May 13-15, 2025 – Baku, Azerbaijan

IATA Aviation Energy Forum
- Synthetic Aviation Turbine Fuel Qualification Status

Gurhan Andac
GE Aerospace
Engineering Technical Leader
Aviation Fuels & Additives, GE Aerospace
ASTM D02.J06 Chair

Terminology

SATF, *synthetic aviation turbine fuel*
: aviation turbine fuel containing synthesized hydrocarbons

SBC, *synthetic blending component*
: synthesized hydrocarbons that meet the requirements of one of the annexes in ASTM D7566 standard specification

CBC, *conventional blending component*
: blending streams derived from hydrocarbons that come from conventional sources such as crude oil, natural gas liquid condensates, heavy oil, shale oil, and oil sands

SAF, *sustainable aviation fuel*
: aviation turbine fuel containing synthesized hydrocarbons derived from sustainable feedstocks and processes

Drop-in Fully-SATF, *drop-in fully synthetic aviation turbine fuel*
: synthetic aviation turbine fuel that exhibit essentially identical composition, performance, and physical properties as existing petroleum-derived fuels and require no special handling or unique operating procedures

Paraffinic-SATF, *paraffinic synthetic aviation turbine fuel*
: synthetic aviation turbine fuel comprised primarily of paraffinic hydrocarbons

SATF history

R&D

CAAFI
(2006)

ASTM D7566
- **A1: FT-SPK**

ASTM D4054
(2009)

A2: HEFA-SPK
(2011)

A3: SIP
(2014)

Commercial use

A4: FT-SKA
(2015)

A5: ATJ-SPK
(2016)

A6: CHJ
(2018)

A7: HHC-HEFA-SPK
(2020)

A8: ATJ-SKA
(2023)

~850,000 flights
According to Air Transport Action Group

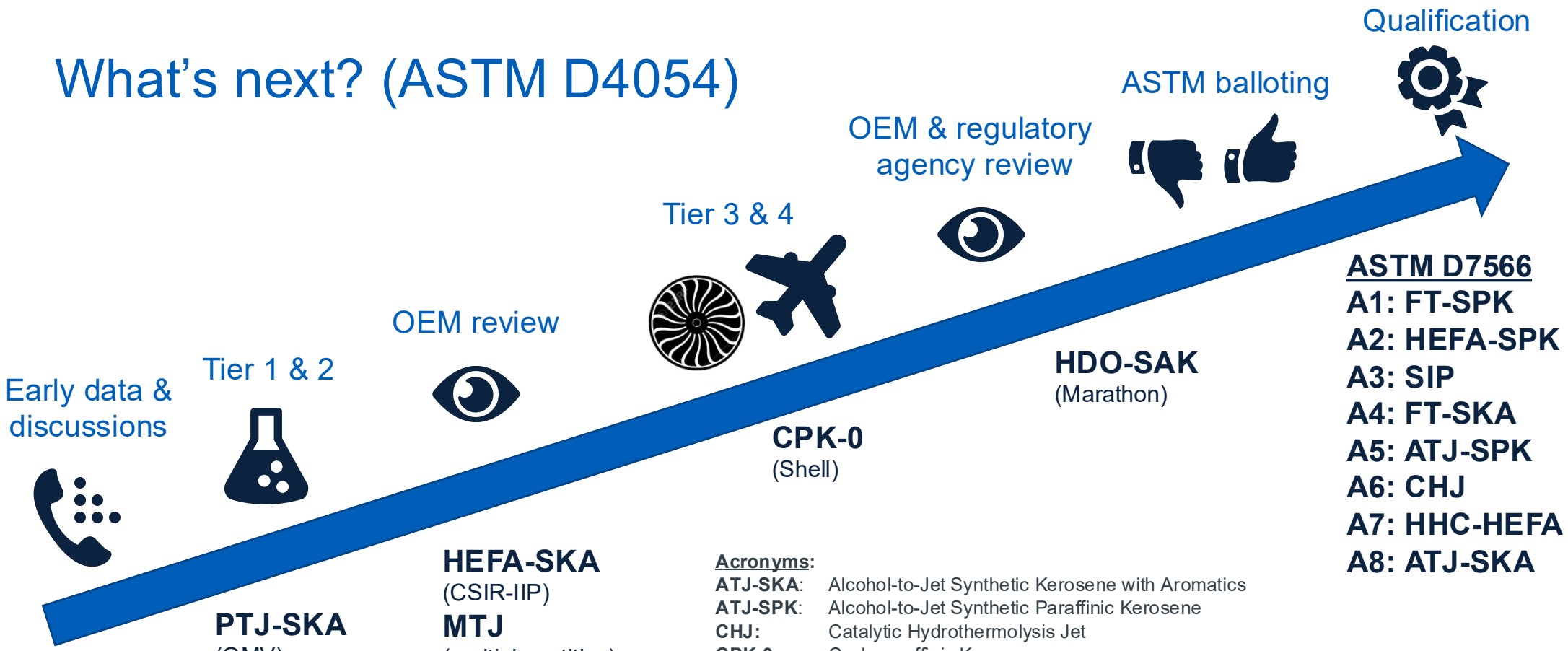
100% drop-in SATF
100% non-drop-in SATF
(?)

