-reference table
  - Passed ballot, Apr 19, 2021
- Continued progress on VTOL
  - WK68805, Bird strike (F3114 Revision)
  - WK68781, Emergency landing conditions (F3083 Revision)
  - WK77098, New Practice for External Loads Compliance Demonstration for eVTOL aircraft

ASTM F44.30 Standards

Structures	F3114 Structures	F3380 Simplified Structural Compliance	WK69159 FEA Validation	
Fatigue & Damage Tolerance	F3115 Durability	F3498 Fatigue Load Spectra	WK61232 Low Stress Airframe Structure	
Loads	F3116 Loads	F3254 Systems/Structures Interaction	F3331 Water Loads	F3396 Simplified Loads
Flutter	F3093 Aeroelasticity	WK70524 Compliance Demonstration	WK77098 VTOL Compliance Demonstration	
Occupant Safety	F3083 Occupant Safety	F3408 Emergency Parachute		

Dark Blue = Specification

Light Blue = Practice

https://www.astm.org/COMMIT/SUBCOMMIT/F4430.htm

ASTM F44.30 Standards Revisions

Structures	WK68805 F3114 Revision VTOL Bird Strike	WK75928 F3114 Revision 23.775 Windshield	WK73017 F3114 Revision Cross-Reference	WK73061 F3380 Revision Cross-Reference
Fatigue & Damage Tolerance				
Loads	WK69726 F3254 Revision Improvements	WK73019 F3116 Revision Cross-Reference	WK73020 F3254 Revision Cross-Reference	WK73060 F3331 Revision Cross-Reference
Flutter	WK73015 F3093 Revision Cross-Reference	WK68230 F3093 Revision Paragraph 4.1.2		
Occupant Safety	WK68781 F3093 Revision VTOL Conditions	WK73015 F3083 Revision Cross-Reference	WK73021 F3408 Revision Cross-Reference	

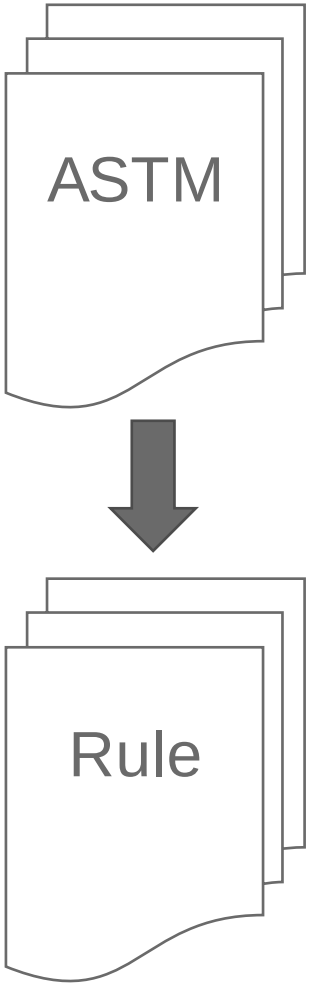
Dark Blue = Specification

Light Blue = Practice

https://www.astm.org/COMMIT/SUBCOMMIT/F4430.htm

Mapping Status

- F3114, Structures
  - 90% complete; need to clean up a few things
- F3115, Durability
  - 100% complete, published
- F3093, Aeroelasticity
  - 100% complete, published
- F3254, Systems and Structures Interaction
  - This standard addresses 1 regulation, need to submit
- F3408, Emergency Parachute
  - 100% complete, published; needs revision for the new format
- F3083, Occupant Safety
  - 70%, in review
- Remaining Specifications to map
  - F3116, Design Loads



Looking to the Future

- Crashworthiness
  - Vertical Seat Attenuation; NASA/FAA working on research
  - Energy storage devices; ongoing work with F44.40
  - Inflatable restraints
  - Alternative injury criteria (use of Hybrid III ATDs)
- FEA Validation (WK69159)
  - Not a new subject; attempting to develop a good set of practical guidance directly applicable to certification projects
- Fatigue & Damage Tolerance
  - Low Stress Airframe Structure (WK61232) for reducing cost
  - F3498 Fatigue Load Spectra for simplified methods published; Scatter Factor guidance is next
- Interaction of Systems and Structures (F3254)
  - Improvements have been balloted – 1 negative to go
- Fixed Wing Aeroelasticity (WK70524)
  - Flutter practitioners have identified a need for compliance demonstration guidance; using AC 23.629 as a baseline
- VTOL (WK68805, WK68781, WK77098)
  - Emergency landing conditions, bird strike, and flutter compliance demonstration

Looking to the Future

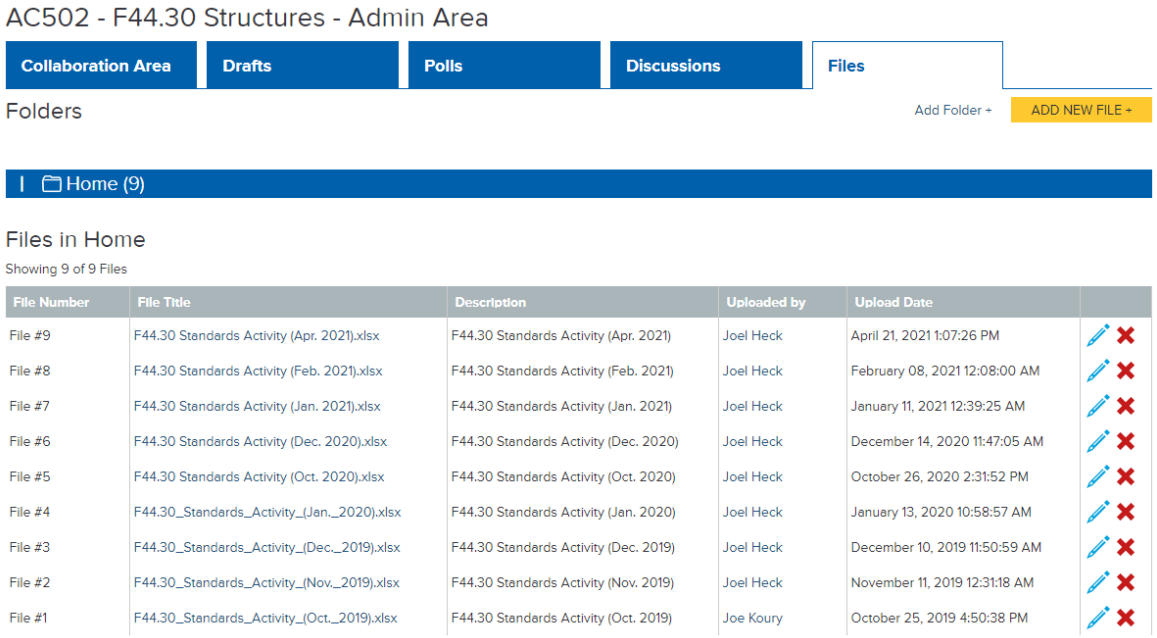
- Technical Cross-Cutting
  - Potential interaction regarding F37 MOSAIC standards readiness – Introduction of Light Personal Aircraft and expansion into electric propulsion
  - Cross-cutting with FEA CAF (Credibility Assurance Framework) working group
  - ASTM F42.07.01 Aviation Subcommittee – Critical Part Classification for Additive Manufacturing

Staying Connected

Committee Officers

Joel Heck – Chair
Matt Kenner – Vice Chair
Terry Ercolani - Secretary

- Collaboration Areas
  - Most work items have collaboration areas with drafts uploaded
  - AC502 - F44.30 Structures - Admin Area
  - https://www.astm.org/COMMIT/SUBCOMMIT/F4430.htm



AC502 - F44.30 Structures - Admin Area

Collaboration Area | Drafts | Polls | Discussions | Files

Folders

Add Folder + ADD NEW FILE +

Home (9)

Files in Home

Showing 9 of 9 Files

File Number	File Title	Description	Uploaded by	Upload Date
File #9	F44.30 Standards Activity (Apr. 2021).xlsx	F44.30 Standards Activity (Apr. 2021)	Joel Heck	April 21, 2021 1:07:26 PM
File #8	F44.30 Standards Activity (Feb. 2021).xlsx	F44.30 Standards Activity (Feb. 2021)	Joel Heck	February 08, 2021 12:08:00 AM
File #7	F44.30 Standards Activity (Jan. 2021).xlsx	F44.30 Standards Activity (Jan. 2021)	Joel Heck	January 11, 2021 12:39:25 AM
File #6	F44.30 Standards Activity (Dec. 2020).xlsx	F44.30 Standards Activity (Dec. 2020)	Joel Heck	December 14, 2020 11:47:05 AM
File #5	F44.30 Standards Activity (Oct. 2020).xlsx	F44.30 Standards Activity (Oct. 2020)	Joel Heck	October 26, 2020 2:31:52 PM
File #4	F44.30_Standards_Activity_(Jan._2020).xlsx	F44.30 Standards Activity (Jan. 2020)	Joel Heck	January 13, 2020 10:58:57 AM
File #3	F44.30_Standards_Activity_(Dec._2019).xlsx	F44.30 Standards Activity (Dec. 2019)	Joel Heck	December 10, 2019 11:50:59 AM
File #2	F44.30_Standards_Activity_(Nov._2019).xlsx	F44.30 Standards Activity (Nov. 2019)	Joel Heck	November 11, 2019 12:31:18 AM
File #1	F44.30_Standards_Activity_(Oct._2019).xlsx	F44.30 Standards Activity (Oct. 2019)	Joe Koury	October 25, 2019 4:50:38 PM

