

A 3D wireframe cube is centered on a black background. The cube's edges are colored in three distinct colors: white, blue, and red. The top and bottom faces are outlined in white. The front-left vertical edge and the bottom-left receding edges are colored blue. The front-right vertical edge and the bottom-right receding edges are colored red. The text "THE NEW FACE OF INDUSTRY IN FRANCE" is superimposed horizontally across the center of the cube in a bold, white, sans-serif font.

THE NEW FACE OF INDUSTRY IN FRANCE

FRANCE REINVENTED

◆ France is a country of inventors, pioneers, entrepreneurs and captains of industry. Every time it has faced adversity, it has found the strength to reinvent itself. ◆ Today, France is once again undergoing a metamorphosis. Its aim is to regain its place among the major industrial powers, and to play its role in both the environmental, energy and digital transitions. France's industrial policy priorities are outlined in this document. They are the fruit of several months' work to identify France's key advantages in a globalized world, and the growth markets on which our efforts should be focused, our means aligned, our funding targeted and our industrial sectors united. We want to build a new industrial offering that is competitive; one that can recover lost markets and win new ones. ◆ These priorities are in the form of 34 sector-based initiatives that will be the focal point of France's efforts, the meeting point of its productive forces, researchers, engineers, designers, workers and entrepreneurs, and the starting point of its industrial renewal. ◆ France's aim is not simply to have technological performances and demonstrators for display cases. Neither can we leave to other nations the task of mass-producing our inventions conceived by French researchers and financed by French taxes. We want to see tall buildings made of timber in French cities and not just in the foyers of architectural firms, we want to see second-generation biofuels in French petrol stations and not just in test tubes, we want to see 3D printers and robots in French factories and not just in those of our competitors. ◆ Rediscovering a taste for industry and innovation and defending the "Made in France" label will require us above all to regain faith in ourselves. It will also require us to take a resolutely optimistic view of France's capacity for renewal. ◆ A nation without industry is a nation doomed to decline. France's growth and employment prospects, along with its social model, are dependent on its ability to reinvent its industry and build a more productive, green and digital society, in which food, transport, housing, heating, healthcare, education and production have been recast. ◆ This society will be a reflection of the new face of industry in France. ◆ **Arnaud Montebourg**

ORIGINS OF THE 34 SECTOR-BASED INITIATIVES

◆ Following a year's work by the National Council for Industry, the French government initiated a strategic review to define France's industrial policy priorities. ◆ They stem from exhaustive analysis of growth markets throughout the world and a comprehensive evaluation of France's role in the globalization of each of these markets. ◆ The project was led by the Directorate General for Competitiveness, Industry and Services (DGCIS), a division of the Ministry for Industrial Renewal, drawing on the international expertise of consultancy firm McKinsey, in association with France's innovation clusters and sector-based strategy committees within which business leaders, employee and employer representative organizations, relevant government departments and professional federations are represented and play an active role. ◆ The priorities were selected on the basis of three criteria: 1/ Presence in

a growth market, or one with considerable growth prospects in the global economy; 2/ Principal reliance on technologies that France masters, their adoption throughout the economy and their development, as well as the mass-production of new industrial offerings; 3/ Established existence of a strong position in the relevant market, with leading companies, or an academic, technological, commercial and industrial ecosystem providing the foundations of a strong position. ◆ The government's methods are new, and its work has now borne fruit with the presentation of 34 industrial renewal initiatives. Their aim is to focus economic and industrial stakeholders around common goals, to align government means more effectively to these goals, and to harness local ecosystems to build a new, competitive French industrial offering that is able to win market share in France and internationally, thereby creating

jobs. ◆ The work in the coming weeks will consist in forming and assembling project teams for each initiative, comprising industry leaders and representatives from government and the National Council for Industry. Each initiative will be led by a project manager, in most cases hailing from industry or the business world. They will be tasked with uniting stakeholders and bringing the various initiatives to operational fruition. They will have to define the goals to be achieved, the hurdles to be overcome, the means at our disposal, the funding to be raised (particularly through France's "National Investment Program"), any experiments to be conducted, partners to be brought on board and the schedule to be respected. ◆ All the relevant government departments and public authorities (bpifrance, General Commission for Investment, government agencies) will play a role in developing these initiatives,

allowing the State to dispose of the means available in a consistent manner in the service of a single project (regulation, training, financing, public procurement, etc.). ◆ The initiatives underscore the new face of industry in France but also that of a new environmentally friendly, digital and inclusive society in which progress is shared by all. They are at the nexus of three broad transitions: in energy and the environment; in digital technology; and in technology and society. ◆ The 34 initiatives offer substantial potential in terms of value added and jobs. McKinsey estimate that they may create 480,000 jobs in 10 years and generate €45.5 billion in value added, nearly 40% of which will come from export markets.

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Tidal energy converter, DCNS

RENEWABLE ENERGIES

◆ We want to build a France fuelled by renewable energies, less dependent on oil and gas. ◆ Energy derived from the wind, sun, water, ocean currents, the depth of the Earth, biomass and the anaerobic digestion of organic waste offers a renewable source of electricity and heat. Mastering these technologies, which are at vastly different stages of maturity, is a critical industrial issue in international competition. ◆ This initiative will address the three major challenges facing the sector: lowering the cost of the more mature renewable energy sources, such as onshore wind and solar photovoltaic power; developing technological leadership to secure the emerging markets such as marine energy, geothermal power and concentrated solar photovoltaics in the face of international competition; and increasing the use of thermal energy through the development of the related French equipment manufacturing sector. ◆ France boasts real strengths, with technology leaders, vast long-established research budgets, and a very active network of companies involved in a broad range of technologies. With six innovation clusters across the country promoting research, France's renewable energies sector is now faced with the challenge of developing a competitive industrial offering capable of achieving energy policy goals for 2020. ◆ The list includes new prototype tidal energy converters and floating wind turbines, the development of high-yield and low-cost solar cells, and the increased use of energy sources available within the country. France must occupy a prominent place in this market, the growth of which may amount to some €2-3 billion of value added in the coming years, half of which from exports.



