Technical Working Group Meeting #4

Roundtable Discussion, Strategic Questions, Design Aircraft, Forming Recommendations

October 16, 2019 4 – 7pm

Airport Operations Center

ASE VISION
INFORM. INVOLVE. COLLABORATE.

ASPEN/PITKIN COUNTY AIRPORT

Technical Working Group Introduction

<u>Housekeeping</u>

Involvement:

- The Technical Working Group will be the deliberating body. Questions will be taken from those attending as deemed appropriate and timely.

Member participation:

- Use of name tents.

Website: https://www.asevision.com/twg/

- Other working groups will have their own sites.
- Ours and other working groups meeting dates will be posted so that others and public can attend if desired.
- Data related to each meeting will be placed under their particular headings.
- Support data (general) still remains on the web where it resides today.

Technical Working Group Meeting Agenda

1. Review of Agenda and Meeting Materials
2. Design Aircraft Dialogue
   A. Commercial
      - *Key Prioritization Criteria*
      - *Questions on Aircraft Matrix*
   B. General Aviation
      - *Review potential new GA aircraft enabled by RWY changes*
      - *GA Forecast*
      - *Key Prioritization Criteria*
3. Design Aircraft Scoring and Dialogue
4. Next Steps
   A. Forming Recommendations and Narrative
      - *Determining Design Aircraft Vote Criteria*
      - *Questions from AVC to vote on*
   B. Next meeting Airfield Design considerations
   C. Airspace Update
5. Next Meeting – October 23rd, Aspen Police Department Meeting Room, 4 – 7pm

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Technical Working Group
Strategic Questions

To meet our community values and goals what is our preferred "design aircraft"?

- *How could the existing or future "fleet mix" meet the air pollution reduction, limited enplanement growth, and noise abatement goals established by the ASE Vision process?*
- *In light of those community goals, what does the future airfield look like in terms of safety and airport design?*
- *What are the implications of the Status Quo VS Airplane Design Group II VS Airplane Design Group III? Could any variations exist within these design groups that might help us attain our community goals?*
- *How could our future airfield be safe and environmentally friendly as possible?*

Reference Materials

October 16th Reference Materials

- Available Aircraft Datasheet – Updated to include engine type
- “Graveyard of ASE Aircraft” presentation

- All previous information is available on ASE Vision website

ASPEN/PITKIN COUNTY AIRPORT

ASE VISION

Design Aircraft Dialogue

Design Aircraft Conversation

1. Commercial
    A. Questions on Aircraft Matrix
    B. Key Prioritization Criteria
2. General Aviation
    A. Review potential new GA aircraft enabled by RWY changes
    B. GA Forecast
    C. Key Prioritization Criteria

Initial Aircraft Ranking TWG (9-18-2019) Draft_v1

	Emissions	Emissions Rank	Noise	Noise Rank	Enplanements/ Operations	Enplanements Rank	Average Score	Overall Rank
A220-300	1.125	2	1.25	1	1.833333333	5	1.4027778	3
A320 NEO Sharklet	1	1	1.25	1	1.833333333	5	1.3611111	2
737-MAX 8	1.5	5	2.25	8	2.166666667	11	1.9722222	6
A320-200 Sharklet	1.25	3	2.875	15	1.833333333	5	1.9861111	7
EMB 195-E2	1.625	6	2.5625	12	1.333333333	1	1.8402778	4
A220-100	1.25	3	1.25	1	1.333333333	1	1.2777778	1
A319-100 Sharklet	1.75	7	2.375	9	1.5	3	1.875	5
737-700 with winglets	2	9	2.875	15	1.5	3	2.125	10
EMB 175 LR, extended wingtips	1.875	8	2.625	13	2.666666667	16	2.3888889	14
EMB 190-E2	2.375	13	2.4375	11	1.833333333	5	2.2152778	11
E 190 Standard	2.5	15	2.375	9	1.833333333	5	2.2361111	13
CRJ 100/200/440 LR (CL-600-2B19)	2.375	13	1.5	5	2.8	19	2.225	12
CRJ 700/701/702 LR	2	9	2	6	2	10	2	8
E 170 Standard	2.1666667	12	2.6875	14	2.4	14	2.4180556	15
CRJ 550 (Same airframe as CRJ-700)	2.8333333	16	2	6	2.8	19	2.5444444	16
M100 SpaceJet		#N/A		#N/A	2.666666667	16		#N/A
M90 SpaceJet		#N/A		#N/A	2.333333333	13		#N/A
EMB 175-E2		#N/A		#N/A	2.5	15		#N/A
737-MAX 7 (same engine as MAX 8)		#N/A		#N/A	2.166666667	11		#N/A
Dash 8 Q400	2	9	1.375	4	2.666666667	16	2.0138889	9

