Presented by

Boris HENRY
Flight Operations Engineer

Three Engine Ferry Flight

Airbus improves dispatch case

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Three Engine Ferry Flight

- Three engine ferry flight for the A340 is certified according to a specific CRI (certification review item).

- An additional engine failure is taken into account for takeoff flight path computation.

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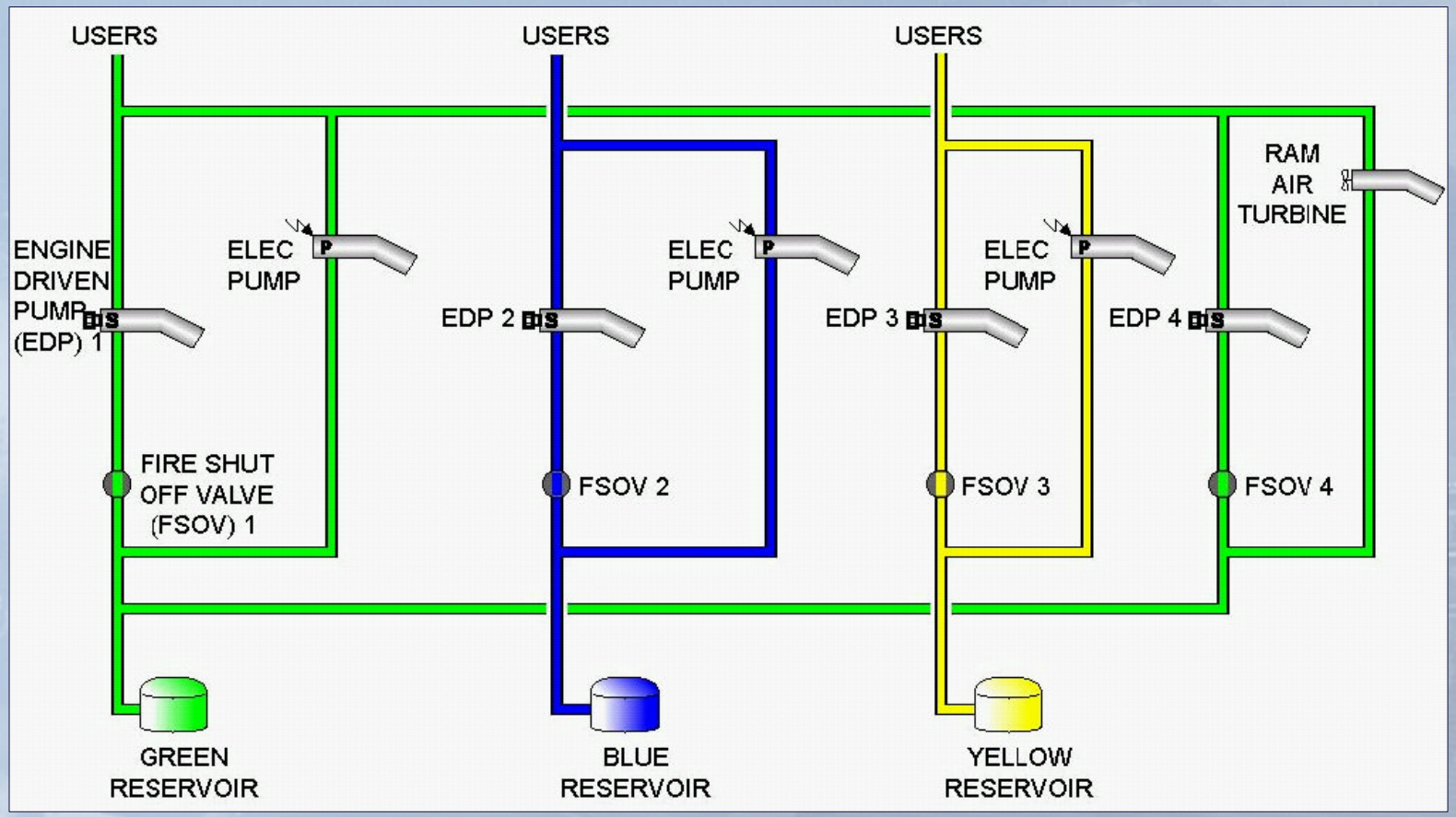
Three Engine Ferry Flight