Hybrid Air powertrain, PSA

UNIVERSAL CARS CONSUMING LESS THAN 2 LITERS PER 100 KM

◆ We want to build a France of green, economical and universal cars consuming less than 2 liters per 100 km (120 mpgUS). ◆ Our aim is to make cars that are accessible to all, designed and manufactured in France, for smart and cleaner driving. We want lighter vehicles that will play a role in the fight against climate change and reducing consumption of fossil fuels.

◆ This initiative will enable the development of new fuel-efficient technologies, involving hybrid engines, lighter vehicles, and reduced power losses attributable to mechanical causes and tire rolling resistance. Work on vehicle connectivity will result in an enhanced driving experience and improved safety.

◆ One of the initiative's major challenges will be to reduce fuel consumption without increasing vehicle prices. Manufacturers Renault and PSA, and equipment manufacturers Valeo, Faurecia, Plastic Omnium and Michelin each have renowned expertise, and have decided to join forces. Based on the roadmap they have laid out for the automotive industry, the project will also involve the network of innovative mid-size companies and SMEs working in the automotive sector, as well as numerous public-sector research laboratories.

◆ The new industrial offering, backed by the government through France's "National Investment Program" and the call for expressions of interest launched in July, is central to the transformation of France's automotive sector; it aims to provide firm foundations for a sustainable rebound.



Electric charging terminal, Saintronic

ELECTRIC CHARGING STATIONS

◆ **We want to build a France of unparalleled electric transport.** ◆ The aim is to cover the entire country with a network of charging station so that French citizens can switch to electric vehicles in the knowledge that they will have access to a charging station whenever they need one. ◆ Electric vehicles are both ecological - they emit no pollutants - and economical. The electric vehicle bonus enables them to be sold at the same price as an internal-combustion vehicle in the same range, while at the same time costing less than €2 to travel 150 km. This makes them ideally suited to the 80% of French people who drive less than 65 km per day, and for whom fuel bills are a heavy burden. Charging is crucial in increasing the popularity of electric vehicles. ◆ France already has Europe's longest-standing and largest network of charging stations. The electricity sector - built around EDF, large equipment manufacturers (Schneider, Legrand) and specialist companies - is well positioned in the market for stations, infrastructure and associated services (roaming, fleet management, car sharing), both in France and internationally. ◆ This initiative will make France the "champion of electric transport" and position French manufacturers at the forefront of a market that may exceed 75,000 vehicles in Europe by 2015. It will also enable electrical equipment manufacturers to develop new job-creating operations.



Battery manufacturing plant

BATTERY LIFE AND POWER

◆ **We want to build a France of long-life batteries.** ◆ The development of the energy storage market to adapt power grids for the integration of renewable energies combined with the growth of the market for electric vehicles will result in a growing need for new batteries with enhanced unit yield in terms of weight, power, energy and cost. In aviation as well as shipbuilding, manufacturers need batteries that last longer. ◆ France has companies that are well placed in the field of high value-added batteries, such as Saft and Batscap, high-quality research and development expertise of international standing, with ICMB, IMM and INES, and leading users including Bolloré, EDF, SEI and Renault. ◆ This initiative seeks to develop French technology enabling batteries to be made competitively in France. ◆ In a fast-growing global market, it aims to provide technological innovation to facilitate the electrification of our means of transport - cars, planes and boats - which will require new storage capacity.



Driverless vehicle simulation, Citroën

DRIVERLESS VEHICLES

◆ **We want to build a France of smart driverless vehicles.** ◆ Driverless vehicles will revolutionize personal transport. Autonomous, and equipped with sensors and embedded software, driverless vehicles interact with their environment, communicate with other vehicles, facilitate driving actions and help improve road safety by eliminating driver error. Freed from the wheel, drivers will enjoy new free time during road trips, in perfect safety. People with disabilities and the elderly will regain the use of their cars. Connected vehicles will also make the management and regulation of traffic easier and more predictable. ◆ Smart driverless vehicles are a product of cooperation between automotive sector companies and players in the digital economy. Driving aids are becoming increasingly common and taking on strategic importance for the automotive industry and the preservation of jobs in the sector, particularly in R&D and design. At a time when the major internet players are looking at cars, automakers and automotive equipment manufacturers are embarking on the digital transition and developing a competitive offering of automotive components, sensors and software with the aim of bringing affordable autonomous vehicles to the market by 2020. ◆ The aim of this initiative is to make the French automotive sector a pioneer in vehicle automation, notably by removing regulatory barriers to growth. Pioneers in this new sector will have access within 10 years to a global market worth several billion euros.