Commercial Aircraft – Characteristics

ADG	Manufacturer	Model	AAC	Approach Speed (V_{ref})	Seating	Wingspan (ft.)	Range (NM)	MTOW	Engine Type (note 6)	ICAO Noise: EPNLdB Noise Level Lateral/Full-Power	ICAO Noise: EPNLdB Noise Level Approach	ICAO Noise: EPNLdB Noise Level Flyover	ICAO Noise: Average ICAO Noise
II	Bombardier	CRJ 100/200/440 LR (CL-600-2B19)	C	140	50	68.67	1,650	53,000	High Bypass Turbofan	82.4	92.2	77.7	84.1
II	Bombardier	CRJ 550 (Same airframe as CRJ-700)	C	135	50	76.27	1,000	65,000	High Bypass Turbofan	89.5	92.6	82.4	88.2
II	Bombardier	CRJ 700/701/702 LR	C	135	70	76.27	1,400	77,000	High Bypass Turbofan	89.5	92.6	82.4	88.2
III	Airbus	A220-100	C	130	109	115.08	3,400	134,000	Geared Turbofan	88.0	91.5	78.8	86.1
III	Airbus	A220-300	C	135	140	115.08	3,350	149,000	Geared Turbofan	87.5	92.4	80.3	86.7
III	Mitsubishi	M100 SpaceJet	C		76	91.30	1,910	86,000	Geared Turbofan	Information not available			
III	Mitsubishi	M90 SpaceJet	C		88*	95.83	2,040	94,358	Geared Turbofan	Information not available			
III	Embraer	EMB 175 LR, extended wingtips	C	124	76	93.92	2,150	85,517	High Bypass Turbofan	91.8	95.1	93.0	93.3
III	Embraer	EMB 175-E2	C	124	80	101.70	2,000	98,767	Geared Turbofan	Information not available			
III	Embraer	EMB 195-E2	C	124	120	115.15	2,600	135,584	Geared Turbofan	92.3	92.7	84.9	90.0
III	Embraer	E 170 Standard	C	124	69	85.42	2,150	82,012	High Bypass Turbofan	92.0	94.5	81.3	89.3
III	Embraer	E 190 Standard	C	124	96**	94.25	2,450	105,359	High Bypass Turbofan	92.2	92.3	82.9	89.1
III	Boeing	737-700 with winglets	C	130	137	117.42	4,400	154,500	High Bypass Turbofan	93.1	95.9	83.5	90.8
III	Embraer	EMB 190-E2	C	124	97	110.70	2,850	124,341	Geared Turbofan	92.3	92.3	83.8	89.5
III	Boeing	737-MAX 7 (same engine as MAX 8)	D	142	153***	117.83	3,850	177,000	LEAP	Information not available			
III	Airbus	A319-100 Sharklet	C	126	132	117.45	3,750	168,653	High Bypass Turbofan	91.4	92.9	83.3	89.2
III	Airbus	A320 NEO Sharklet	C	136	157	117.45	3,500	174,165	LEAP or Geared Turbofan	86.4	92.4	80.5	86.4
III	Airbus	A320-200 Sharklet	C	136	157	117.45	3,300	171,961	High Bypass Turbofan	90.9	93.6	84.1	89.5
III	Bombardier	Dash 8 Q400	C	125	76	93.25	1,100	65,200	Turboprop	84.9	94.0	77.8	85.6
III	Boeing	737-MAX 8	D	142	178****	117.83	3,550	181,200	LEAP	88.2	94.0	80.9	87.7

Model	ICAO Emissions: Fuel per LTO Cycle (kg) per Passenger	Fuel Compared to CRJ-700	CO2 Total Mass LTO (g) per Passenger	CO2 Compared to CRJ-700	NOx Total Mass LTO (g) per Passenger	NOx Compared to CRJ-700	NOx Takeoff	NOx Climbout	NOx Approach	NOx Idle	NOx Total (All Segments)	ASE Operational Capability: ASE Missed Approach Capable? Winter	ASE Missed Approach Capable? Summer	Significant Wt Penalty at ASE?	Operations Data: Annual Ops 2018	Annual Ops Future
CRJ 100/200/440 LR (CL-600-2B19)	3.34	100%	67.00	188%	22.74	77%	0.23	0.20	0.14	0.08	0.65	Charter	N	Y	16,452	17,816
CRJ 550 (Same airframe as CRJ-700)	4.69	140%	49.87	140%	41.30	140%	0.29	0.25	0.22	0.09	0.84	Y	Y	N	16,452	17,816
CRJ 700/701/702 LR	3.35	100%	35.62	100%	29.50	100%	0.20	0.18	0.15	0.06	0.60	Y	Y	Y	11,751	12,726
A220-100	2.71	81%	17.44	49%	36.83	125%	0.17	0.14	0.07	0.03	0.40	Y	Y	N	7,547	8,173
A220-300	1.98	59%	14.33	40%	25.08	85%	0.24	0.19	0.10	0.06	0.58	Unknown	Unknown	Unknown	5,876	6,363
M100 SpaceJet					Information not available							Unknown	Unknown	Unknown	10,823	11,721
M90 SpaceJet					Information not available							Unknown	Unknown	Unknown	9,348	10,123
EMB 175 LR, extended wingtips	3.23	96%	26.96	76%	30.34	103%	0.20	0.17	0.14	0.06	0.57	Y	Marginal	Y	10,823	11,721
EMB 175-E2					Information not available							Unknown	Unknown	Unknown	10,282	11,135
EMB 195-E2	2.63	78%	53.83	151%	26.17	89%	0.16	0.13	0.07	0.03	0.39	Unknown	Unknown	Unknown	6,855	7,423
E 170 Standard	3.57	107%	29.65	83%	33.63	114%	0.22	0.19	0.16	0.07	0.63	Unknown	Unknown	Unknown	11,921	12,910
E 190 Standard	3.24	97%	68.39	192%	31.59	107%	0.20	0.17	0.09	0.04	0.49	Unknown	Unknown	Unknown	8,569	9,279
737-700 with winglets	2.99	89%	47.66	134%	32.15	109%	0.15	0.12	0.06	0.03	0.37	Y	Marginal	Y	6,528	7,070
EMB 190-E2	3.23	96%	67.14	188%	31.81	108%	0.20	0.17	0.09	0.04	0.49	Unknown	Unknown	Unknown	8,480	9,184
737-MAX 7 (same engine as MAX 8)					Information not available							Y	Y	N	5,376	5,822
A319-100 Sharklet	2.89	86%	39.96	112%	31.07	105%	0.12	0.08	0.06	0.03	0.29	Y	Y	N	6,426	6,959
A320 NEO Sharklet	1.99	60%	22.00	62%	19.13	65%	0.16	0.13	0.06	0.03	0.37	Unknown	Unknown	Unknown	5,876	6,363
A320-200 Sharklet	2.57	77%	27.55	77%	31.17	106%	0.16	0.13	0.07	0.04	0.40	Unknown	Unknown	Unknown	5,484	5,939
Dash 8 Q400					Information not available							Y	Y	N	10,823	11,721
737-MAX 8	1.99	60%	13.52	38%	32.01	108%	0.27	0.13	0.06	0.03	0.48	Y	Marginal	Y	4,621	5,006