Other pathways
(?)

Acronyms:

ATJ-SKA:	Alcohol-to-Jet Synthetic Kerosene with Aromatics
ATJ-SPK:	Alcohol-to-Jet Synthetic Paraffinic Kerosene
CAAFI:	Commercial Aviation Alternative Fuels Initiative
CHJ:	Catalytic Hydrothermolysis Jet
FT-SKA:	Fischer-Tropsch Synthetic Kerosene with Aromatics
FT-SPK:	Fischer-Tropsch Synthetic Paraffinic Kerosene
HEFA-SPK:	Hydro-processed Esters and Fatty Acids Synthetic Paraffinic Kerosene
HHC-HEFA:	Hydroprocessed Hydrocarbons, Esters and Fatty Acids
SATF:	Synthetic Aviation Turbine Fuel
SIP:	Synthetic Iso-paraffins

What's next? (ASTM D4054)



Acronyms:

ATJ-SKA:	Alcohol-to-Jet Synthetic Kerosene with Aromatics
ATJ-SPK:	Alcohol-to-Jet Synthetic Paraffinic Kerosene
CHJ:	Catalytic Hydrothermolysis Jet
CPK-0:	Cycloparaffinic Kerosene
FT-SKA:	Fischer-Tropsch Synthetic Kerosene with Aromatics
FT-SPK:	Fischer-Tropsch Synthetic Paraffinic Kerosene
HBTJ:	Hybrid Bio-Thermocatalytic Jet
HDO-SAK:	Hydro-deoxygenation Synthetic Aromatic Kerosene
HEFA-SKA:	Hydro-processed Esters and Fatty Acids Synthetic Kerosene with Aromatics
HEFA-SPK:	Hydro-processed Esters and Fatty Acids Synthetic Paraffinic Kerosene
HHC-HEFA:	Hydroprocessed Hydrocarbons, Esters and Fatty Acids
ITJ-SCP:	Isoprene-to-Jet Synthesized Cycloparaffins
MTJ:	Methanol-to-Jet
PTJ-SKA:	Plastics-to-Jet Synthetic Kerosene with Aromatics
SATF:	Synthetic Aviation Turbine Fuel
SBC:	Synthetic Blending Component
SBTJ:	Sewage Biosolids to Jet
SIP:	Synthetic Iso-paraffins

100% SATF Task Forces

100% Drop-in: Qual of pathways good for drop-in; also allow blends of SBCs

100% non-Drop-in: Standardization only; for testing/certification

ASTM D1655 co-processing of alternate crude with petro-crude

- **Lipids**
- **Fischer-Tropsch**
- **Hydroprocessed biomass**

ASTM Task Force for "generic" co-processing

ASTM Task Force for pyrolysis oil from used tires

ASTM Task Force for waste plastics

Qualification into D7566 via D4054 process

Prescreening
- US – WSU
- EU – DLR
- 1L fuel

Clearinghouse
- US – UDRI
- EU – Trinity College
- UK – Univ. of Sheffield
- process, data, plans
- 50-100 gal fuel early
- 1000's gal later if req'd

OEM introduction
- ready for clearinghouse?
- fast track?

ASTM Task Force
- D02.J06 Chair

Wider tech community engagement
- overview at ASTM/CRC

ASTM balloting & deliberations
- comments
- negatives

Incorporation into ASTM D7566
- new or modified Annex

Prescreening: Josh Heyne (WSU), Georg Eckel (DLR)
OEM intro: George Wilson (SwRI)
Clearinghouse: Zach West (UDRI), Stephen Dooley (Trinity College), Matthew Jee (Univ. of Sheffield)
ASTM J06: Gurhan Andac (GE Aerospace)

Fully-SATF (Drop-in vs Paraffinic)

Drop-in: not just compatible with a particular engine and/or aircraft, but fleet-wide and infrastructure-wide compatible

	Drop-in 	**Paraffinic**
Composition:	Fully formulated Jet A/A-1	**Subset** of Jet A/A-1
Applicability:	Fleet Wide drop-in	**Designated** aircraft/engines only
Example pathways:	CHJ (D7566 Annex A6), FT-SKA (D7566 Annex A4), ATJ-SKA (D7566 A8), future: HEFA-SKA, multi-blend, others	FT-SPK (D7566 Annex A1) HEFA-SPK (D7566 Annex A2) ATJ-SPK (D7566 Annex A5) *certain types*
Specification:	ASTM D7566	**New standard** needed
Regulatory Cert/Substantiation:	No change	**Required** for each intended aircraft/engine model
Infrastructure:	No impact	**Separate** supply chain/handling/storage required

ASTM Task Force est. Apr '21
Chair: G. Andac (GE), Vice-Chair: M. Rumizen (Air Company)
Approval of use as Jet A/A-1 for conforming fully-SATF

ASTM Task Force est. Apr '22
Chair D. Parmenter (Airbus), Vice-Chair: A. Hobday (Rolls-Royce)
NOT approval of use currently; standardization of test fuel

OEMs are active via ASTM, IAEG, and internally

Thank you!