

Global Safran Vision

Optimized Non-Propulsive Energy Generation

Electric Assistance to Gas Turbine Engine

Hybrid Propulsion

Distributed Hybrid Prop. toward Turbo-electric



> 10 MW
SMR 200-300 Pax



4 - 10 MW
Regional 100-150 Pax



3 - 4 MW
Regional 50-100 Pax
Business Jets



1 - 3 MW
Helicopters / Commuters
VTOL / UAVs



100 - 500 kW
General Aviation



<< 100 kW
Drone

Today

+ 10 yrs

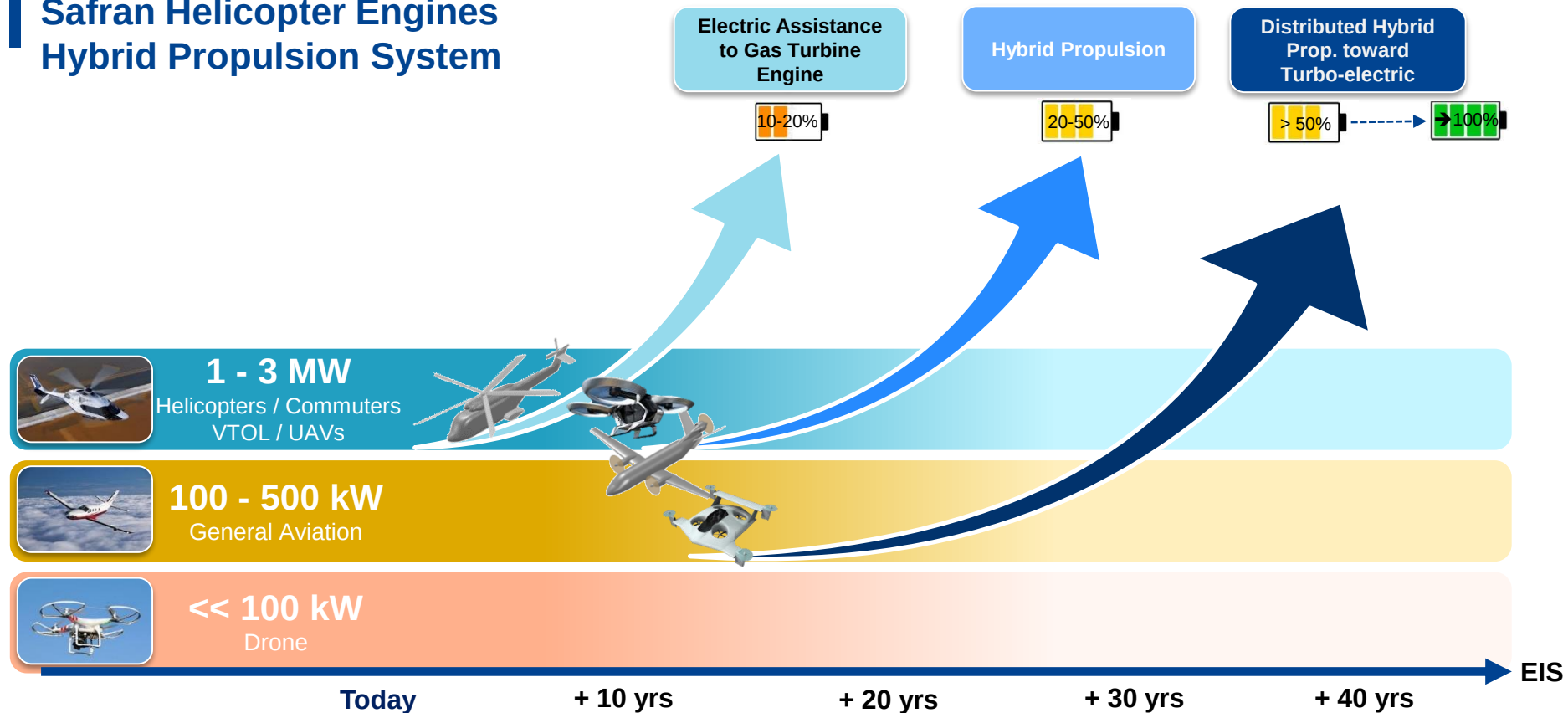
+ 20 yrs

+ 30 yrs

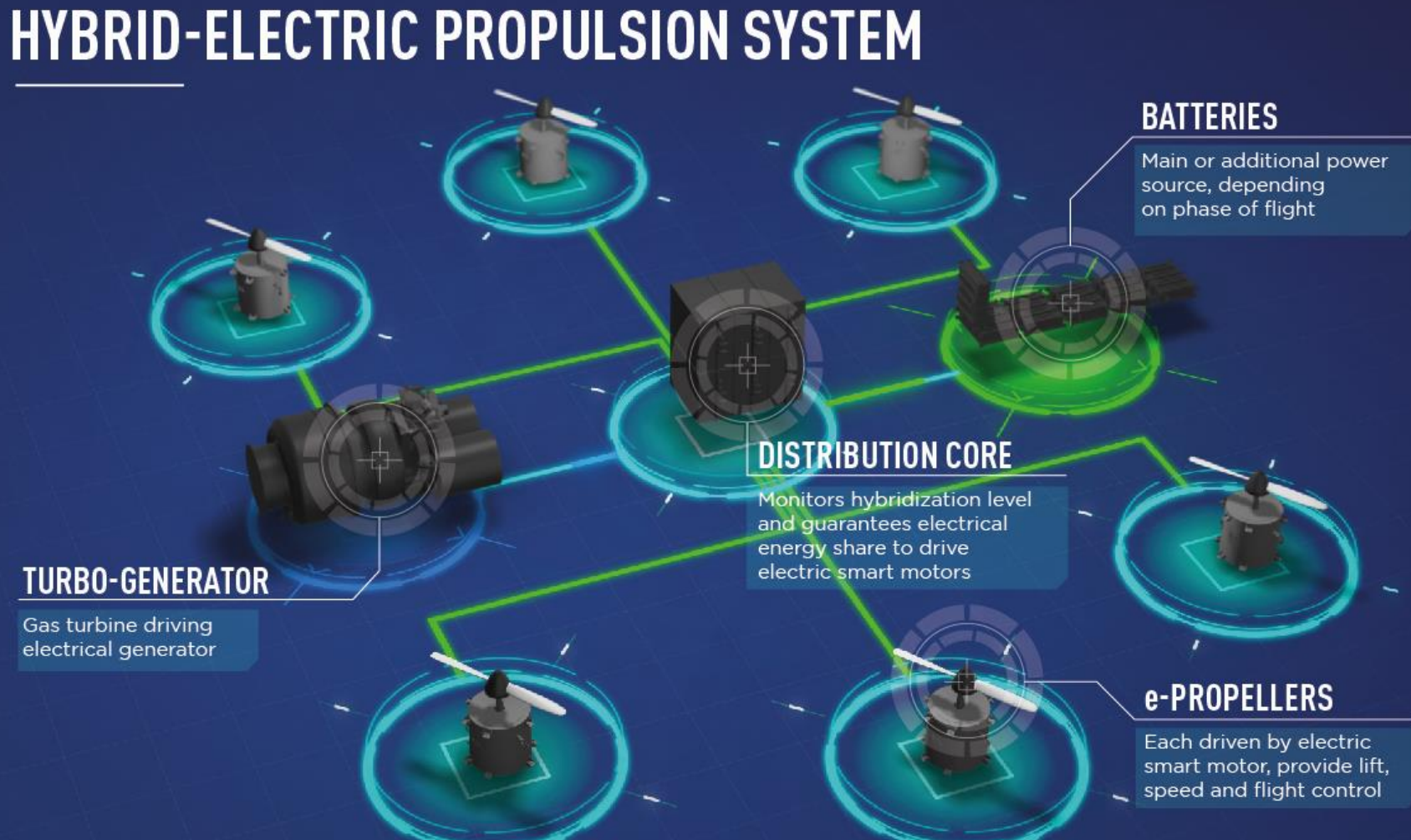
+ 40 yrs

EIS

Safran Helicopter Engines Hybrid Propulsion System



HYBRID-ELECTRIC PROPULSION SYSTEM

A schematic diagram of a hybrid-electric propulsion system. At the center is a 'DISTRIBUTION CORE' represented by a cube with a circular face. To the left is a 'TURBO-GENERATOR' shown as a large cylindrical engine. To the right is a 'BATTERIES' unit depicted as a stack of cells. Six 'e-PROPELLERS' are arranged around the central core, each shown as a propeller on a motor. Green lines connect the turbo-generator and batteries to the distribution core, and then from the core to each of the six e-propellers. The entire system is set against a dark blue background with a faint grid pattern.

BATTERIES

Main or additional power source, depending on phase of flight

DISTRIBUTION CORE

Monitors hybridization level and guarantees electrical energy share to drive electric smart motors

TURBO-GENERATOR

Gas turbine driving electrical generator

e-PROPELLERS

Each driven by electric smart motor, provide lift, speed and flight control

Safran Helicopter Engines: New Hybrid Market



Logistics

EIS ~ 2025

Load transport. > 150 kg



Urban ODM

EIS ~ 2025 - 2030

Pax transport. (4 Pax mini)



Inter-Urban ODM

EIS > 2025

Pax transport. (9-19 Pax)

Safran View On Helicopter Engine Business

Growth strategy

Pulled by new means of mobility...

EIS Hybrid Propulsion Systems
Payload >150kg

...and by conventional architectures that will remain for a long time

2025 2030 2035 2040 2045

Hybrid systems opportunities

On Demand Mobility

Logistic

Cannibalization

Replacement acceleration

Sustainable need

NEW

CURRENT

Safran Helicopter Engines: 80-year pioneering spirit