Notes:

1) Noise and Emissions Source - ICAO Certification Database, August 2019 | HMMH, August 2019; Per-passenger interpretation - Kimley-Horn August 2019.
2) Operations 2018 = Actual Enplanements at 70% load factor. Future = 2028 Enplanments at 0.8% Annual Growth and 70% load factor
3) Aircraft Load and Dimensions from FAA Aircraft Design Characteristics Database OCT 2018
4) ASE Operational Capability from August 2018 Aircraft Feasibilty analysis done by Alec Seybold - Flight Tech Engineering
5) Range is nominal stated by manufacturer
6) LEAP = "Leading Edge Aviation Propulsion" by CFM, a NextGen High Bypass Engine which competes with Pratt & Whitney Geared Turbofan

* Single-class seating as configured for ANA for use in Japan. Range is 76 to 92
** Dual-class seating per Manufacturer
*** Dual-class range 138 to 153
**** Dual-class range 162 to 178

Commercial Aircraft – Noise

ADG	Manufacturer	Model	AAC	Approach Speed (V_{ref})	Seating	Wingspan (ft.)	Range (NM)	MTOW	Engine Type (note 6)	ICAO Noise: EPNLdB Noise Level Lateral/Full-Power	ICAO Noise: EPNLdB Noise Level Approach	ICAO Noise: EPNLdB Noise Level Flyover	Noise Score	Operations for 2018 Enplanements
II	Bombardier	CRJ 100/200/440 LR (CL-600-2B19)	C	140	50	68.67	1,650	53,000	High Bypass Turbofan	82.4	92.2	77.7		16,452
III	Bombardier	Dash 8 Q400	C	125	76	93.25	1,100	65,200	Turboprop	84.9	94.0	77.8		10,823
III	Airbus	A220-100	C	130	109	115.08	3,400	134,000	Geared Turbofan	88.0	91.5	78.8		7,547
III	Airbus	A320 NEO Sharklet	C	136	157	117.45	3,500	174,165	LEAP or Geared Turbofan	86.4	92.4	80.5		5,876
III	Airbus	A220-300	C	135	140	115.08	3,350	149,000	Geared Turbofan	87.5	92.4	80.3		5,876
III	Boeing	737-MAX 8	D	142	178****	117.83	3,550	181,200	LEAP	88.2	94.0	80.9		4,621
II	Bombardier	CRJ 550 (Same airframe as CRJ-700)	C	135	50	76.27	1,000	65,000	High Bypass Turbofan	89.5	92.6	82.4		16,452
II	Bombardier	CRJ 700/701/702 LR	C	135	70	76.27	1,400	77,000	High Bypass Turbofan	89.5	92.6	82.4	2	11,751
III	Embraer	E 190 Standard	C	124	96**	94.25	2,450	105,359	High Bypass Turbofan	92.2	92.3	82.9		8,569
III	Airbus	A319-100 Sharklet	C	126	132	117.45	3,750	168,653	High Bypass Turbofan	91.4	92.9	83.3		6,426
III	Embraer	E 170 Standard	C	124	69	85.42	2,150	82,012	High Bypass Turbofan	92.0	94.5	81.3		11,921
III	Embraer	EMB 190-E2	C	124	97	110.70	2,850	124,341	Geared Turbofan	92.3	92.3	83.8		8,480
III	Airbus	A320-200 Sharklet	C	136	157	117.45	3,300	171,961	High Bypass Turbofan	90.9	93.6	84.1		5,484
III	Embraer	EMB 195-E2	C	124	120	115.15	2,600	135,584	Geared Turbofan	92.3	92.7	84.9		6,855
III	Boeing	737-700 with winglets	C	130	137	117.42	4,400	154,500	High Bypass Turbofan	93.1	95.9	83.5		6,528
III	Embraer	EMB 175 LR, extended wingtips	C	124	76	93.92	2,150	85,517	High Bypass Turbofan	91.8	95.1	93.0		10,823
III	Mitsubishi	M100 SpaceJet	C		76	91.30	1,910	86,000	Geared Turbofan	Information not available				10,823
III	Mitsubishi	M90 SpaceJet	C		88*	95.83	2,040	94,358	Geared Turbofan	Information not available				9,348
III	Embraer	EMB 175-E2	C	124	80	101.70	2,000	98,767	Geared Turbofan	Information not available				10,282
III	Boeing	737-MAX 7 (same engine as MAX 8)	D	142	153***	117.83	3,850	177,000	LEAP	Information not available				5,376