ASTM INTERNATIONAL
Helping our world work better

ASTM F44.40
Powerplant Subcommittee

Christoph Genster
Subcommittee Chair

F44.40 Standards & Work Items

F3062 **Standard Specification for Powerplant Installation - Jeff Knutson**

F3063 **Standard Specification for Fuel Systems - Carlos Mourao**

F3397 **Standard Practice for Aeroplane Turbine Fuel System Hot Weather Operations – Marshall Leemann**

F3064 **Standard Specification for Powerplant Operation, Control & Indication - Marshall Leemann**

- WK68803 eVTOL aspects AC433
- WK72765 FADEC (Jeff Knutsen)

F3432 **Standard Practice for Powerplant Instruments - Marshall Leemann**

F3065 **Standard Specification for Propeller Systems - Scott Randle**

- WK58618 Maintenance of Standard (Scott Randle)
- WK68801 eVTOL aspects AC433

F3066 **Standard Specification for Powerplant Hazard Mitigation - Ray Best**

- WK65947 New Concepts for Fire Protection (Marshall Leemann)
- WK68795 eVTOL aspects AC433

F3239 **Standard Specification for Electric Propulsion Systems - Christoph Genster**

- WK65629 Post Impact Conditions (Tine Tomazic)
- WK66028 Distributed Propulsion (Herb Schlickenmayer)

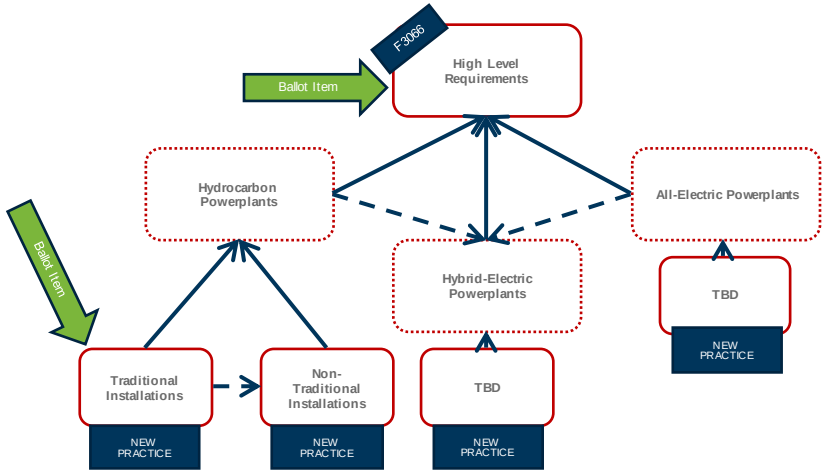
WK72765 – FADEC Requirements

- Incorporation of frequently used special conditions for FADEC installation
- SAIL list item
- Technical Contact: Jeff Knutsen

WK72034 and WK65947
POWERPLANT FIRE PROTECTION

Background

A Standard Practice providing instructions on compliance with powerplant fire protection requirements was started to accommodate novel fire protection methods for existing and “new” powerplant installations. The revision to F3066 and the new Practice are intended to be part of a framework of fire protection requirements that provide the same level of safety afforded by the existing prescriptive requirements.



Status

This item has not experienced any progress due to resource constraints as a result of COVID-19. It remains active, however, and once resources are available it will be resumed.

WK66028 - F3239/ F3316 – Distributed Propulsion Systems

Scope

- Assess F3239 and F3316 standard specifications for changes that may be required to accommodate Distributed Propulsion:
  - F3239-18, Standard Specification for Aircraft Electric Propulsion Systems
  - F3316/F3316M-18, Standard Specification for Electrical Systems for Aircraft with Electric or Hybrid- Electric Propulsion

Technical Approach

- Define Distributed Propulsion Systems for
  - [1] installation only;
  - [2] high-lift configuration; and
  - [3] propulsion-controlled vehicle for eVTOL
- Assess the applicability of each standard for each definition.

Current Status

- Produce the DPS-integrated standards F3239 and F3316
- Distribute for final working group comment

Next Step

- Format for two items in an F44.40 subcommittee ballot with an administrative negative
- Address comments from the ballot
- Ensure that objectives-based standard specifications can be produced with the new functions that DPS enables and integration outside of the traditional Powerplant environment

WK68801 – F3065 – Aircraft Propeller System Installation

Scope

- Assess F3065 standard specifications for changes that may be required for aircraft propeller system installation with consideration for eVTOL.

Technical Approach

- Decompose F3065-19
- Walk through each paragraph and assess its applicability
- Propose inserts for missing requirements

Working Team

- Herb Schlickenmaier (HS Advanced Concepts)
- Will Bohle (Joby Aviation)
- Ray Best (Textron)
- Micah Larson (ES Aero)

WK68795 – F3066 – Powerplant Hazard Mitigation

Scope

- Assess F3066 standard specifications for changes that may be required for aircraft propeller system installation with consideration for eVTOL.

Technical Approach

- Decompose F3066-18
- Assess each paragraph and its applicability
- Propose inserts for missing requirements

Working Team

- Herb Schlickenmaier (HS Advanced Concepts)
- Will Bohle (Joby Aviation)
- Ray Best (Textron)
- Micah Larson (ES Aero)

WK68803 - F3064/F3432 – Powerplant Indication for EVTOL

- Request from AC433 to revise the F3064 to address EVTOLs
- F3432 was published since the WK68803 was open and was added to the scope
- Conventional take-off airplanes with eletric prop Other electric airplanes (e-CTOL) powerplant indications

F44.40 Roadmap

- 2021
  - FADEC
  - Distributed Propulsion
  - F3239 as accepted means of compliance for basic electric propulsion
- 2022
  - SAIL-List item
  - Hydrogen
  - eVTOL

Recent Accomplishments

F3397/F3397M-21
Standard Practice for Aeroplane Turbine Fuel System Hot Weather Operations

Incorporation of Cross reference matrix in most specifications

1st ballot for Distributed Propulsion

F44.40

Committee Officers

Christoph Genster– Chair
Luciano Serra – Vice Chair
Alexandru Duminica - Secretary

- Collaboration Areas AC 398 for meeting material and helpful information

- Webex meetings every other Thursday 10 am EST, 16 pm CET
  - Access information available via
    - ASTM F44 Google Calendar
    - Collaboration Areas AC 398

Additional Task group meetings as needed

ASTM INTERNATIONAL
Helping our world work better

ASTM F44.50
Systems & Equipment Subcommittee

David Stevens
Subcommittee Chair

F44.50 – Systems and Equipment

Membership Update – 6 Available Producer Votes

	Producer	User	Consumer	General Interest	Unclassified	Total
Official Voting Member	67	8	0	65	0	140
Non Official Voting Member	48	0	0	38	0	86
TOTAL	115	8	0	103	0	226

F44.50 – Systems and Equipment

Standards Status

- Main Committee Ballots
  - None

- Subcommittee Ballots
  - NEW – Specification for [Cybersecurity] – Ballot Closed 05-26-21
  - F3061 Revision – Ballot Closed 06-07-21
  - F3236 Revision – Ballot Closed 06-07-21
  - F3367 Revision – Ballot Closed 06-07-21

- Previous Subcommittee Meeting Efforts
  - Several Negatives dispositioned at the May Virtual Subcommittee Meeting
  - A ballot to uphold the Subcommittee findings should be out soon

F44.50 – Systems and Equipment

Current Activities

- New Standards In Work
  - WK60748 – Application of Systems-Theoretic Process Analysis (STPA) – Contact: Dave Stevens
  - WK61549 – Indirect Control Systems in Aircraft – Contact: Dave Stevens
  - WK63976 – Establishing the Net Safety Benefit of Aircraft Systems – Contact: Davy Armstrong
  - WK68766 – Sensor Fusion in General Aviation Aircraft – Contact: Tom Gunnarson
  - WK68767 – Simplified Vehicle Operations (SVO) in General Aviation Aircraft – Contact: Anna Dietrich

- Revisions In Work
  - Cross-Reference Tables – Contact: Dave Stevens
  - F3061 – Systems & Equipment – Contact: Eddie Estagin

- Nearing Expiration
  - F3228 – Flight Data and Voice Recording
  - F3229 – Static Pressure System Tests
  - F3234 – Exterior Lighting
  - F3235 – Aircraft Storage Batteries
  - F3236 – HIRF Protection

ASTM INTERNATIONAL
Helping our world work better

ASTM F44.91
Terminology Subcommittee

Larry Van Dyke
Subcommittee Chair

F3060 Standard Terminology for Aircraft

F3060-20

- No additional revisions are in work at this time.
- Several groups looking at terminology for new technology that may result in additional annexes or revisions to existing Annex in the future.