Two-seater electric plane, EADS Innovative Works

ELECTRIC PLANES AND NEXT-GENERATION AIRCRAFT

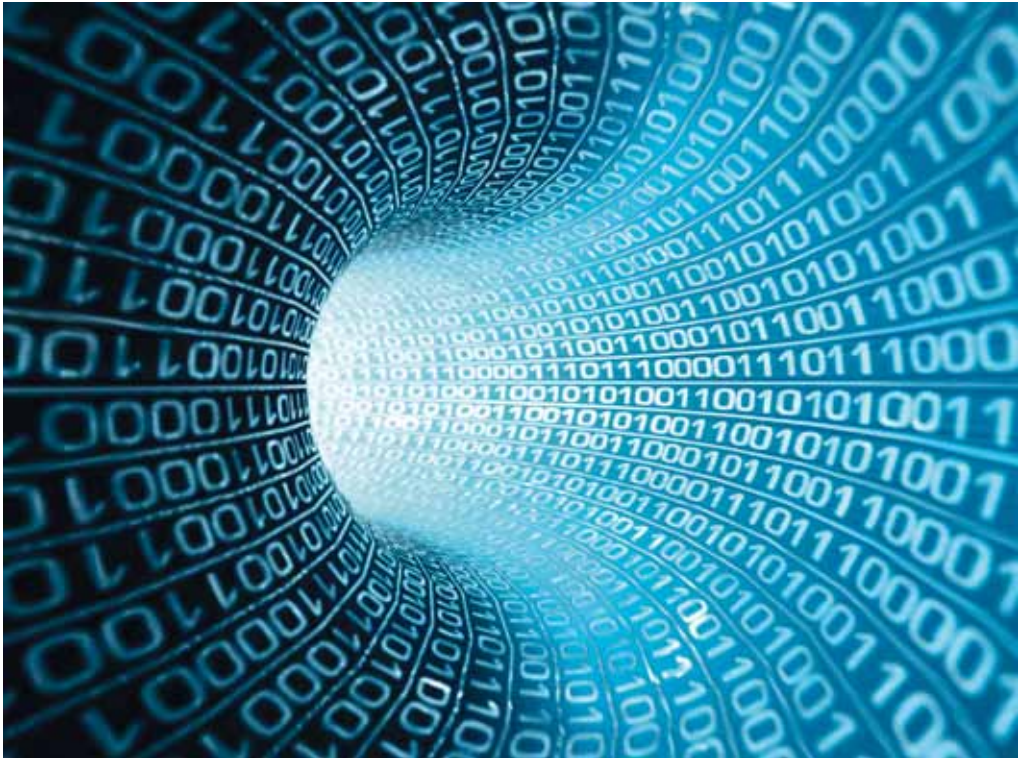
◆ We want to build a France of industrial supremacy in aerospace. ◆ The French aerospace sector, structured around major global players and a network of skilled mid-size companies and SMEs, occupies a leading position worldwide. French aircraft and helicopters are benchmarks in all countries. ◆ The preservation of these competitive advantages, derived from a successful cooperation between industry and the government dating back several decades, is a key challenge. ◆ This initiative builds on the priorities identified by the Council for Research in Civil Aerospace, including the implementation of new production methods, research on quieter and more fuel-efficient aircraft, and the development of more efficient piloting systems. ◆ While improving working conditions in production facilities through the use of new processes and technologies, the sector will build new generations of aircraft, helicopters and engines boasting innovative, safe and reliable solutions making them cheaper, quieter, more fuel-efficient and cleaner. ◆ Work will need to focus on the development of several prototypes, including E-Fan, the fully electric two-seater trainer, A30X, successor to the A320, Falcon5X, successor to the Falcon 2000, and the X4 and X6 helicopters, successors to the Dauphin and Super Puma respectively.



Sketch of an airship drone

HEAVY-LIFT AIRSHIPS

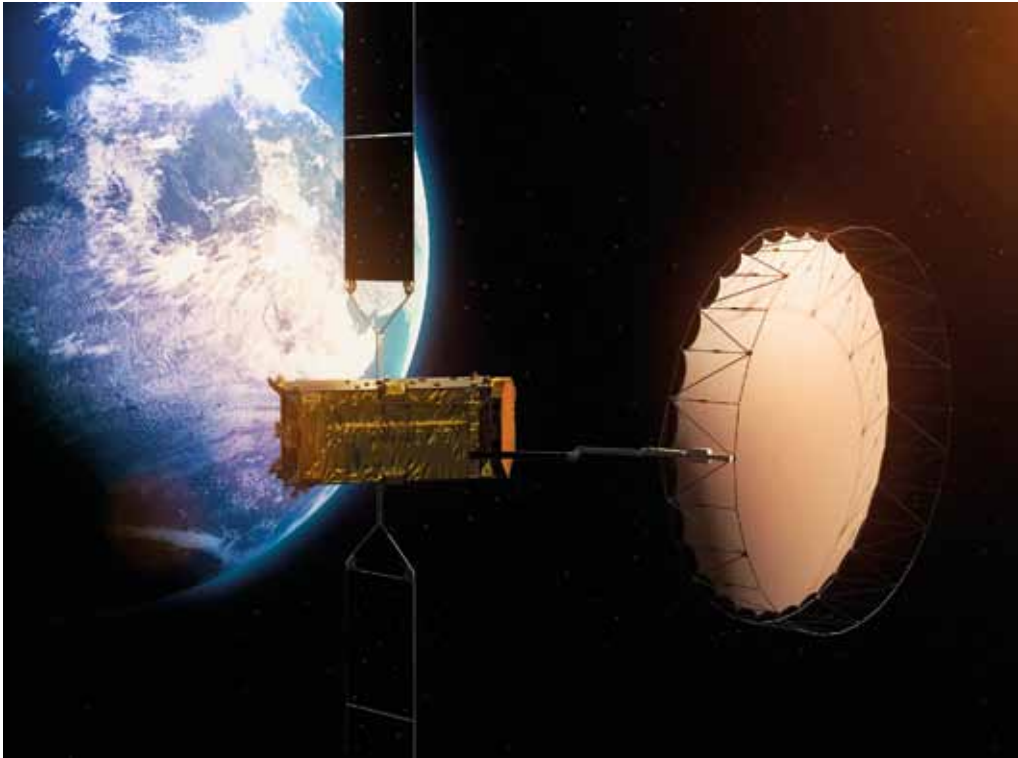
◆ We want to build a France at the cutting edge of tomorrow's aerospace sectors. ◆ This initiative will herald the emergence of a world-leading French sector in the fast-growing market for new civilian air equipment, unmanned helicopters and aircraft (drones), and airships, as well as the development of new services based on this equipment. ◆ Airships will enable point-to-point transport of heavy loads, including hard-to-access areas, in addition to applications in aerostatic cranes or platforms for monitoring public safety and observing sovereign airspaces. ◆ The use of drones will enable maritime surveillance and the low-cost development of precision agriculture. ◆ These devices are fuel-efficient and relatively clean, cost fairly little to purchase and use, and are very flexible. Their applications are very diverse and global (for airships: inter-island transport, point-to-point transport, airborne monitoring and observation, etc.). This gives them significant growth potential, for equipment as well as services, both in France and internationally. ◆ This initiative will use all the levers of public policy: R&D support, innovation clusters (Pégase and Aerospace Valley), support for SMEs, public procurement and regulatory change. ◆ France has all the necessary skills: large industrial aerospace groups, equipment manufacturers (sensors, telecommunications, etc.) and SMEs (Delair-Tech, Swat-m3g, A-NSE, etc.) operating in niche sectors. ◆ The recent introduction of national regulations clarifying the conditions governing the use of civilian drones will facilitate the development of these new sectors.



