



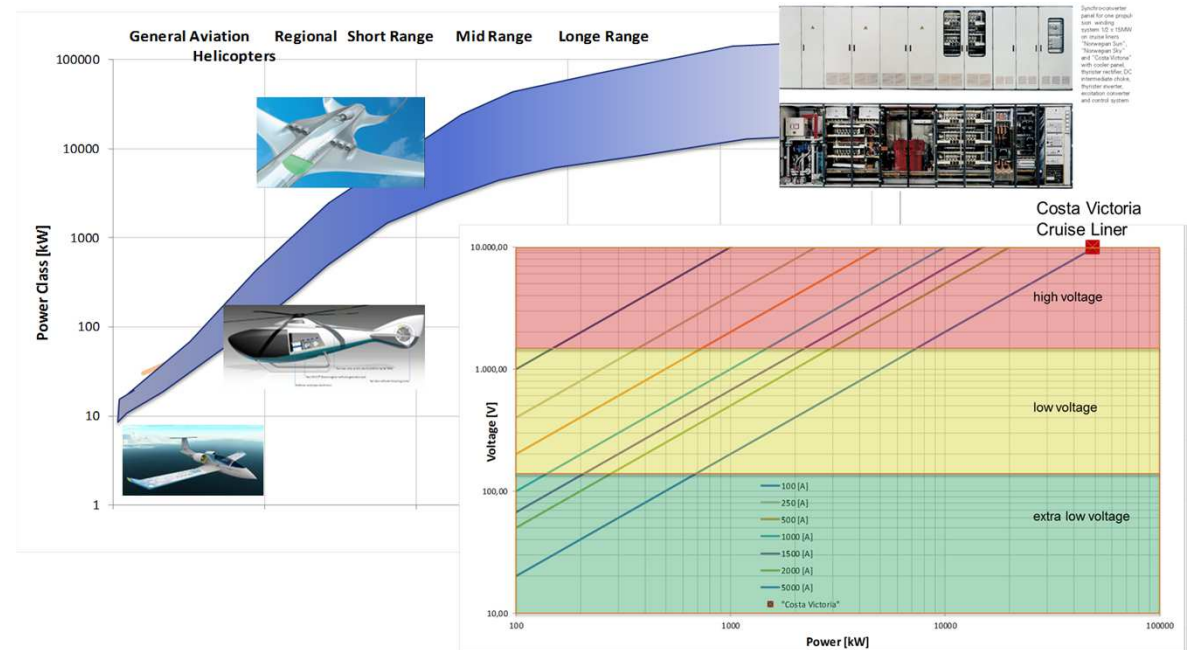
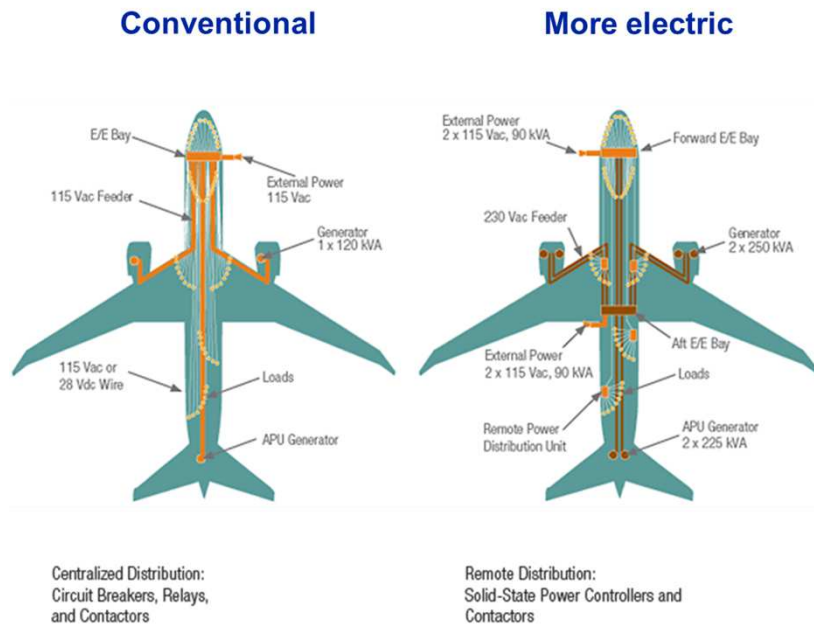
Europe-Japan Symposium Electrical Technologies for the Aviation of the Future

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Power Generation and Conversion Setting the Scene

Johannes Stuhlberger
Airbus Group CTO – Technology Strategy - Global Innovation Network

Electric Network for MEA Onboard Energy and Primary Propulsion



- Best fitting voltage level
 - Low voltage Network
 - High Voltage Network (Carbon nanowire network)
 - HTS based lower voltage networks
 - Best fitting architecture
- Incl. all functional elements (ATA chapters)**

From 3 „currencies“ to one for overall integrated energy management / optimization

Power Generation and Conversion

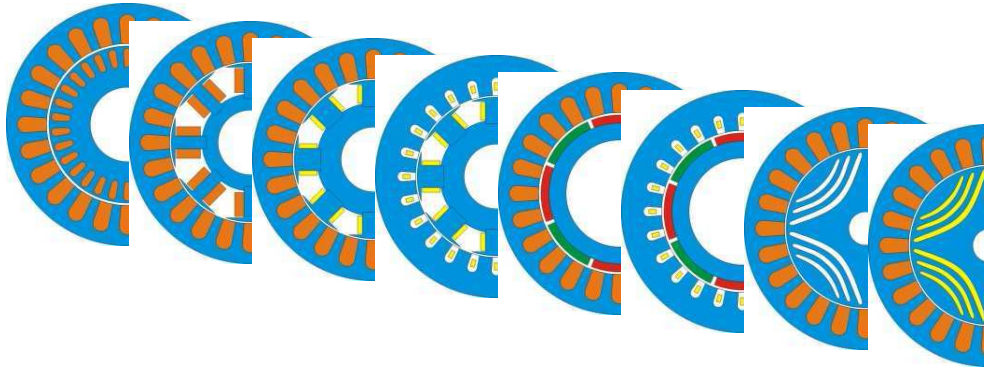


Power Generation									
Power Classes	MW	0,1	0,2	1	2	10	20	40	75
ICE based generator	rpm	3500	to	8000					
Turbine based generator	rpm	10000	to	50000					

Power Conversion							
Power Classes	MW	0,1	0,2	1	2	10	20
Rotation speed	rpm	300-400	~2000	4000	to	5000	

all values given as order of magnitude

Power Generation and Conversion



- Best fitting architecture for motor and inverter
- Best fitting rpm level (with or w/o gearbox)
- Classic or HTS
- ...

Expectation for key performance indicators

Classic electric machines			
	Power / mass ratio	efficiency	
Short term (5-10 years)	5-10 kW/kg	96 %	cont. power
Mid Term (10 to 15 years)	10-20 kW/kg	97 %	cont. power

Superconducting electric machines			
	Power / mass ratio	efficiency	
Short term (5-10 years)	7-10 kW/kg	99,20%	cont. power
Mid Term (10 to 15 years)	10-20 kW/kg	99,50%	cont. power
Long Term (>>15 years)	20 -50 kW/kg	99,90%	cont. power

“It seems to be impossible until anybody does it”

Thank you for your attention!