REVIEW OF TODAY'S AGENDA

TIME	SUBJECT	PRESENTER
10.30	**Welcome and Opening Remarks**	Christoph Genster
10.40	**Administrative Reports** – ASTM HQ Report – Membership Report – F44.90 Executive Subcommittee Report Out	 Joe Koury Brian Richardet Christoph Genster
11.00	**Technical Subcommittee Reports (10min each)** – F44.10 General – F44.20 Flight – F44.30 Structures – F44.40 Powerplant – F44.50 Systems & Equipment – F44.91 Terminology	 Larry Van Dyke/Dean Boston Marten Bosman Joel Heck Christoph Genster Dave Stevens Larry Van Dyke
12:00	**Cross Cutting Activities (10min each)** – AC433 eVTOL certification – AC377 Autonomy in Aviation – AC478 BVLOS	 Tom Gunnarson Stephen Cook Adam Morrison
12.30	**Liaison Reports** – F44.93 Industry Liaison (10min) – F38 UAS Liaison (20min) – GAMA CS 23 / Part 23 Implementation Report Recommendations (20min)	 Anna Dietrich Phil Kenul/Ajay Sehgal Lowell Foster
13.20	**Future Meetings & Closing Remarks** – 24 June 2021 – Regulatory Briefings – Webex – 4 – 8 October 2021 – Atlanta Marriott Marquis; Atlanta, GA, USA (face to face) o *Workshops 4th-5th and F44 Meetings 6-8th* – 4-8 April 2022 – Prague, Czech Republic (face to face) – Other: **ASTM Aviation Standards Meetings**	Christoph Genster
13.30	**Adjourn**	Christoph Genster

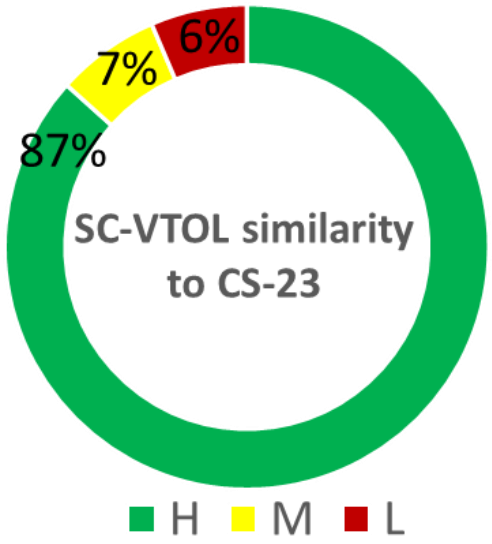
ASTM INTERNATIONAL
Helping our world work better

AC433 eVTOL Certification Briefing

Tom Gunnarson
AC433 Co-lead

Overview

- AC433 was convened in spring 2019 to serve a coordinating role in identifying and addressing gaps in the available means of compliance for eVTOL aircraft
  - F44, F39 focus with F37 & F38 connectivity
- 14CFR23 A64 (and SC-VTOL, which is 87% CS-23) used as baseline rule language
- ASTM F44 MOC from F3264 used as starting point
- AC433 is not doing technical work, rather serving as a coordinating, recruiting, program management role
- Meeting every two to four weeks
- Co-leads: Tom Gunnarson & Anna Dietrich



AC433: 23 Active Work Items

Subject/Title	Standard	Sub Comm	WK number
Aircraft Electric Propulsion System (EPS) Design & Installation	F3239	F44.40	WK65620
Electric Propulsion Unit Design (EPU)	F3338	F39.05	WK67455
Electric Propulsion Energy Storage Systems (ESS)	NONE	F39.05	WK56255
Emergency Conditions	F3083	F44.30	WK68781
Bird Strike	F3114	F44.30	WK68805
Handling Characteristics	F3173	F44.20	WK63578
Performance	F3179	F44.20	WK63580
Energy Shedding (Crashworthiness)	F3239	F44.40	WK65629
Electric Propulsion Unit Design (EPU)	F3338	F39.05	WK66523 & WK68764
Integral Thrusters	F3338	F39.05	WK70381
Aircraft Powerplant Control and Indication	F3064	F44.40	WK68803
Design Loads and Conditions	F3116	F44.20	Pending

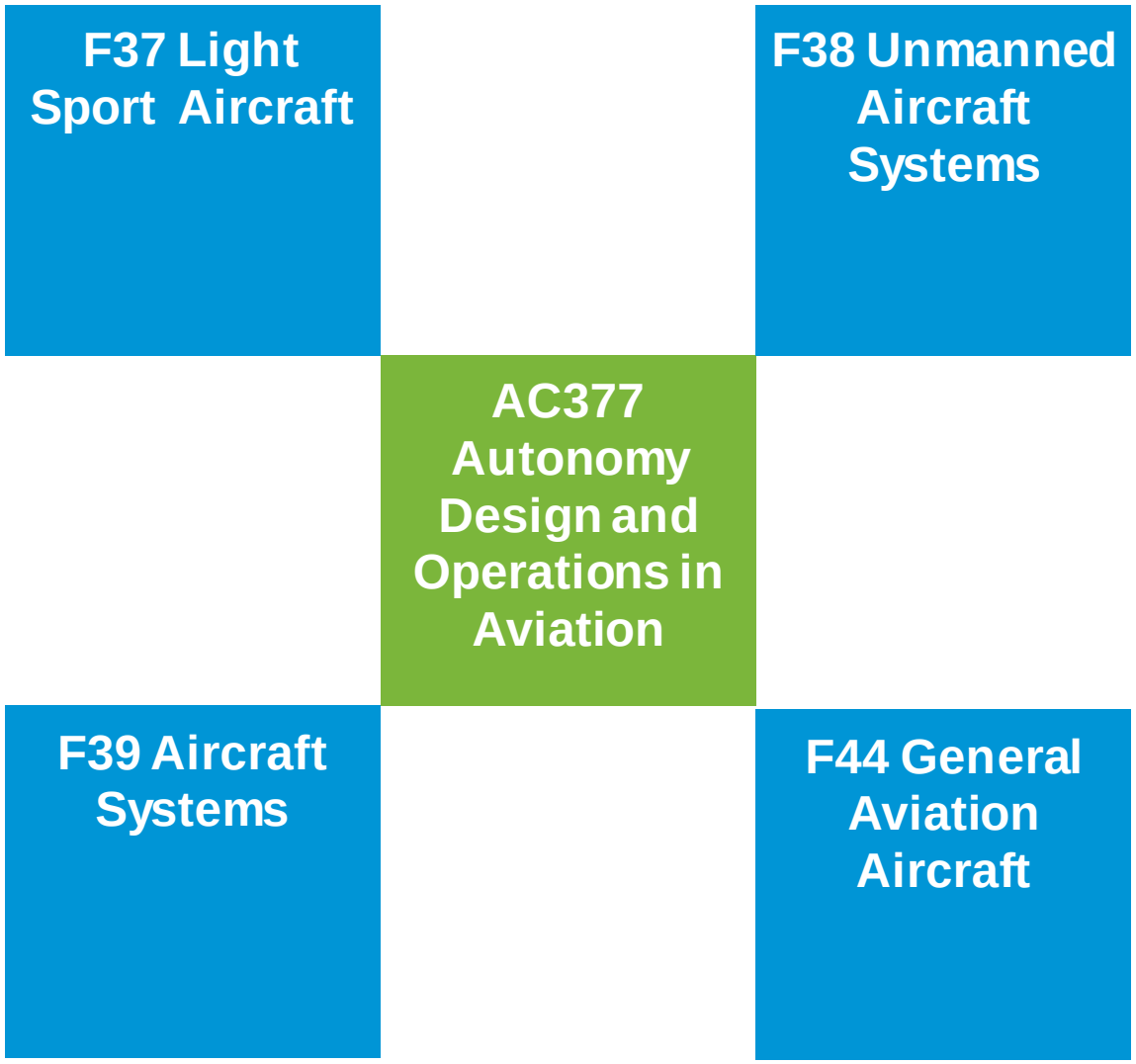
Subject/Title	Standard	Sub Comm	WK number
Aircraft Propeller System Installation	F3065	F44.40	WK68801
Powerplant Hazard Mitigation	F3066	F44.40	WK68795
Safety Assessment of Systems and Equipment	F3230	F44.50	WK68765
Distributed Electric Propulsion	F3239	F44.40	WK66028
Inadvertent Icing	NONE	F44.10	WK68757
Simplified Vehicle Operations (SVO)	NONE	F44.50	WK68767
Weight and CG	F3082	F44.20	WK68849
Crew Interface - SVO modifications/coordination	F3117	F44.10	WK68779
Specification for Low-Speed Flight Characteristics of Aircraft	F3180	F44.20	WK70924
Maintenance Standards	NONE	F44.10	WK68762
Acoustic Evaluation Practice	NONE	F44.10	WK68763
Sensor Fusion	NONE	F44.50	WK68766

ASTM INTERNATIONAL
Helping our world work better

AC377 Autonomy in Aviation Briefing

Stephen Cook
AC377 Chair
F38.01 Airworthiness Chair

ASTM produces industry standards for aviation



4 Areas of Focus for AC377:

- Terminology
- Requirements framework for certification
- Design "pillars" of autonomy
- Regulatory barriers