1 = Measurably meets community goals
2 = Generally maintains current condition
3 = Worsens current condition

Notes:

1) Noise and Emissions Source - ICAO Certification Database, August 2019 | HMMH, August 2019; Per-passenger interpretation - Kimley-Horn August 2019.
2) Operations 2018 = Actual Enplanements at 70% load factor. Future = 2028 Enplanments at 0.8% Annual Growth and 70% load factor
3) Aircraft Load and Dimensions from FAA Aircraft Design Characteristics Database OCT 2018
4) ASE Operational Capability from August 2018 Aircraft Feasibilty analysis done by Alec Seybold - Flight Tech Engineering
5) Range is nominal stated by manufacturer
6) LEAP = "Leading Edge Aviation Propulsion" by CFM, a NextGen High Bypass Engine which competes with Pratt & Whitney Geared Turbofan

* Single-class seating as configured for ANA for use in Japan. Range is 76 to 92
** Dual-class seating per Manufacturer
*** Dual-class range 138 to 153
**** Dual-class range 162 to 178

Commercial Aircraft – Emissions

ADG	Manufacturer	Model	AAC	Approach Speed (Vref)	Seating	Wingspan (ft.)	Range (NM)	MTOW	Engine Type (note 6)	ICAO Emissions											Emissions Score
										Fuel per LTO Cycle (kg) per Passenger	Fuel Compared to CRJ-700	CO2 Total Mass LTO (g) per Passenger	CO2 Compared to CRJ-700	NOx Total Mass LTO (g) per Passenger	NOx Compared to CRJ-700	NOx Takeoff	NOx Climbout	NOx Approach	NOx Idle	NOx Total (All Segments)	
III	Airbus	A220-300	C	135	140	115.08	3,350	149,000	High Bypass Turbofan	1.98	59%	14.33	40%	25.08	85%	0.24	0.19	0.10	0.06	0.58	
III	Airbus	A320 NEO Sharklet	C	136	157	117.45	3,500	174,165	Turboprop	1.99	60%	22.00	62%	19.13	65%	0.16	0.13	0.06	0.03	0.37	
III	Boeing	737-MAX 8	D	142	178****	117.83	3,550	181,200	Geared Turbofan	1.99	60%	13.52	38%	32.01	108%	0.27	0.13	0.06	0.03	0.48	
III	Airbus	A320-200 Sharklet	C	136	157	117.45	3,300	171,961	LEAP or Geared Turbofan	2.57	77%	27.55	77%	31.17	106%	0.16	0.13	0.07	0.04	0.40	
III	Embraer	EMB 195-E2	C	124	120	115.15	2,600	135,584	Geared Turbofan	2.63	78%	53.83	151%	26.17	89%	0.16	0.13	0.07	0.03	0.39	
III	Airbus	A220-100	C	130	109	115.08	3,400	134,000	LEAP	2.71	81%	17.44	49%	36.83	125%	0.17	0.14	0.07	0.03	0.40	
III	Airbus	A319-100 Sharklet	C	126	132	117.45	3,750	168,653	High Bypass Turbofan	2.89	86%	39.96	112%	31.07	105%	0.12	0.08	0.06	0.03	0.29	
III	Boeing	737-700 with winglets	C	130	137	117.42	4,400	154,500	High Bypass Turbofan	2.99	89%	47.66	134%	32.15	109%	0.15	0.12	0.06	0.03	0.37	
III	Embraer	EMB 175 LR, extended wingtips	C	124	76	93.92	2,150	85,517	High Bypass Turbofan	3.23	96%	26.96	76%	30.34	103%	0.20	0.17	0.14	0.06	0.57	
III	Embraer	EMB 190-E2	C	124	97	110.70	2,850	124,341	High Bypass Turbofan	3.23	96%	67.14	188%	31.81	108%	0.20	0.17	0.09	0.04	0.49	
III	Embraer	E 190 Standard	C	124	96**	94.25	2,450	105,359	High Bypass Turbofan	3.24	97%	68.39	192%	31.59	107%	0.20	0.17	0.09	0.04	0.49	
II	Bombardier	CRJ 100/200/440 LR (CL-600-2B19)	C	140	50	68.67	1,650	53,000	Geared Turbofan	3.34	100%	67.00	188%	22.74	77%	0.23	0.20	0.14	0.08	0.65	
II	Bombardier	CRJ 700/701/702 LR	C	135	70	76.27	1,400	77,000	High Bypass Turbofan	3.35	100%	35.62	100%	29.50	100%	0.20	0.18	0.15	0.06	0.60	**2**
III	Embraer	E 170 Standard	C	124	69	85.42	2,150	82,012	Geared Turbofan	3.57	107%	29.65	83%	33.63	114%	0.22	0.19	0.16	0.07	0.63	
II	Bombardier	CRJ 550 (Same airframe as CRJ-700)	C	135	50	76.27	1,000	65,000	Geared Turbofan	4.69	140%	49.87	140%	41.30	140%	0.29	0.25	0.22	0.09	0.84	
III	Mitsubishi	M100 SpaceJet	C		76	91.30	1,910	86,000	High Bypass Turbofan					Information not available							
III	Mitsubishi	M90 SpaceJet	C		88*	95.83	2,040	94,358	Geared Turbofan					Information not available							
III	Embraer	EMB 175-E2	C	124	80	101.70	2,000	98,767	Geared Turbofan					Information not available							
III	Boeing	737-MAX 7 (same engine as MAX 8)	D	142	153***	117.83	3,850	177,000	Geared Turbofan					Information not available							
III	Bombardier	Dash 8 Q400	C	125	76	93.25	1,100	65,200	LEAP					Information not available							