IT time code

EMBEDDED SOFTWARE AND SYSTEMS

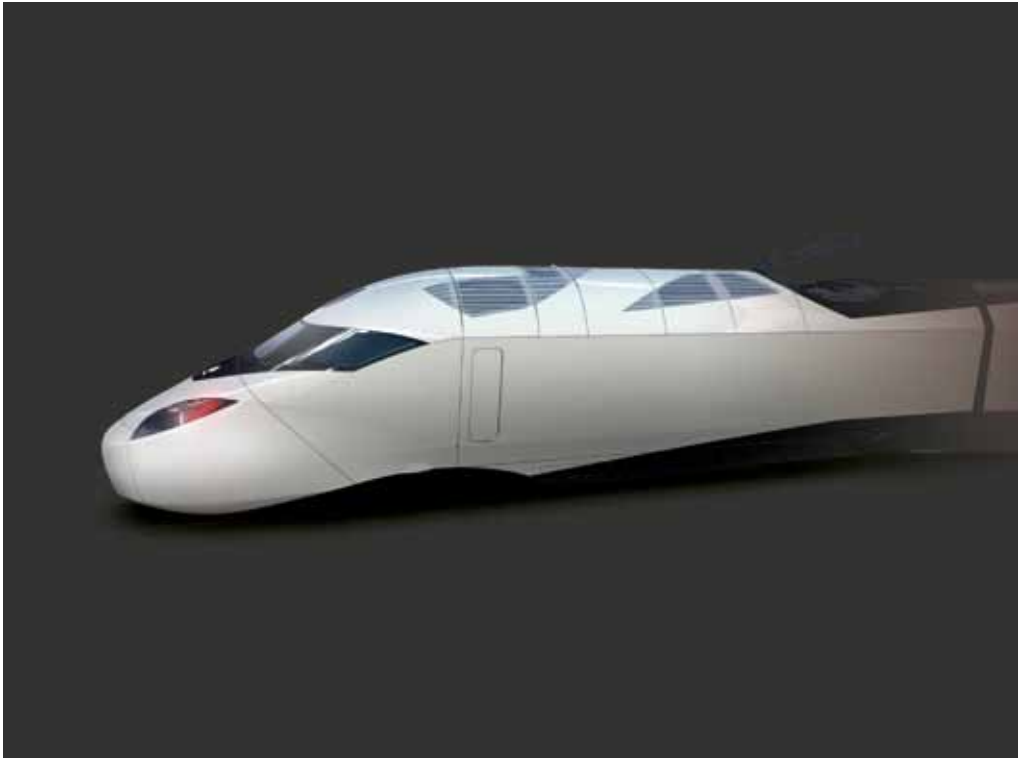
◆ We want to build a France of smart devices and systems. ◆ Aviation automatic pilot, vehicle traction control and thermal power plant control systems all rely on embedded software. The global market for embedded software is currently worth €130 billion, with annual growth of around 2%. ◆ France accounts for a significant share of this, with annual revenues of approximately €10 billion. ◆ It is an essential business line for manufacturing clients: embedded software currently accounts for 9% of costs in industry, and 40% of research budgets. In the aerospace sector, for instance, embedded software accounts for 12% of aircraft production costs and 35% of research budgets. ◆ As the cost of materials and electronic circuits falls, the value of a device is increasingly linked to the embedded software that gives it its intelligence and functionality. The ubiquity of embedded software and systems increases the reliability and efficiency of production processes in industrial plants, secures the operation of many of the key features ensuring the operations of manufactured goods (automotive, rail, air) in order to avoid accidents, and enables everyday devices to communicate with each other. ◆ In France, the embedded software sector is structured around innovation clusters. The skills of 74,000 employees, working in start-ups, SMEs and large groups, give it an enviable position in a fast-growing global market. ◆ This initiative aims to consolidate the sector, particularly software publishers, and to support innovation, fostering the emergence of powerful exporters.



Sketch of an electric-propulsion satellite

ELECTRIC-PROPULSION SATELLITES

◆ **We want to build a France of electric-propulsion satellites.** ◆ Geostationary satellites are an area of excellence of French industry and represent a market with compelling growth prospects, chiefly in export markets. At least 20 such satellites are to be launched by 2017 to enable ultra-fast broadband coverage of geographically isolated areas with low population density. ◆ France is a European leader in the space sector but will have to adapt quickly to market trends arising from the emergence of electric-propulsion platforms, which are lighter and cheaper. Changes in user demand will affect the entire French space sector, from system suppliers such as Thales Alenia Space (TAS) and Astrium to equipment suppliers such as Snecma, Saft and Sodern. ◆ In addition to facilitating the development of the planned NEOSAT next-generation platform and work on the payload of the ultra-fast broadband satellite, funded by France's "National Investment Program", this initiative aims to support industry in the design, development and technological mastery of electric-propulsion platforms and associated industrial processes. ◆ As such, by 2017, European industry can hope to account for a third of the market for ultra-fast broadband satellites, which constitute the largest source of growth.



Sketch of the high-speed train of the future, Alstom

HIGH-SPEED TRAIN OF THE FUTURE

◆ **We want to build a France of widely available high-speed rail.** ◆ France, a pioneer of high-speed train travel, is facing the challenge of new markets currently opening up in Asia, the Middle East and Brazil. Worldwide, high-speed networks are poised to grow from around 10,000 km in 2010 to around 40,000 km by 2030. ◆ France must complete the revolution of its rail network and develop the next-generation TGV (high-speed train) if it is to conquer new markets and withstand competition from new players. It can count on Alstom, a renowned global leader in high-speed rail, a well-organized network of subcontractors and an active R&D environment, with world-class innovation clusters as well as cutting-edge public-sector research laboratories. ◆ The high-speed train of the future will need to satisfy national needs while gaining market share internationally. It will combine a cruising speed of 320-350 km/h with power consumption reduced by 20% to 30%, scalability enabling it to carry up to 640 passengers on two decks, compared with 509 today, and the versatility required to meet traffic constraints across the entire European network, with trains dedicated not to a single line but to a complete network. The high-speed train of the future is due to come into service in 2018, with a prototype ready for use in a series of tests in the first half of 2017.