F46 Aerospace Personnel

Some Benefits of bringing autonomy into aviation

Improved Light Sport and General Aviation safety

Refuse-to-crash

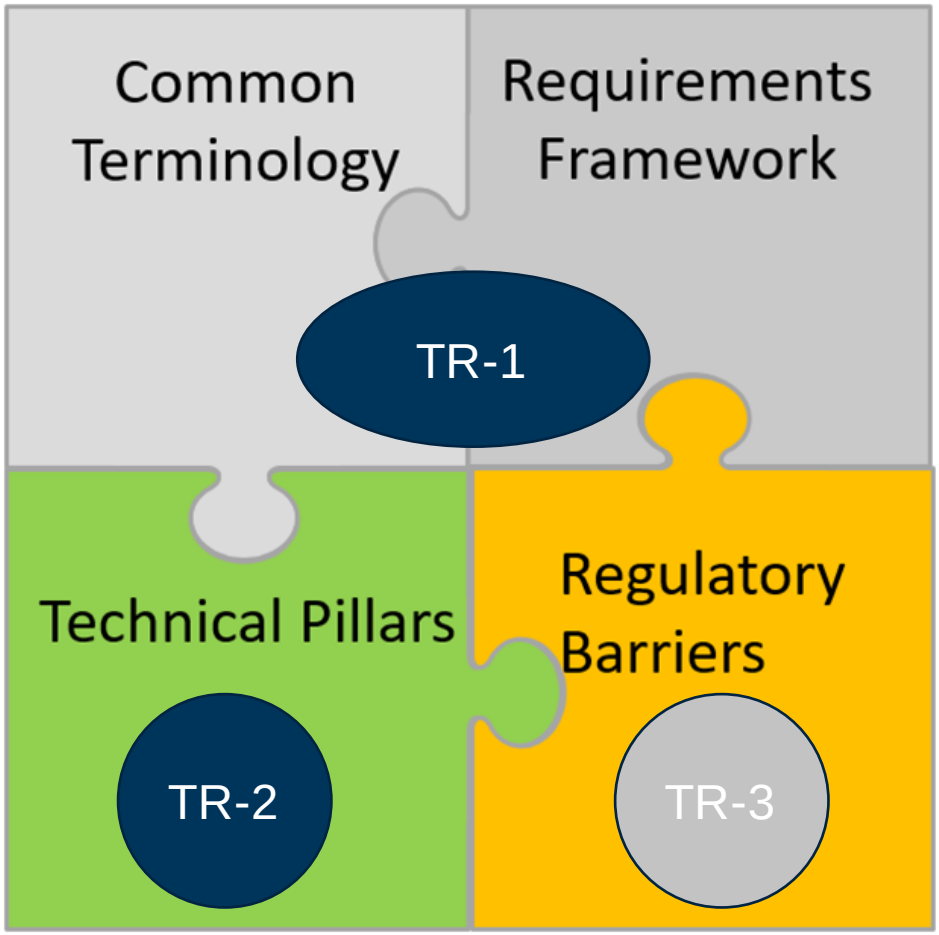
New UAS applications

Automated collision avoidance

System robustness and certification

Advanced aerial mobility - unlock underutilized areas of airspace

AC377 proposes a Holistic Approach to incorporating autonomy in aviation



Bring stakeholders together from industry, government, academia, research, operations, etc.

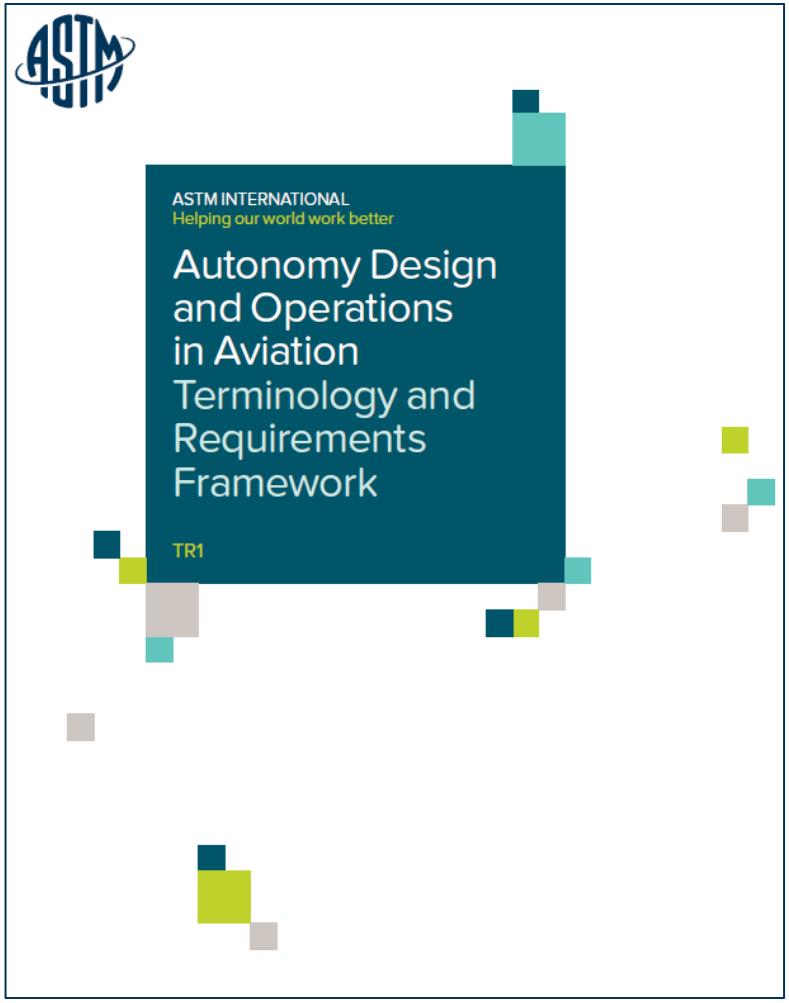
Build consensus recommendations regarding autonomy for standards committees

Publish recommendations in the form of Technical Reports:

- Terminology and Requirements Framework – 2019
- Technical Pillars – 2020
- Regulatory Barriers - 2021