- A340 hydraulic system:



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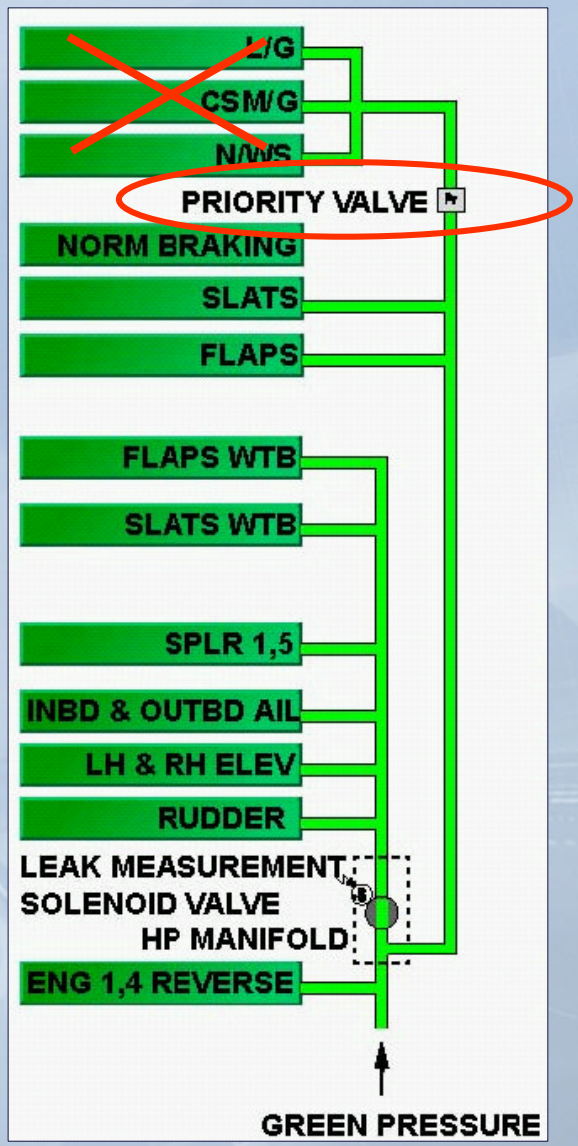
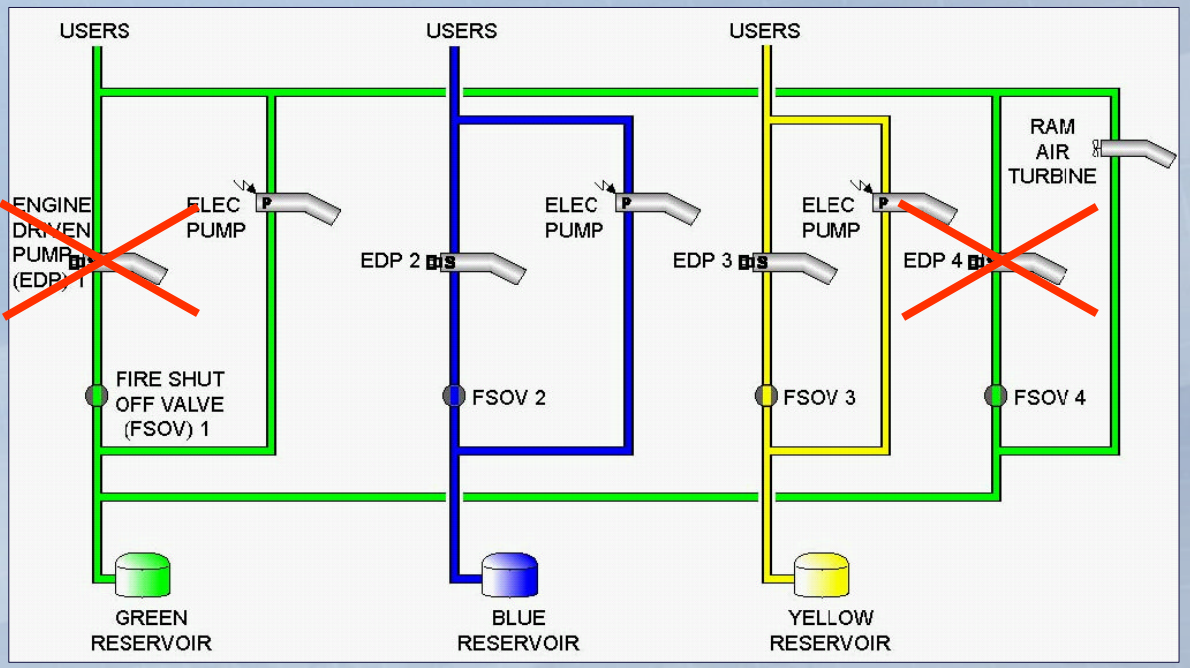
Three Engine Ferry Flight