Planned environmentally friendly ship, STX France

ENVIRONMENTALLY FRIENDLY SHIPS

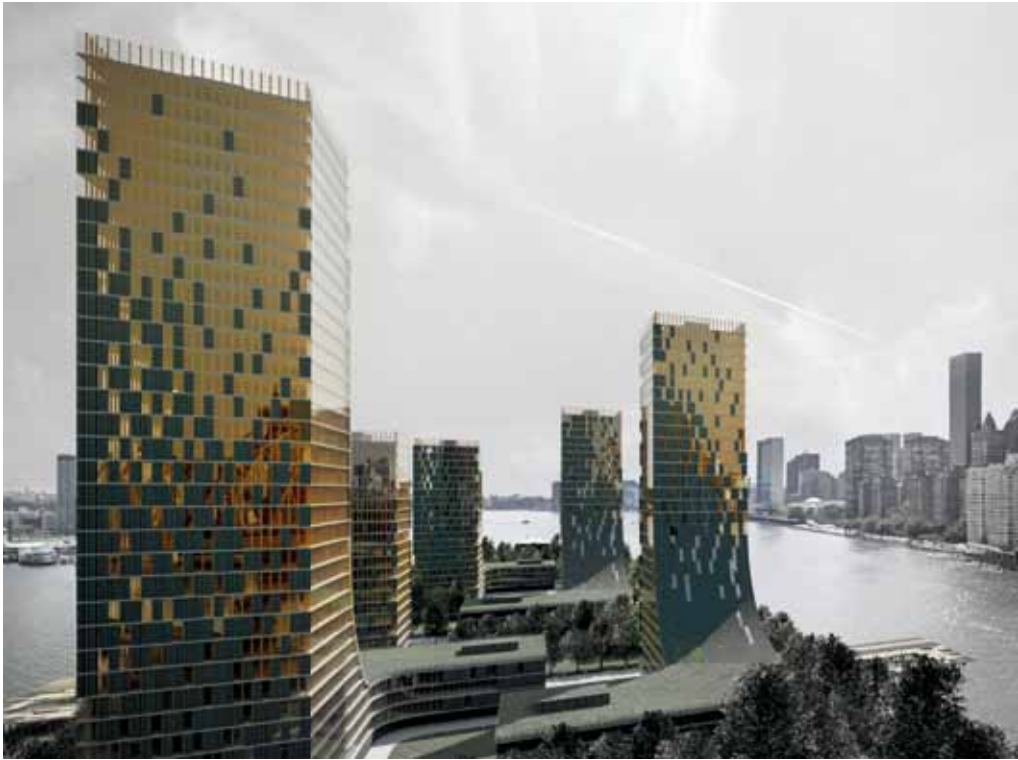
◆ We want to build a France of fuel-efficient and environmentally friendly ships. ◆ With nearly 90% of trade in goods involving ocean transport, not to mention the anticipated growth of marine renewable energies and river traffic by 2020, the shipbuilding industry has attractive growth prospects. ◆ With revenues of €10 billion, including €4 billion in export markets, and approximately 70,000 employees, the French shipbuilding industry is ranked sixth in the world. Structured around STX and DCNS, highly efficient shipyards and a network of active subcontractors and equipment manufacturers, it spans a wide range of activities: shipbuilding, repair and vessel conversion, including offshore technologies. ◆ In a highly competitive global environment, the French shipbuilding industry must remain competitive if it is to meet the demands of its customers, offering scalable ships and environmentally friendly solutions that are as safe as they are affordable. ◆ This initiative aims to develop the ships of the future. The first goal will be to anticipate environmental protection regulations (reduction of emissions of CO₂, sulfur oxide, nitrogen oxide and fine particles, reduction of wastewater and waste production), with the target of halving a vessel's overall environmental impacts throughout its life cycle. The second goal will be to integrate innovative approaches to improve safety and security standards for cargo and crew, and to heighten passenger comfort. The third goal will be to embed innovations, enabling crews to optimize navigation, consumption, emissions, and the vessel's standard and critical operations.



Light curtains, Brochier Technologies

TECHNICAL AND SMART TEXTILES

◆ **We want to build a France of innovative textiles.** ◆ An enduring and evolving symbol of the first industrial revolution, France's resilient textile industry has established itself as a promising sector. For contrary to common misapprehensions, the textile industry is still a strong force in France, and is highly innovative. Its revival, supported by the government, has been initiated by diversifying existing SMEs into technical textiles and the development of new fibers, including bio-based textiles, smart textiles capturing solar energy or monitoring personal biometrics, and curative or shape-retentive clothing. ◆ The textiles of the future will be more technological and environmentally friendly. They will also be present everywhere in our daily lives: sport, building, health, transport, defense, packaging and food, agriculture and the environment, and safety and protection. The scientific advances generated by technical textiles will spark innovation which will spread to the whole industry. ◆ France is a key player that is already preparing the industrial projects of the future. Its key strengths include a network of innovative and successful companies backed by leading research laboratories, respected engineering schools, structures such as the French Institute of Textiles and Clothing, and the European Centre for Innovative Textiles, and vibrant innovation clusters (Uptex and Techtera). France also boasts key advantages: highly qualified personnel, knowledge of materials, incorporation of technological advances, etc. Together, they will facilitate the development and marketing of future textiles in France and internationally. ◆ To this end, the government, working hand-in-hand with textile-producing regions and the scientific and industrial ecosystem, is promoting the emergence of new products by facilitating funding and finding new markets.



Michael Green wood-frame building

WOOD INDUSTRY

◆ **We want to build a France of green gold, where forests are a vital future resource.**

◆ The technical, economic and environmental properties of wood make it a strategic material with multiple uses, including construction, furniture, chemicals and biomass, among others. It is now possible to build tall wood-frame buildings and to reuse by-products from the paper industry. Technical innovations offer attractive prospects for economic growth and new jobs in the wood industry. ◆ France is home to Europe’s third-largest collection of forests, and its exceptional key advantages should be exploited further. For, curiously enough, and yet for good reason, France’s wood industry is actually the source of the second-largest deficit in France’s trade balance, as unprocessed wood cut in French forests is exported, and finished products with greater value added imported. This results in a deficit of more than €6 billion every year in France’s trade balance. Sector players, mostly SMEs and very small family-owned companies, must therefore join forces, invest and innovate. ◆ The “Wood Industry” initiative aims to correct this imbalance by relocating processing activities in France and stepping up the pace of industrialization. The idea is to make the industry more competitive by improving access to forest resources, promoting timber construction, the second-largest usage in France, and furthering the use of biomass for energy. ◆ The development of this potential for excellence will also help familiarize French consumers with new uses for wood, thereby promoting new markets for the industry. ◆ French wood, processed in France, will thereby provide energy, construction materials and consumer goods, while representing the potential to create up to 60,000 new jobs, predominantly in rural areas. The initiative will make France’s forests the renewable source of a modern, innovative and responsible industry.