Gap Analysis and Standards

AC377 TR-1:
Terminology and Requirements Framework

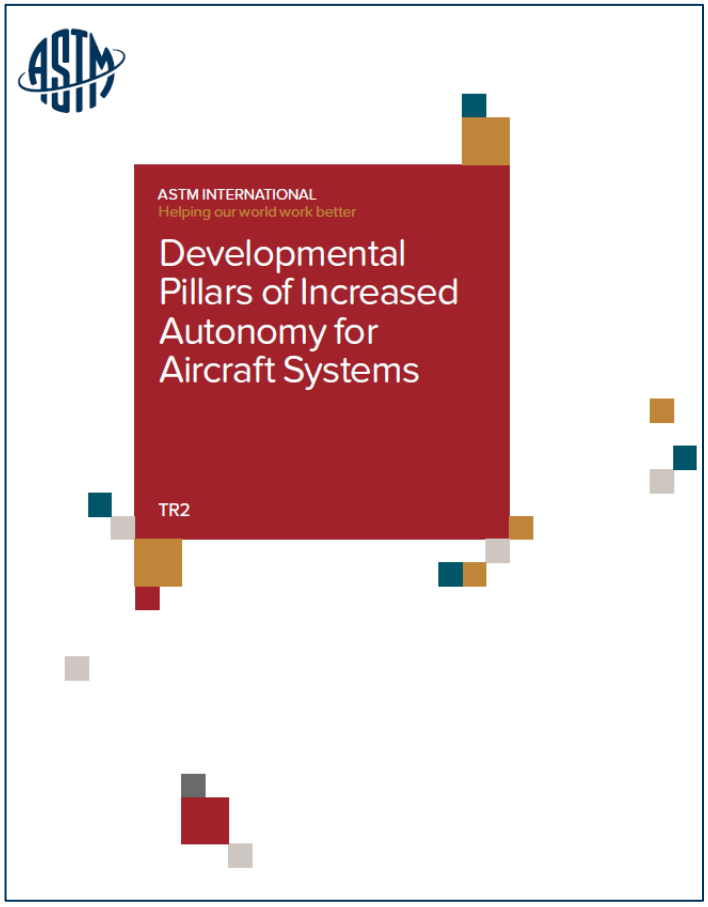


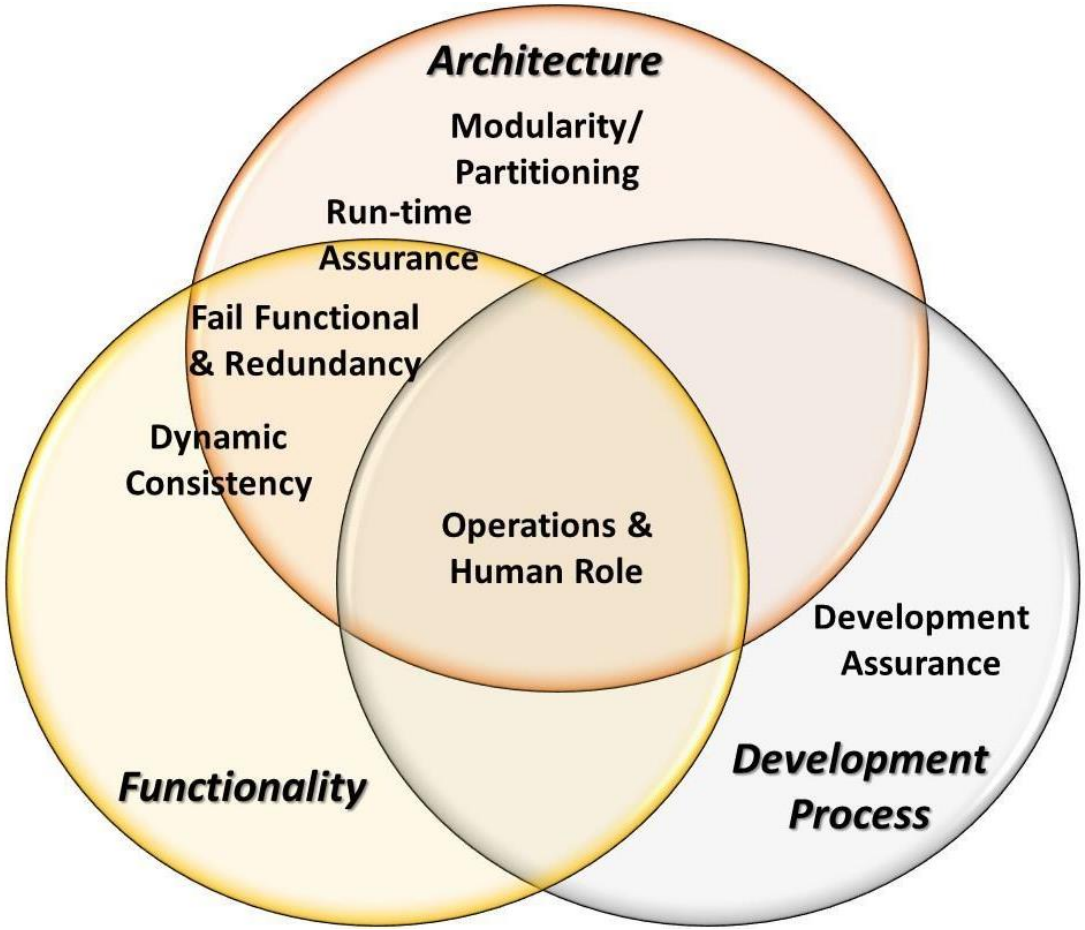
- Definitions for 51 Terms relating to aviation autonomy
- Recommendation to use a requirements framework instead of “levels of autonomy” approach in aviation
- Example aviation functional decompositions for requirements generation

More info: https://www.astm.org/newsroom/new-astm-international-report-provides-technical-underpinning-drones-autonomy-aviation

AC377 TR-2: Pillars of Autonomy

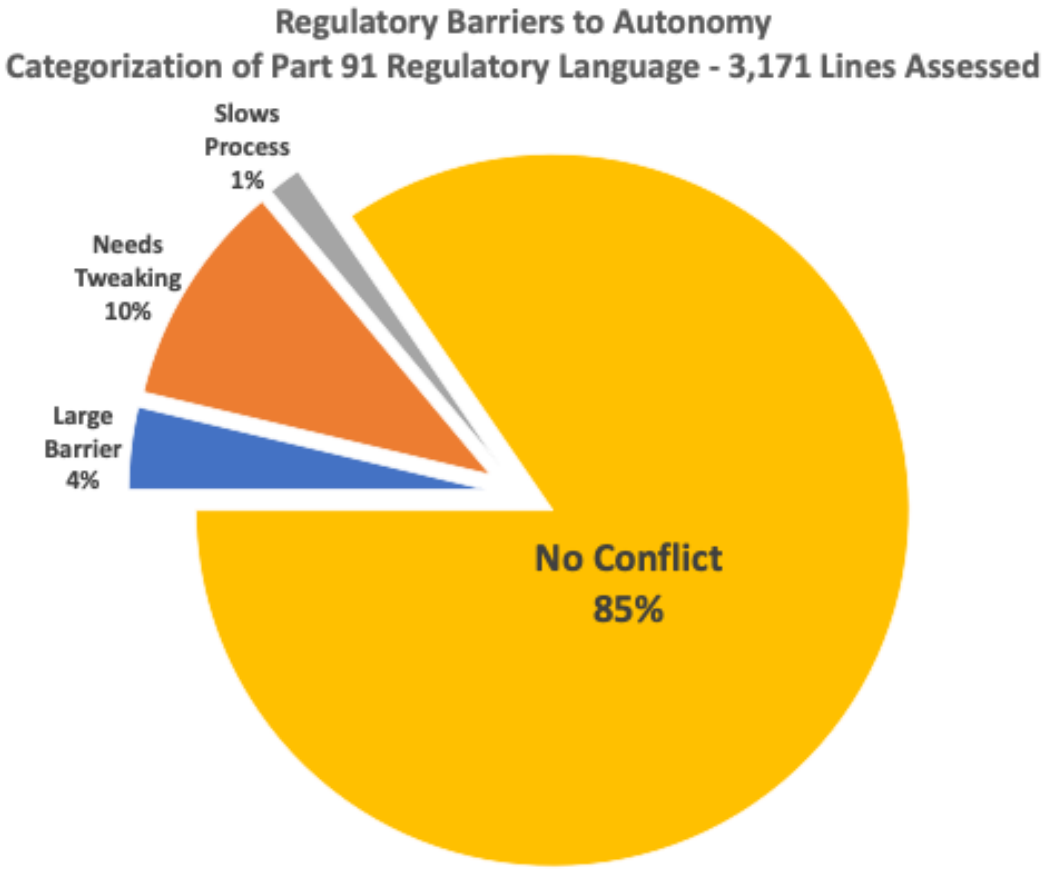
What are the foundational technologies that can safely enable autonomy?





TR2-EB - Developmental Pillars of Increased Autonomy for Aircraft Systems (astm.org)

Forthcoming TR-3: Regulatory Barriers



Our aviation system was developed on the assumption of the human performing most of the functions

As functionality is shifted from humans entirely to systems without potential human direct oversight, we must understand the compatibility with the aviation regulatory system

Conclusions

- Autonomy has the potential to improve aviation by increasing safety and enabling new aviation applications
- Aviation standards bodies like ASTM can support approval processes for increasingly autonomous systems through consensus standards
- AC377 is using a holistic approach :
  - Use of common terminology
  - Consistent framework for developing requirements and means of compliance
  - Understanding of the developmental pillars of autonomy
  - Identification of regulatory barriers associated with human-centric regulations
- Gap analysis leading to new standards efforts

Together we can move aviation into the "age of autonomy"

ASTM INTERNATIONAL
Helping our world work better

AC478 BVLOS

Adam Morrison
AC478 Chair

REVIEW OF TODAY'S AGENDA

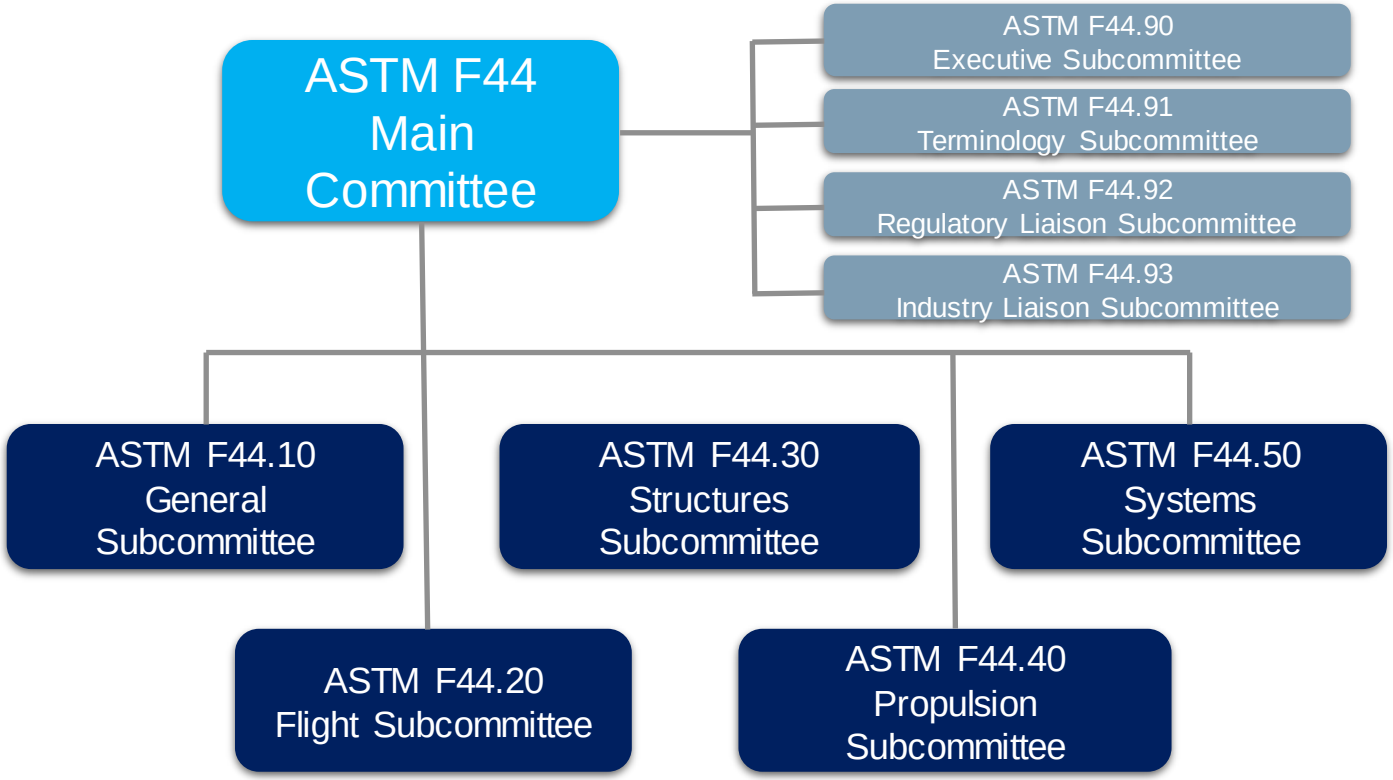
TIME	SUBJECT	PRESENTER
10.30	**Welcome and Opening Remarks**	Christoph Genster
10.40	**Administrative Reports** – ASTM HQ Report – Membership Report – F44.90 Executive Subcommittee Report Out	 Joe Koury Brian Richardet Christoph Genster
11.00	**Technical Subcommittee Reports (10min each)** – F44.10 General – F44.20 Flight – F44.30 Structures – F44.40 Powerplant – F44.50 Systems & Equipment – F44.91 Terminology	 Larry Van Dyke/Dean Boston Marten Bosman Joel Heck Christoph Genster Dave Stevens Larry Van Dyke
12:00	**Cross Cutting Activities (10min each)** – AC433 eVTOL certification – AC377 Autonomy in Aviation – AC478 BVLOS	 Tom Gunnarson Stephen Cook Adam Morrison
12.30	**Liaison Reports** – F44.93 Industry Liaison (10min) – F38 UAS Liaison (20min) – GAMA CS 23 / Part 23 Implementation Report Recommendations (20min)	 Anna Dietrich Phil Kenul/Ajay Sehgal Lowell Foster
13.20	**Future Meetings & Closing Remarks** – 24 June 2021 – Regulatory Briefings – Webex – 4 – 8 October 2021 – Atlanta Marriott Marquis; Atlanta, GA, USA (face to face) o *Workshops 4th-5th and F44 Meetings 6-8th* – 4-8 April 2022 – Prague, Czech Republic (face to face) – Other: **ASTM Aviation Standards Meetings**	Christoph Genster
13.30	**Adjourn**	Christoph Genster