1 = Measurably meets community goals
2 = Generally maintains current condition
3 = Worsens current condition

Notes:

1) Noise and Emissions Source - ICAO Certification Database, August 2019 | HMMH, August 2019; Per-passenger interpretation - Kimley-Horn August 2019.
2) Operations 2018 = Actual Enplanements at 70% load factor. Future = 2028 Enplanments at 0.8% Annual Growth and 70% load factor
3) Aircraft Load and Dimensions from FAA Aircraft Design Characteristics Database OCT 2018
4) ASE Operational Capability from August 2018 Aircraft Feasibilty analysis done by Alec Seybold - Flight Tech Engineering
5) Range is nominal stated by manufacturer
6) LEAP = "Leading Edge Aviation Propulsion" by CFM, a NextGen High Bypass Engine which competes with Pratt & Whitney Geared Turbofan

* Single-class seating as configured for ANA for use in Japan. Range is 76 to 92
** Dual-class seating per Manufacturer
*** Dual-class range 138 to 153
**** Dual-class range 162 to 178

Commercial Aircraft – Operations Capability

ADG	Manufacturer	Model	Physical Class (Engine)	AAC	Approach Speed (V_{ref})	Seating	Wingspan (ft.)	Range (NM)	MTOW	Engine Type (note 6)	ASE Operational Capability			ASE Operation Capability Score
											ASE Missed Approach Capable? Winter	ASE Missed Approach Capable? Summer	Significant Wt Penalty at ASE?	
II	Bombardier	CRJ 550 (Same airframe as CRJ-700)	Jet	C	135	50	76.27	1,000	65,000	High Bypass Turbofan	Y	Y	N	
III	Airbus	A220-100	Jet	C	130	109	115.08	3,400	134,000	Geared Turbofan	Y	Y	N	
III	Boeing	737-MAX 7 (same engine as MAX 8)	Jet	D	142	153***	117.83	3,850	177,000	LEAP	Y	Y	N	
III	Airbus	A319-100 Sharklet	Jet	C	126	132	117.45	3,750	168,653	High Bypass Turbofan	Y	Y	N	
III	Bombardier	Dash 8 Q400	Turboprop	C	125	76	93.25	1,100	65,200	Turboprop	Y	Y	N	
II	Bombardier	CRJ 700/701/702 LR	Jet	C	135	70	76.27	1,400	77,000	High Bypass Turbofan	Y	Y	Y	2
III	Embraer	EMB 175 LR, extended wingtips	Jet	C	124	76	93.92	2,150	85,517	High Bypass Turbofan	Y	Marginal	Y	
III	Boeing	737-700 with winglets	Jet	C	130	137	117.42	4,400	154,500	High Bypass Turbofan	Y	Marginal	Y	
III	Boeing	737-MAX 8	Jet	D	142	178****	117.83	3,550	181,200	LEAP	Y	Marginal	Y	
II	Bombardier	CRJ 100/200/440 LR (CL-600-2B19)	Jet	C	140	50	68.67	1,650	53,000	High Bypass Turbofan	Charter	N	Y	
III	Airbus	A220-300	Jet	C	135	140	115.08	3,350	149,000	Geared Turbofan	Unknown	Unknown	Unknown	
III	Mitsubishi	M100 SpaceJet	Jet	C		76	91.30	1,910	86,000	Geared Turbofan	Unknown	Unknown	Unknown	
III	Mitsubishi	M90 SpaceJet	Jet	C		88*	95.83	2,040	94,358	Geared Turbofan	Unknown	Unknown	Unknown	
III	Embraer	EMB 175-E2	Jet	C	124	80	101.70	2,000	98,767	Geared Turbofan	Unknown	Unknown	Unknown	
III	Embraer	EMB 195-E2	Jet	C	124	120	115.15	2,600	135,584	Geared Turbofan	Unknown	Unknown	Unknown	
III	Embraer	E 170 Standard	Jet	C	124	69	85.42	2,150	82,012	High Bypass Turbofan	Unknown	Unknown	Unknown	
III	Embraer	E 190 Standard	Jet	C	124	96**	94.25	2,450	105,359	High Bypass Turbofan	Unknown	Unknown	Unknown	
III	Embraer	EMB 190-E2	Jet	C	124	97	110.70	2,850	124,341	Geared Turbofan	Unknown	Unknown	Unknown	
III	Airbus	A320 NEO Sharklet	Jet	C	136	157	117.45	3,500	174,165	LEAP or Geared Turbofan	Unknown	Unknown	Unknown	
III	Airbus	A320-200 Sharklet	Jet	C	136	157	117.45	3,300	171,961	High Bypass Turbofan	Unknown	Unknown	Unknown	