Metal recycling

RECYCLING AND GREEN MATERIALS

◆ **We want to build an eco-responsible industrial France.** ◆ Avoiding wastage of natural resources and energy, and reducing the economy’s impact on the environment are among the major challenges of the new century. France must also secure its supplies of all kinds of raw materials. This is why recycling is such a compelling solution. ◆ France can count on a solid base of leading companies in waste management. Two multinational groups, mid-size companies and a densely woven network of very micro-enterprises and SMEs already operate in the “circular economy”. ◆ However, waste, whether from industry or household consumption, is still insufficiently recycled in a complex institutional, regulatory and economic framework. ◆ The “Recycling and Green Materials” initiative aims to migrate our consumption, production and distribution patterns to a circular economy model. Industrial and agricultural sectors will have to adapt by promoting eco-design, recycling and the recovery of waste. Across France, industrial ecology projects may be undertaken on localized product and material circuits.



DomoLab, the first innovation centre for housing in Aubervilliers

THERMAL RENOVATION OF BUILDINGS

◆ **We want to build a France of energy efficiency.** ◆ A third of France's greenhouse gas emissions stem from energy wasted in buildings. Energy efficiency is an ecological, social and economic challenge. ◆ Cities are complex areas that must balance quality of life with economic activity. Renovating existing housing will help build sustainable cities, improving the lives of people and promoting a vital business sector. Energy efficiency will help fight against global warming. ◆ The "Thermal Renovation" initiative announced by President François Hollande on March 21, 2013 will make it easier for people to invest in the thermal renovation of their homes. In addition to components seeking to increase demand for renovation, the initiative to promote professional practice in the sector aims to provide an affordable pool of efficient tradespeople using the best technologies available, ensuring that everyone has access to quality. ◆ The French construction sector, which has real expertise and spans the entire energy efficiency chain (architects, design consultants, tradespeople, equipment manufacturers, HVAC and new technology players, large construction companies), is ready to rise to the thermal renovation challenge. It is supported by active R&D, backed up by several innovation clusters. ◆ This initiative aims to extract synergies between different players in order to provide an integrated offering and to develop the competitiveness of French industry and tradespeople. More than 75,000 jobs are at stake, directly and indirectly, of which around 4,000 are in related industrial sectors. ◆ By structuring the French industrial offer for thermal renovation, the initiative aims to mass produce exportable solutions to improve quality of life and lower energy bills for people living in France and in other countries.



Electricity is vital for our cities

SMART GRIDS

◆ **We want to build a France of smart grids.** ◆ Electricity consumption in France has changed in its make-up and its nature. Machines - electric vehicles, for instance - and habits have been transformed. French methods of electricity generation have also evolved as a result of the development of renewable and intermittent energy sources, and changes in France's energy mix. ◆ The electrical system must therefore move towards greater flexibility, efficiency and elasticity in order to take better account of the emergence of these new uses and to ensure the optimal management of electricity generation in a changing energy landscape. ◆ The integration of new information and communication technologies into power systems can help create smart grids. Such innovation makes for better measurement of consumption and more adaptable grids. ◆ Smart grids help maintain power at a reasonable price, enabling electricity companies and network managers to align investment needs with new uses, and consumers - both residential and business customers - to monitor their consumption in real time, anticipating in order to keep it on a tighter rein. Smart grids enable consumers to become actors in their electricity consumption. ◆ The launch of the "Smart Grids" initiative aims to take France's power and information technology sectors into new markets with high growth and job-creation potential. Total global investments are estimated at nearly €30 billion per year starting in 2015. The initiative will also support the rollout of Linky and experiments on real-scale buildings and smart homes. ◆ France already boasts world leaders in all smart grid technologies, including operators of electrical and telecom networks, equipment manufacturers, components producers, software engineers, and data centers. ◆ The "Smart Grids" initiative will enable French industry to take the lead in smart grids.



Water, a priceless resource

WATER QUALITY AND SCARCITY MANAGEMENT

◆ We want to build a France of smart water management. ◆ Water is a vital resource and is scarce throughout the world. The specificity of the water sector is that it is both a service and a growing global market. The water management process is seeing much innovation, thanks in large part to smart networks and the fight against wastage. Ecological engineering in the fields of quality control and remediation is another major challenge. ◆ As a global leader, the French water sector has renowned expertise. ◆ R&D operations can be established throughout the country around flagship projects such as: the wastewater treatment plant of the future, which will reduce residual waste and produce more energy than it consumes; or the emergence of smart water networks that will provide a long-term response to health and environmental issues; the protection of water resources; as well as the optimization of renovation, maintenance and operating costs. ◆ The French water sector must also focus on continuing to develop an offering aimed at satisfying demand for drinking water and sanitation facilities so as to consolidate or increase its position in the sanitary control of the environment in fast-growing emerging markets (by 2050, China, Brazil, India and South Africa will account for 40% of global water needs). ◆ The strategic issues addressed in the “Water Quality and Scarcity Management” initiative are how to innovate in a global market in a sector of excellence, how to maintain a leadership position, how to support environmental and health policy goals, and how to develop new services enabling individuals, communities and industry to keep a tighter rein on costs.



Plant chemistry facility, rapeseed processing

GREEN CHEMICALS AND BIOFUELS

◆ We want to build a France of green molecules in which the chemical industry anticipates the post-oil era. ◆ The chemical industry is doubly dependent on hydrocarbons - for energy and as a raw material. The inexorable increase in their prices is weighing on our chemical industry, where sites are scattered, small and sometimes ageing. Encouraging innovation to maintain competitiveness is therefore a priority. ◆ The industry needs to move towards green and sustainable chemicals that satisfy demand for energy savings, environmental protection and economic development if it is to position itself in the post-oil world. ◆ With 950,000 jobs, 7,000 companies and value added of around €32 billion, the importance of the chemicals industry to the French economy is considerable. While it is the second-largest producer in Europe and seventh-largest in the world, the French chemicals industry is now facing the dual challenge of competitiveness and sustainable development. ◆ By ushering in more efficient processes in terms of energy consumption and yield, the “Green Chemicals and Biofuels” initiative aims to bolster and hasten the modernization of industrial facilities. ◆ France can master the entire chain of bio-based chemical production, relying on its considerable capacity for innovation, its tried and tested scientific and industrial know-how, its abundant agricultural resources, its numerous industrial markets and its position at the heart of the world’s second-largest market. ◆ The initiative aims to enable the mass production of second-generation biofuels and heavy investment in the third generation. It will support the development of bio-refineries and white biotechnology, as well as the marketing of high value-added molecules and materials.