ASTM INTERNATIONAL
Helping our world work better

ASTM F44.93
Industry Liaison Subcommittee Briefing

Anna Dietrich
Subcommittee Chair

ASTM F44 General Aviation Aircraft



Standards Process

Effort Launched

- Need Identified
- Volunteers Selected
- Subcommittee Chair Approves
- Taskgroup formed

Content Generated

- Drafting text
- Taskgroup review

Subcommittee Ballot

- Negative, Suggested Improvement, Editorial

Main Committee Ballot

- Negative, Suggested Improvement, Editorial

Publication

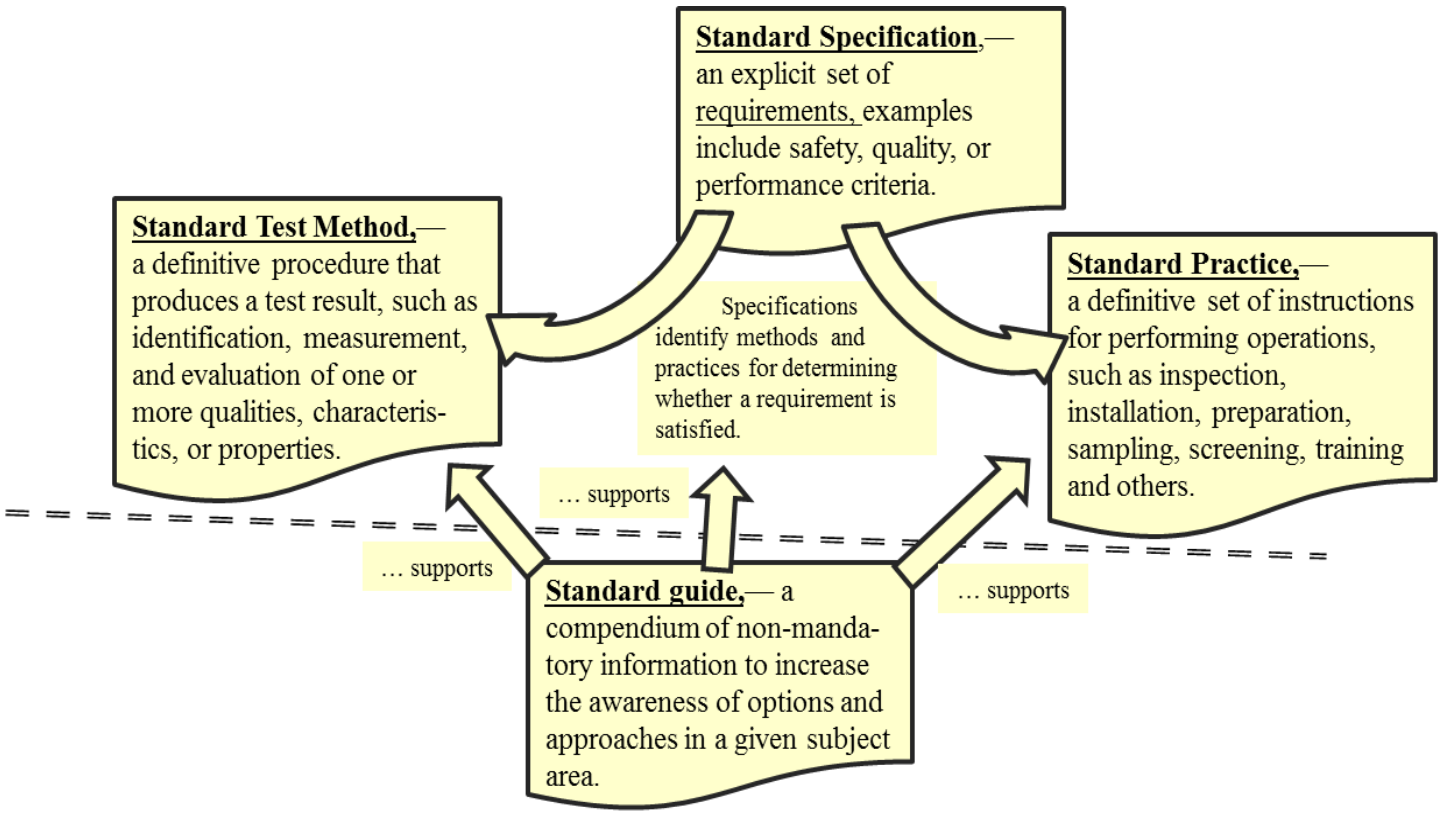
- Specification, Guide, Practice, or Test Method

CAA Acceptance

- F3264 aka “TLS”

Standards Types

Specification
Guide
Practice
Test Method



F44 Editorial Guidelines

1. Scope
2. References
3. Terminology
4. Determining the Type of Standard
5. Standard Titles
6. Content of Standards

Units and Nomenclature
Formulas
Using Notes
Referencing Other Documents
Transfer of Prescriptive Content from Current Rules
Revision Appendix

My Committees > “Committee Documents” under Committee F44 > Editorial Guidelines

Key considerations

Usability of Standards

Continuous improvement
Align with Rule structure as much as possible
Include clear applicability statements
Consider implications of harmonization (or lack thereof)
Modular standards construction

New Technology Considerations

EVTOL MOC tracking in AC433
UAS/RPAS/SPAS: coordinate with F38 directly and via AC377
Include clear applicability statements
Support liaison efforts with SAE/RTCA/EUROCAE, etc.
Use Annexes as much as practical

ASTM INTERNATIONAL
Helping our world work better

Questions?

Anna Mracek Dietrich: annamdietrich@gmail.com

ASTM INTERNATIONAL
Helping our world work better

GAMA SACC Updates
CS 23/Part 23 Implementation Plan

Lowell Foster
GAMA Director, Global Innovation & Engineering

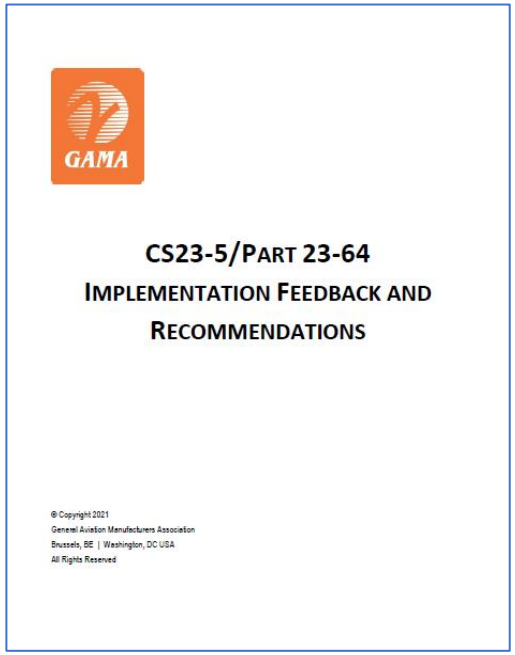
SMALL AIRPLANE CERTIFICATION AD HOC COMMITTEE (SACC)