1 = Measurably meets community goals
2 = Generally maintains current condition
3 = Worsens current condition

Notes:

1) Noise and Emissions Source - ICAO Certification Database, August 2019 | HMMH, August 2019; Per-passenger interpretation - Kimley-Horn August 2019.
2) Operations 2018 = Actual Enplanements at 70% load factor. Future = 2028 Enplanments at 0.8% Annual Growth and 70% load factor
3) Aircraft Load and Dimensions from FAA Aircraft Design Characteristics Database OCT 2018
4) ASE Operational Capability from August 2018 Aircraft Feasibilty analysis done by Alec Seybold - Flight Tech Engineering
5) Range is nominal stated by manufacturer
6) LEAP = "Leading Edge Aviation Propulsion" by CFM, a NextGen High Bypass Engine which competes with Pratt & Whitney Geared Turbofan

* Single-class seating as configured for ANA for use in Japan. Range is 76 to 92
** Dual-class seating per Manufacturer
*** Dual-class range 138 to 153
**** Dual-class range 162 to 178

Commercial Aircraft – Operations for 0.8% Growth

ADG	Manufacturer	Model	AAC	Approach Speed (Vref)	Seating	Wingspan (ft.)	Range (NM)	MTOW (lbs)	Engine Type (note 6)	Operations Data: Annual Ops 2018	Operations Data: Annual Ops Future	Ability to limit Operations Score
III	Boeing	737-MAX 8	D	142	178****	117.83	3,550	181,200	LEAP	4,621	5,005	
III	Boeing	737-MAX 7 (same engine as MAX 8)	D	142	153***	117.83	3,850	177,000	LEAP	5,376	5,822	
III	Airbus	A320-200 Sharklet	C	136	157	117.45	3,300	171,961	High Bypass Turbofan	5,484	5,939	
III	Airbus	A220-300	C	135	140	115.08	3,350	149,000	Geared Turbofan	5,876	6,363	
III	Airbus	A320 NEO Sharklet	C	136	157	117.45	3,500	174,165	LEAP or Geared Turbofan	5,876	6,363	
III	Airbus	A319-100 Sharklet	C	126	132	117.45	3,750	168,653	High Bypass Turbofan	6,426	6,959	
III	Boeing	737-700 with winglets	C	130	137	117.42	4,400	154,500	High Bypass Turbofan	6,528	7,070	
III	Embraer	EMB 195-E2	C	124	120	115.15	2,600	135,584	Geared Turbofan	6,855	7,423	
III	Airbus	A220-100	C	130	109	115.08	3,400	134,000	Geared Turbofan	7,547	8,173	
III	Embraer	EMB 190-E2	C	124	97	110.70	2,850	124,341	Geared Turbofan	8,480	9,184	
III	Embraer	E 190 Standard	C	124	96**	94.25	2,450	105,359	High Bypass Turbofan	8,569	9,279	
III	Mitsubishi	M90 SpaceJet	C		88*	95.83	2,040	94,358	Geared Turbofan	9,348	10,123	
III	Embraer	EMB 175-E2	C	124	80	101.70	2,000	98,767	Geared Turbofan	10,282	11,135	
III	Mitsubishi	M100 SpaceJet	C		76	91.30	1,910	86,000	Geared Turbofan	10,823	11,721	
III	Embraer	EMB 175 LR, extended wingtips	C	124	76	93.92	2,150	85,517	High Bypass Turbofan	10,823	11,721	
III	Bombardier	Dash 8 Q400	C	125	76	93.25	1,100	65,200	Turboprop	10,823	11,721	
II	Bombardier	CRJ 700/701/702 LR	C	135	70	76.27	1,400	77,000	High Bypass Turbofan	11,751	12,726	2
III	Embraer	E 170 Standard	C	124	69	85.42	2,150	82,012	High Bypass Turbofan	11,921	12,910	
II	Bombardier	CRJ 100/200/440 LR (CL-600-2B19)	C	140	50	68.67	1,650	53,000	High Bypass Turbofan	16,452	17,816	
II	Bombardier	CRJ 550 (Same airframe as CRJ-700)	C	135	50	76.27	1,000	65,000	High Bypass Turbofan	16,452	17,816	

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Notes:

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* Single-class seating as configured for ANA for use in Japan. Range is 76 to 92
** Dual-class seating per Manufacturer
*** Dual-class range 138 to 153
**** Dual-class range 162 to 178