Biotechnology laboratory, France Biotec

MEDICAL BIOTECHNOLOGIES

◆ We want to build a France of bespoke medical treatments prescribed in accordance with each patient’s personal profile. These medicinal products will have both preventive and curative functions. ◆ Following the decoding of the human genome by the Généthon Genotyping Centre, France has ushered in a new era in which each patient receives customized treatment based on their genetic heritage, making the switch from general practice medicine, offering a single drug for each illness, to medicine tailoring the most appropriate medication to each patient. ◆ France, which has historically been at the forefront in the field of chemical-based drugs, is branching out into biotechnologies. France boasts cutting-edge research based on successful public-private partnerships, substantial bio-production capacity, and an ecosystem of high-tech SMEs that alone accounts for more than 9,000 jobs. It has everything it takes to carve out a leading position in a market that is expected to grow by approximately 20% per year worldwide over the next five years. Today, 70% of pharmaceutical products in development are bio-drugs, in a global pharmaceutical market worth more than US\$1,150 billion. ◆ The “Medical Biotechnologies” initiative aims to help consolidate France’s positions in synthetic biotechnology and cellular therapy by strengthening research partnerships and helping biotech companies expand their offerings.



Medical imaging

DIGITAL HEALTHCARE

◆ **We want to build a France of better quality and safer hospital care.** ◆ The modernization of healthcare provision in medical facilities, as well as to outpatients, will benefit patients, healthcare professionals and industry alike. The “Digital Healthcare” initiative is at the nexus of three key challenges: increasing the quality of healthcare provision, reining in healthcare costs and providing the French industrial sector with growth opportunities. ◆ This modernization, made possible by the digital revolution, covers the development of information systems for hospitals, but also the development of the full range of digital health tools (e-health). ◆ Its aim is to achieve an improvement in patient management in hospitals and at home, notably with the development of effective diagnostic and monitoring tools, particularly in the city-hospital space. ◆ The field of e-health already covers a vibrant ecosystem comprising industry leaders and start-ups. This ecosystem is driven by innovation clusters and actors including the reference center for home healthcare. ◆ The development of a French industrial offering in the field of e-health will help provide support for “digital healthcare” and “regional digital care” experiments undertaken by regional health bodies.



ROSA surgical procedure assistance robot, Medtech

MEDICAL DEVICES AND NEW HEALTHCARE EQUIPMENT

◆ We want to build a France of medical technology for more reliable diagnosis and increasingly effective treatments. ◆ Medical devices are a major field for innovation, improving the quality of health and patient care. Medical imaging, robotic surgery assistance technologies, implant treatments and smart dressings are new responses in the fields of diagnosis, treatment and patient care in hospitals and at home. ◆ The French market for medical devices accounts for 11% of France's GDP. ◆ Meanwhile, the global market is currently worth in excess of €200 billion, with annual growth of more than 6%. In the face of global competition, France can count on the excellence of its medicine and its hospital model. The sector currently employs 45,000 people, compared with two million in the United States. ◆ As a big importer of medical devices at present (deficit of €800 million), France has the capacity to close the gap thanks to its high-quality research and its dynamic and innovative ecosystem of start-ups, SMEs and mid-size companies. The emergence of global leaders will hinge on two central challenges, namely the structuring of the sector and support for growth companies. France's industrial offering must be positioned on high-value added and high-growth medical device segments such as medical imaging (CT scans, ultrasound, endoscopy, etc.) and e-health (telecardiology, analysis and management of patient data, etc.). It must embrace the changing demands of patients and healthcare facilities, orders from which should facilitate the industrialization of a competitive and exportable offering.



Organic tomato plants

INNOVATIVE PRODUCTS FOR SAFE, HEALTHY AND SUSTAINABLE FOOD

◆ **We want to build a France of quality food.** ◆ The food industry, a pillar of the French economy, contributes positively to France's trade balance, but faces a dual challenge: meeting the new expectations of consumers in France and internationally, while getting the most from our agricultural resources. ◆ Today's new expectations stem mainly from the desire to eat healthier, more natural and tastier processed foods that can be kept longer, notably without refrigeration in order to facilitate exports, and that have a small environmental impact. ◆ The broad outlines of the initiative are as follows: lowering the proportion of inputs such as sugar and salt, optimizing the functionality of proteins to reduce or replace additives, improving food stabilization techniques and the quality of their packaging to keep them longer, and producing with less energy, excess and waste. ◆ By improving the quality of food, its life cycle and its traceability, and by anticipating foreseeable regulatory changes, notably in relation to inputs and allergens, this initiative will consolidate the French and European markets and the development of an export offering.



Computer data, lines of code

BIG DATA

◆ **We want to build a France of digital sovereignty.** ◆ The development of the mobile internet, with smartphones and tablets, has resulted in a veritable deluge of digital data accentuated by the increasing presence of connected devices in our everyday lives. This has made data the fuel of the digital economy. ◆ All business sectors, from retailing to the automotive and energy sectors, and all aspects of daily life (health, education, etc.) are concerned. ◆ Big Data encompasses the processing, collection and storage of large amounts of data, as well as their visualization and analysis. How can data be linked up? How can they tell us things? How can they be used to benefit consumers and our fellow citizens? ◆ These questions represent not only an economic challenge - value creation related to Big Data is projected to account for 8% of European GDP by 2020 - but also a strategic challenge, as they encompass the protection of digital data. ◆ France has countless key strengths in this area: its talented mathematicians and computer scientists, its network of digital companies including Talend, Criteo, Capgemini, Atos and Exalead/Dassault Systèmes, as well as an array of companies operating in sectors transformed by the digital revolution, which account for nearly 80% of GDP. ◆ The goal of the “Big Data” initiative is to make France the world leader in this field. The initiative covers the entire spectrum of hurdles to be cleared: training data scientists, opening a technological resource center to speed up the growth of start-ups, supporting R&D, managing the crossover between technology and vertical markets (energy, smart cities, retailing, security) and providing dedicated seed funding.