OBJECTIVE

- Identify what's working well and support
- Identify challenging issues and recommend solutions

BACKGROUND

- Prescriptive to Performance-Based Rules (PRB) - Major Shift
- Challenges were anticipated
- We're all learning during this transition to a new approach
- Already benefitting from new rules



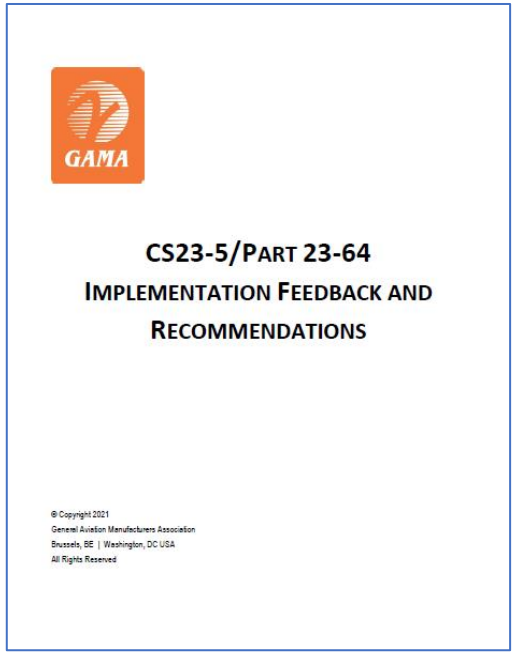
Small Airplane Certification Ad Hoc Committee (SACC) – Report

What's Working Well

- Performance-Based Rules Enable Certification of Innovation
  - Effectiveness & Timeliness of Industry Standards Process
  - Safety Continuum
  - Reduced Cost for Safety Enhancing Equipment
  - Target Safety Areas
- Improved Collaboration Between Industry and Authorities
- Easier Entry into CS-23/Part 23
- More Efficient Regulatory Process

Challenges

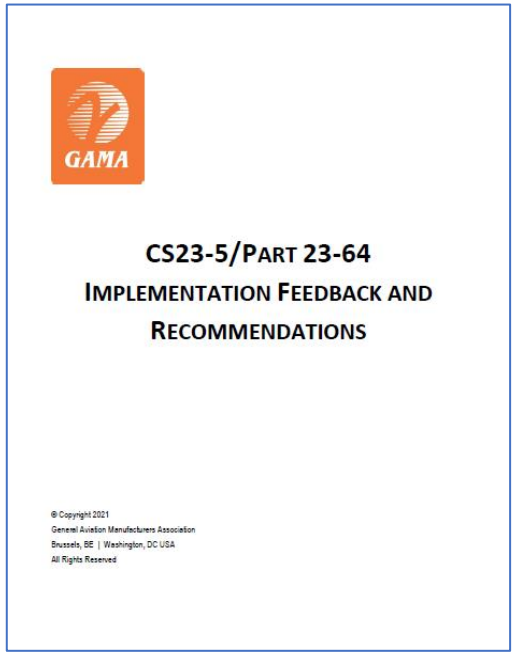
- Training and Education
- Understanding Industry Standards as Airworthiness Accepted Means of Compliance Concept
- Level of Detail Required in the Compliance Plan
- Harmonization
- Process Improvement and Clarification for Changed Product Rule Applications
- Implementation of the Safety Continuum within the Airworthiness Means of Compliance
- Forms and Processes
  - FAA specific issues
  - EASA specific issues



Small Airplane Certification Ad Hoc Committee (SACC) – Report

Recommendations – Next Steps

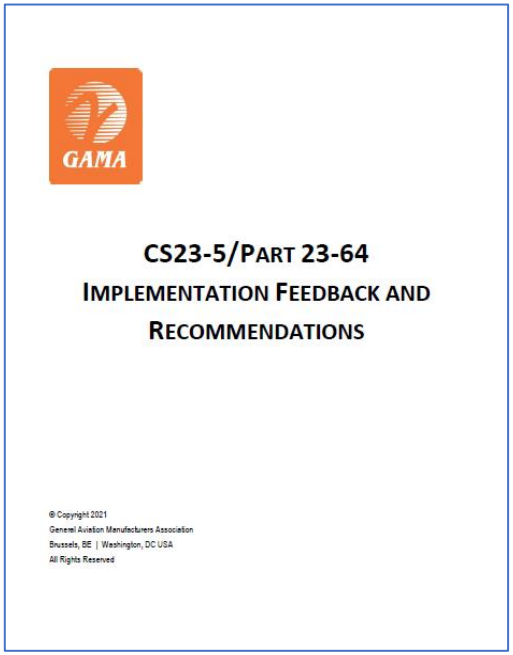
- Continued support for efforts already underway
  - ASTM cross reference tables
  - FAA Performance-based rule policy
  - FAA internal training
- Working Group to develop the Safety Continuum Guidance
  - Initial scope will be Normal Category
  - Will include EPIC members for VTOL perspective
- Performance-based rule training and guidance
  - May SACC meeting focus on PBR and means of compliance



Small Airplane Certification Ad Hoc Committee (SACC) – Report

Recommendations – ASTM Specific

SACC REC 3.2-1. For the MOC to CS23-5/Part 23-64, the F44 standards document organization should be studied so that the most effective approach from the different types of ASTM standards are used. The different disciplines under F44 are trying slightly different approaches to their standards organization. Now that the initial work to capture the old prescriptive rules is done, the F44 committee should consider ways to streamline the organization of the standards such that there is a logical, clearer association between the new rules and the industry standards.

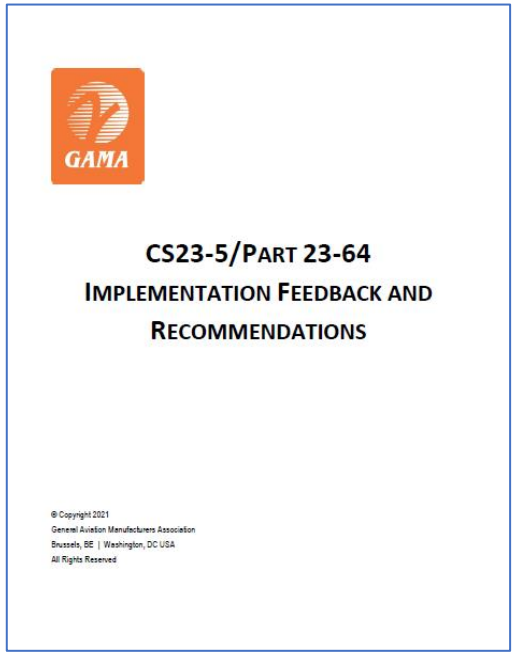


Small Airplane Certification Ad Hoc Committee (SACC) – Report

Recommendations – ASTM Specific

SACC REC 3.2-2. Encourage the ASTM F44 committee to evolve the standards towards more intuitive link to the CS-23/Part 23 rules.

SACC REC 3.2-3. A master cross-reference mapping needs to be developed that maps the specific ASTM F44 and other relevant standards sections to the new rule paragraphs. The master cross-reference mapping should track changes in the ASTM documents which might help with numbering changes and associated references. This mapping effort can leverage the annexes currently being introduced by ASTM F44 to ensure a consistent mapping.

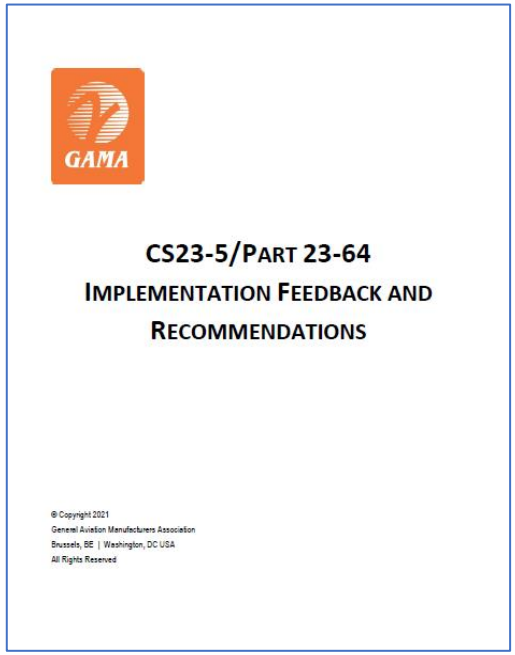


Small Airplane Certification Ad Hoc Committee (SACC) – Report

Recommendations – ASTM Specific

SACC REC 3.2-4. Encourage participation in the standards efforts for both industry and authorities. This participation is crucial for standards development and evolution on existing airplanes and to address new technologies and should include certification specialists from both industry and the authorities.

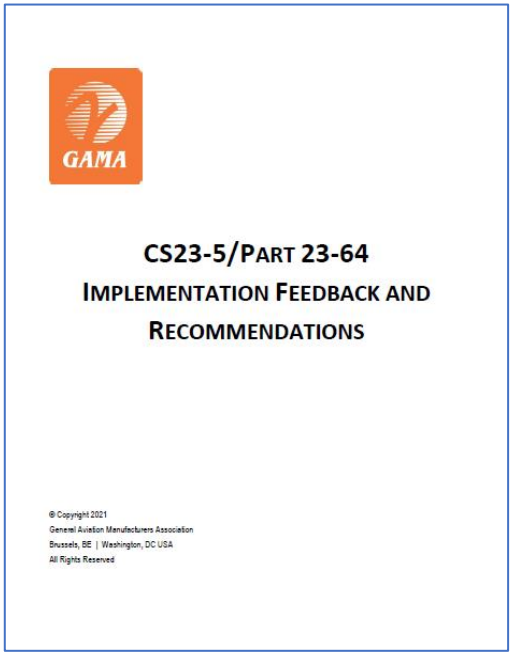
SACC REC 3.2.5. Essentially the same as REC 3.2-4 except for new MOC appropriate for new and innovative designs in parallel to the existing MOC.