General Aviation Aircraft - Characteristics

Manufacturer	Model	Seat Count	# Engines	AAC	ADG	Approach Speed (Vref)	Wingtip Config	Wingspan, ft	Length, ft	MTOW
Boeing	737-BBJ	20	2	C	III	132	winglets	117.4	110.3	171,000
Bombardier	Challenger (BD-100-1A10) 300	9	2	B	II	117	winglets	63.8	68.8	38,850
Bombardier	Challenger (BD-100-1A10) 350 (the 300 with sn/ 20501 and subsequent)	8	2	C	II	125	winglets	69.0	68.8	40,600
Bombardier	Global 5000 (BD-700-1A11)	17	2	B	III	107.9	winglets	94.0	96.8	92,500
Bombardier	Global 6000/Express (BD-700-1A10)	19	2	B	III	107.9	winglets	94.0	99.4	99,500
Bombardier	Global 7500 (BD-700-2A12)	19	2	B	III	110.5	winglets	104.3	110.6	106,250
British Aerospace (BAe)/Avro	BAe HS 125-1/2/3-700/800	8	2	No Value	No Value		tbd		tbd	tbd
Cessna	Citation CJ1 (Model C525)	6	2	B	I	107.9	no winglets	46.9	42.6	10,600
Cessna	Citation CJ2 (Model C525A)	7	2	B	II	114.4	no winglets	49.8	47.7	12,300
Cessna	Citation XLS, XLS+	9	2	B	II	117	no winglets	56.3	52.5	20,200
Cessna	Citation Sovereign	8	2	B	II	107.9	no winglets	63.3	63.5	30,300
Dassault Aviation	Falcon 7X	16	3	B	III	104	winglets	86.0	76.1	70,000
Dassault Aviation	Falcon 8X	16	3	B	III	106	winglets	86.3	80.2	73,000
Eclipse Aerospace	Eclipse 500*	4	2	A	I	89.7	tip tanks	37.3	33.1	5,950
Embraer	Phenom 100 (EMB-500)	7	2	B	I	100.1	no winglets	40.3	42.1	10,582
Embraer	Phenom 300 (EMB-505)	11	2	B	II	115.7	winglets	52.2	51.3	17,968
Gulfstream Aerospace Corp.	Gulfstream V (G-V)	14	2	C	III	125	winglets	93.3	95.4	90,500
Gulfstream Aerospace Corp.	G650	18	2	D	III	145	winglets	99.6	99.8	99,600

Notes: *in lieu of the Eclipse 550 identified by LF Forecast 2019

General Aviation Aircraft – Noise Data

Manufacturer	Model	Type	ICAO Noise Data		
			EPNdB Noise Level Lateral/Full-Power	EPNdB Noise Level Approach	EPNdB Noise Level Flyover
Boeing	737-BBJ	GA	88.2	94.1	81.3
Bombardier	Challenger (BD-100-1A10) 300	GA	87.6	89.6	75.4
Bombardier	Challenger (BD-100-1A10) 350 (the 300 witl	GA	89.1	89.5	76.0
Bombardier	Global 5000 (BD-700-1A11)	GA	88.6	89.7	80.3
Bombardier	Global 6000/Express (BD-700-1A10)	GA	88.4	89.7	82.1
Bombardier	Global 7500 (BD-700-2A12)	GA			
British Aerospace (BAe)/Avro	BAe HS 125-1/2/3-700/800	GA			
Cessna	Citation CJ1 (Model C525)	GA	84.4	89.1	73.6
Cessna	Citation CJ2 (Model C525A)	GA	87.5	90.6	75.0
Cessna	Citation XLS, XLS+	GA	86.6	92.8	72.5
Cessna	Citation Sovereign	GA	87.6	90.2	71.7
Dassault Aviation	Falcon 7X	GA	89.8	92.1	82.0
Dassault Aviation	Falcon 8X	GA			
Eclipse Aerospace	Eclipse 500*	GA	79.0	81.9	68.5
Embraer	Phenom 100 (EMB-500)	GA	81.5	86.1	70.7
Embraer	Phenom 300 (EMB-505)	GA	88.8	88.7	70.3
Gulfstream Aerospace Corp.	Gulfstream V (G-V)	GA	89.9	90.8	79.1
Gulfstream Aerospace Corp.	G650	GA	90.0	88.3	76.2

Notes: *in lieu of the Eclipse 550 identified by LF Forecast 2019

General Aviation Aircraft – Fuel Data

Manufacturer	Model	Type	Seat Count	ICAO Fuel Data	
				Fuel per LTO Cycle (kg) Aircraft	Fuel per LTO Cycle (kg) per Passenger
Boeing	737-BBJ	GA	20	364.9	18.2
Bombardier	Challenger (BD-100-1A10) 300	GA	9	152.0	16.9
Bombardier	Challenger (BD-100-1A10) 350 (the 300 witl	GA	8	157.0	19.6
Bombardier	Global 5000 (BD-700-1A11)	GA	17	299.0	17.6
Bombardier	Global 6000/Express (BD-700-1A10)	GA	19	299.0	15.7
Bombardier	Global 7500 (BD-700-2A12)	GA	19		
British Aerospace (BAe)/Avro	BAe HS 125-1/2/3-700/800	GA	8		
Cessna	Citation CJ1 (Model C525)	GA	6		
Cessna	Citation CJ2 (Model C525A)	GA	7		
Cessna	Citation XLS, XLS+	GA	9		
Cessna	Citation Sovereign	GA	8		
Dassault Aviation	Falcon 7X	GA	16	144.8	9.0
Dassault Aviation	Falcon 8X	GA	16		
Eclipse Aerospace	Eclipse 500*	GA	4		
Embraer	Phenom 100 (EMB-500)	GA	7		
Embraer	Phenom 300 (EMB-505)	GA	11		
Gulfstream Aerospace Corp.	Gulfstream V (G-V)	GA	14	295.7	21.1
Gulfstream Aerospace Corp.	G650	GA	18	304.6	16.9

Notes: *in lieu of the Eclipse 550 identified by LF Forecast 2019

ASPEN/PITKIN COUNTY AIRPORT

ASE VISION

Design Aircraft Scoring and Dialogue

Next Steps

Technical Working Group Final Report Outline
Forming Recommendations and Narrative

I. Determining Design Aircraft Vote Criteria

II. Questions from AVC to Vote on

Future Meetings Schedule

Meeting 5 – Airfield Design Considerations, Draft Recommendation

- October 23rd, Aspen Police Department Building Meeting Room, 4 - 7 pm

Symposium on Future Aircraft

- November 13th, Aspen Meadows, Doerr-Hosier, 4 – 7pm

NEW - Added to Schedule

Meeting 6 - Draft Report: Finalize and Refine Recommendations

- November 12th or 14th?