If unserviceable engine is an outer one, additional failure of the other outer prevents gear retraction

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Three Engine Ferry Flight

- Initial certification of the A340-200/300: worst case
  - Unserviceable engine: 1 outer
  - Additional failure : 2nd outer engine
- Consequence: takeoff flight path computed with landing gear down.

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Three Engine Ferry Flight

- For the A340-500/600, 2 cases have been certified:
  - 1 outer engine unserviceable

    Takeoff flight path computed with gear down

  - 1 inner engine unserviceable

    Takeoff flight path computed with gear up

- Same is now being certified for the A340-200/300

Dispatch is improved

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Three Engine Ferry Flight

- Example: Bogota-Outer engine inoperative

MTOW # OWE

Flight impossible

OAT C	WIND 0 KT		WIND HEADWIND 20 KT	
0	137.7	3/3	149.5	3/3
	146/49/58		148/49/57	
5	135.4	3/3	148.3	3/3
	145/49/58		147/49/57	
10	133.2	3/3	145.8	3/3
	145/49/58		147/49/57	
15	130.0	3/3	141.8	3/3
	145/49/58		147/49/57	
20	124.3	3/3	135.2	3/3
	145/49/57		146/49/57	
			127.9	3/3
			146/49/57	
			118.3	3/3
			146/49/56	

31R — 23.1.1 02-FEB-06 AA313C02 V 9

0 obstacle

DRY
CONF 2
TOGA

eight 400 FT Min QNH alt 8756 FT
eight 2260 FT Max QNH alt 10616 FT

Min V1/VR/V2 = ***/149/155

CHECK VMU LIMITATION

Correct. V1/VR/V2 = 0.2 KT/1000 KG

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Three Engine Ferry Flight

- Example: Bogota -Inner engine inoperative

OAT C	WIND 0 KT	
0	154.9	3/3
	145/49/57	
5	152.3	3/3
	145/49/57	
10	149.9	3/3
	145/49/57	
15	146.1	3/3
	144/49/57	
20	139.7	3/3
	144/49/57	

31R	23.3.0B 02-FEB-06 AA313C03 V 9
0 obstacle	DRY CONF 2 TOGA

HEADWIND 20 KT	
169.4	3/3
147/49/57	
166.5	3/3
147/49/57	
163.6	3/3
146/49/57	
159.5	3/3
146/49/57	
152.5	3/3
146/49/57	
144.4	3/3
146/49/56	
133.6	3/3
145/49/56	

eight	400 FT	Min QNH alt	8756 FT
eight	3052 FT	Max QNH alt	11408 FT

Min V1/VR/V2 = ***/149/155
CHECK VMU LIMITATION
Correct. V1/VR/V2 = 0.2 KT/1000 KG

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Three Engine Ferry Flight

OAT C		OAT C	WIND 0 KT	
0	137.7	0	154.9 145/49/57	3/3
5	135.4	5	152.3 145/49/57	3/3
10	133.2	10	149.9 145/49/57	3/3
15	130.0	15	146.1 144/49/57	3/3
20	124.3	20	139.7 144/49/57	3/3

Increase in weight: # 16 tons

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Conclusion

- With the initial three engine ferry flight certification , the A340-200/300 was very limited at takeoff:
  - Fuel quantity limited, then limited range
  - Takeoff impossible from high altitude airports

- With the new certification, with one inner engine inoperative:
  - Better takeoff performance, then greater range
  - Takeoff at high altitude airport possible

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