Small Airplane Certification Ad Hoc Committee (SACC) – Report

Recommendations – ASTM Specific

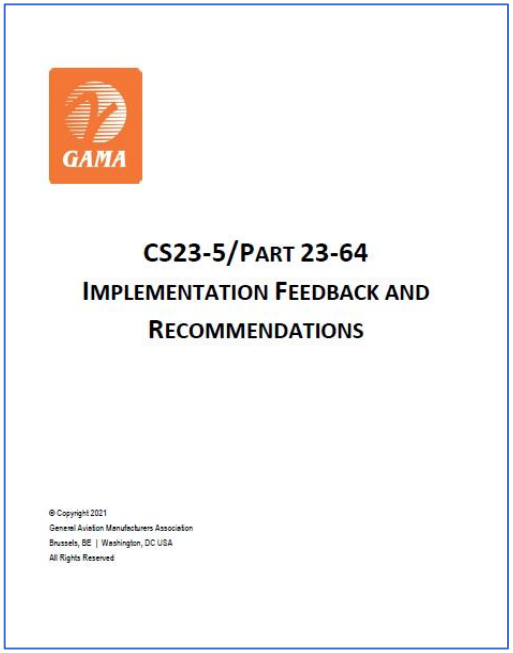
SACC REC 3.2-6. In addition to the cross-reference mapping new rules to F44 Standards sections, mapping the old rule language to the new rules is needed because amended TC and STC projects use the older rules as airworthiness MOC. This mapping is needed to get the benefits of the new rules for existing airframes, including CS23-5/Part 23-64 and could leverage the cross-reference table in the Part 23-64 NPRM. For existing Approved Model List (AML) STCs that were originally approved to an older certification basis such as Amdt 63, this mapping would provide an easy means to increase the certification basis to Amdt 64 so that new production aircraft could be added to the AML. This mapping may also be necessary for validations where validating countries have not yet adopted performance-based rules.



Small Airplane Certification Ad Hoc Committee (SACC) – Report

Part 23/CS-23 Already Making a Difference – Alternative Approaches

- Emergency Conditions, Occupant Safety and Accommodations
- Simplified Methods for Addressing High-Intensity Radiated Fields (HIRF) and Indirect Effects of Lightning on Aircraft
- Simplified Safety Assessment of Systems and Equipment in Small Aircraft
- Fatigue Load Spectra
- Low-Speed Flight Characteristics of Aircraft
- Ice Protection for General Aviation Aircraft



REVIEW OF TODAY'S AGENDA

TIME	SUBJECT	PRESENTER
10.30	**Welcome and Opening Remarks**	Christoph Genster
10.40	**Administrative Reports** – ASTM HQ Report – Membership Report – F44.90 Executive Subcommittee Report Out	 Joe Koury Brian Richardet Christoph Genster
11.00	**Technical Subcommittee Reports (10min each)** – F44.10 General – F44.20 Flight – F44.30 Structures – F44.40 Powerplant – F44.50 Systems & Equipment – F44.91 Terminology	 Larry Van Dyke/Dean Boston Marten Bosman Joel Heck Christoph Genster Dave Stevens Larry Van Dyke
12:00	**Cross Cutting Activities (10min each)** – AC433 eVTOL certification – AC377 Autonomy in Aviation – AC478 BVLOS	 Tom Gunnarson Stephen Cook Adam Morrison
12.30	**Liaison Reports** – F44.93 Industry Liaison (10min) – F38 UAS Liaison (20min) – GAMA CS 23 / Part 23 Implementation Report Recommendations (20min)	 Anna Dietrich Phil Kenul/Ajay Sehgal Lowell Foster
13.20	**Future Meetings & Closing Remarks** – 24 June 2021 – Regulatory Briefings – Webex – 4 – 8 October 2021 – Atlanta Marriott Marquis; Atlanta, GA, USA (face to face) o *Workshops 4th-5th and F44 Meetings 6-8th* – 4-8 April 2022 – Prague, Czech Republic (face to face) – Other: **ASTM Aviation Standards Meetings**	Christoph Genster
13.30	**Adjourn**	Christoph Genster

Future Meetings

Upcoming F44 Sessions

F44.92 Regulatory Briefings

– 24 June 2021 (same time)

AC377 Autonomy in Aviation Symposium

– Fall 2021, Atlanta, Georgia USA (dates will be confirmed soon)

Upcoming F44 Meetings

– 4-8 October 2021, Atlanta, Georgia USA

– 4-8 April 2022, Prague, Czech Republic

Task Groups via Webex

– See Google Calendar

Upcoming ASTM Sessions

F37 Light Sport Aircraft

- 28 July, Oshkosh, Wisconsin USA at Airventure
- 5-6 October, Atlanta, Georgia USA

F38 Unmanned Aircraft Systems

- November, Syracuse, New York USA at NUAIR (tentative)

F39 Aircraft Systems

- September/October (2½ day sessions)

F46 Aerospace Personnel

- 6-7 October, Atlanta, Georgia USA

Joint Chairs Calls

- 1 Wednesday each month

ASTM Aviation Standards Calendar

Public Google Calendar

– Publicly available: https://calendar.google.com/calendar/b/3?cid=YXZpYXRpb24uc3RhbmRhcmRzQGdtYWlsLmNvbQ

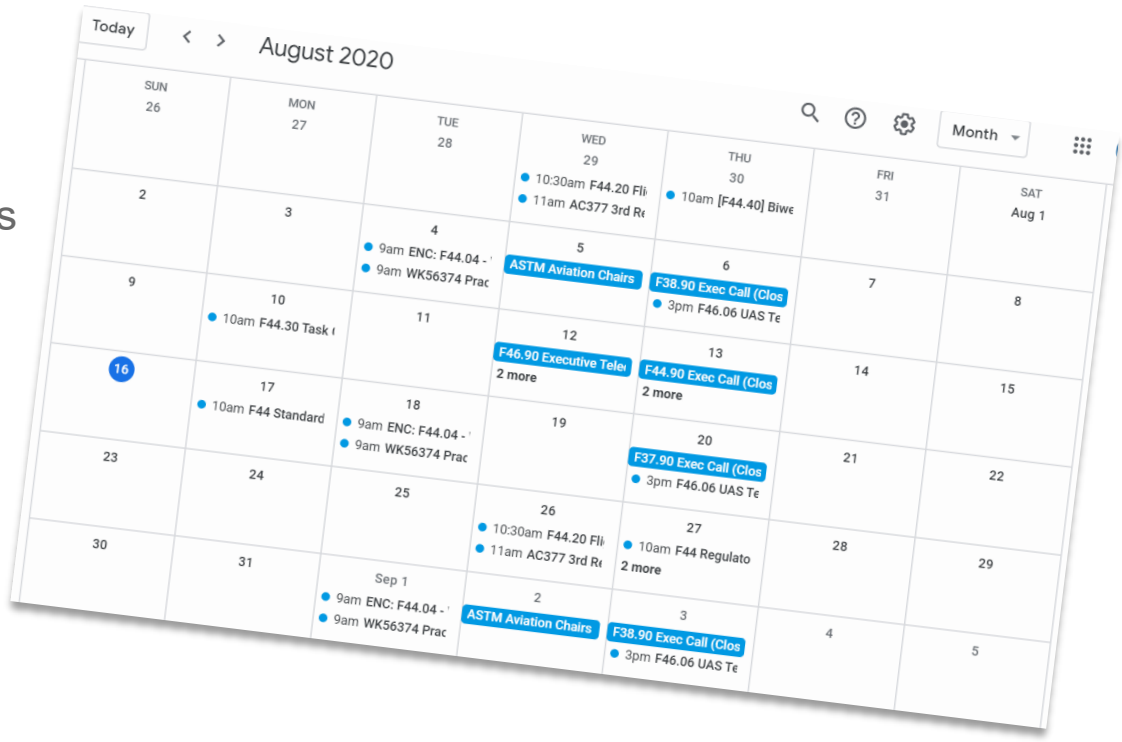
– Access / Integrate Calendar: https://calendar.google.com/calendar/ical/aviation.standards%40gmail.com/public/basic.ics

– F37, F38, F39, F44, F46 Meetings

– Increase awareness about sessions

– Does not replace ASTM's official notices

– Does not change how TG's operates or how to get engaged.



Adjourn

Contact Information

Christine DeJong Bernat
F44 Chair
Director, Global Innovation and Policy
General Aviation Manufacturers Association
cdejong@gama.aero
+1-202-236-7580

Joe Koury
F44 Staff Manager
Manager, Technical Committee Operations
ASTM International
jkoury@astm.org

**Slides will be posted online & distributed to registrants post-event*