Final Technical Working Group Report

- December 5th, Aspen Meadows, Doerr-Hosier , 4 – 7pm

ASPEN/PITKIN COUNTY AIRPORT ASE VISION

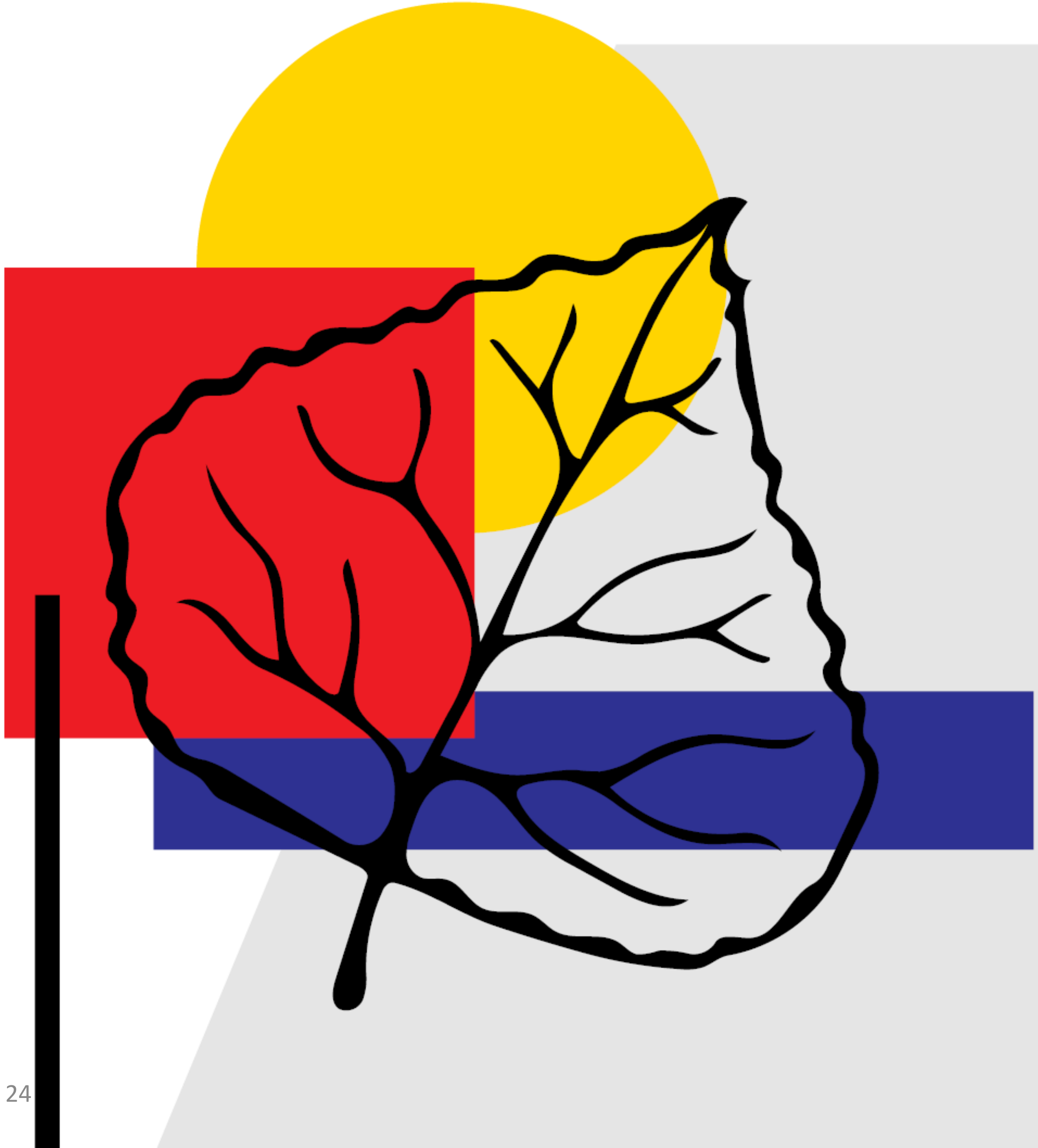
Deliverables by December to Report Back to the Airport Vision Committee

I. Design Aircraft Values Scorecard
   - Rank available aircraft to community values and goals

II. Answers to Strategic Questions
   - Preferred Design Aircraft, ADG, Green and Carbon Neutral Airfield
   - Identify areas of conflict and areas of group alignment

III. Success Factors for TWG
   - Community Character Lens

IV. Other Recommendations | Considerations
   - Other factors, comments, captured dialogue



Thank You!