Computer server

CLOUD COMPUTING

◆ We want to build a France where it is easier to access and share computer data.

◆ Through a telecommunications network, the cloud computing model provides the ability to access remote, scattered and scalable computing resources based on need, rather than using a local infrastructure of servers and software. It promises to increase business competitiveness and enable the rollout of new innovative services. ◆ The cloud computing market was worth more than €2 billion in France in 2012, and is growing at around 25% per year. ◆ In addition to these economic stakes, cloud computing also raises strategic issues related to sovereignty (such as the protection of personal data and the security of critical business data). In 2013, more than three-quarters of servers were in North America. Expanding the cloud computing sector in France and Europe will enhance French digital sovereignty and the competitiveness of French SMEs. ◆ France boasts an active network of innovative SMEs in the field, including OVH, Gandi and Numergy. Many large companies are also involved in this part of the digital economy. They include Capgemini, Orange, Atos and Thales. ◆ Consolidating the French cloud offering will come through the promotion of innovation among the various players and through helping software publishers migrate their offers to the SAAS (Software as a Service) model. At the same time, the appropriation of the cloud by users will be enhanced by the development of a guide to best practices in the use of the cloud and by the example set by public procurement. Industry players will also structure themselves around key issues for the growth of the cloud, including standardization and data security.



Students studying on digital tablets

E-LEARNING

◆ We want to build a France of educational revolution and where knowledge is passed on to the greatest number. ◆ Digital technologies with educational applications are maturing and revolutionizing the learning experience, in initial and continuing education alike. ◆ This revolution encompasses the development of distance learning courses as well as connected classrooms and schools: classes can be attended remotely, becoming truly interactive and participatory, can be fun and stimulate creativity. E-learning will bring improvements in all traditional forms of education: relationships between teachers and pupils, relationships between teachers, relationships between pupils, etc. E-learning is a great opportunity for fostering interactivity and creativity. ◆ The economic stakes are also high: the global e-learning market is estimated to be worth US\$91 billion, with the prospect of annual growth of 23% between now and 2017. ◆ France can build upon numerous experiments in educational settings, which will be furthered by the digital schools transformation program initiated by Education Minister Vincent Peillon. There is also a dynamic network of start-ups working on developing applications, design and connected devices (such as tablets) for educational use. ◆ Some of the key issues addressed in the “E-Learning” initiative include: structuring the offer of start-ups and SMEs by providing concrete opportunities at all levels of education (primary, secondary, higher, continuing), supporting the digital transition of traditional stakeholders in education, including content publishers, and creating a broad e-learning ecosystem ranging from equipment (tablets, devices) to content via software.



Optical fibre

TELECOM SOVEREIGNTY

◆ We want to build a France that defends its sovereignty by regaining its capacity to innovate and roll out new digital infrastructure. ◆ Promoting the use of digital networks will require high-quality infrastructure, in society and in the digital economy, without which nothing will be possible. This infrastructure is undergoing relentless technological change: the next generation of networks will integrate future technologies such as IP core routers, ultra-fast terrestrial and submarine optical communications and ultra-fast mobile networks. These technologies will herald greater cybersecurity and the migration to a fifth generation mobile telecommunications network (5G). ◆ The challenges are not only technological. They also bear upon economic, societal and security issues, as well as the question of national sovereignty. Nearly 20,000 jobs are at stake in France, with export volumes just shy of €1 billion. This initiative will contribute to the development of fixed and mobile broadband internet access for all people, across the entire country, and will also seek to ensure safe use of France's telecommunications infrastructure. ◆ France has many advantages, with a world leader, Alcatel-Lucent, and several major players, including integrators such as Thales, and companies operating on specific sectors (Gemalto, Oberthur and Technicolor). France can also count on innovative SMEs boasting advanced technologies, especially in the optical sphere. ◆ The "Telecom Sovereignty" initiative aims to ensure the continuing development of the commercial ecosystem throughout the country to enable France to master and roll out essential infrastructure for the development of the digital economy.



Electronic components plant in Crolles (Isère)

NANO-ELECTRONICS

◆ We want to build a France where the infinitely small is of service to all. ◆ Nanotechnology is no longer science fiction. Nano-electronic components and integrated circuits are ubiquitous in our daily lives: they store information on USB flash drives, run our computers, ensure the safety of our cars, regulate pacemakers to suit each patient's needs and optimize our energy consumption. ◆ Progress in nanotechnology is reinventing numerous industries. It lies at the heart of many social and economic challenges, including energy, health and communication. It is truly strategic for industrial policy. ◆ Nano-electronics have been a priority of France's industrial policy since the launch of the "Crolles 1" program in 1992. Thanks to this sustained effort over time, France is now ranked among the world's top three nations for access to nanotechnology. This lead, symbolized by STMicroelectronics (whose Crolles plant is considered the most advanced in Europe), needs to be preserved. ◆ The "Nano-electronics" initiative is at the crossroads of two fundamental goals of government policy: to focus public money on the technological issues that will shape global industry in many fields in the future, and to maximize the effectiveness of programs by uniting all stakeholders. ◆ In addition to increasing production, the initiative will promote links between industrial laboratories and the various manufacturers that already use them to develop products today and will continue to do so in the future. The aim is to encourage the production of everyday devices that are among the best in the global market, such as innovative medical devices, traceability systems for consumer products, improvements in the quality of materials and advances in energy efficiency.



Smart baby monitor, Withings

CONNECTED DEVICES

◆ **We want to build a France of connected devices.** ◆ Smart connected devices are increasingly present in our daily lives, improving cars, refrigerators, scales, watches, etc. These devices are progressively becoming smarter, thanks to sensors and embedded software. They exchange data between each other, thereby forming the internet of connected devices.

◆ Globally, the number of connected devices is expected to reach 50 billion in the short term, equivalent to ten times the number of smartphones. ◆ This development will transform our lives by creating new applications in the fields of health, education, transport, home safety and many other aspects of daily life. ◆ It will also revolutionize our industry by shortening innovation cycles and improving traceability. ◆ France already boasts an active network of start-ups that were quick to position themselves in this sector. It may not be a widely known fact, but five of the 12 top-selling connected devices in Apple Stores in the United States are French. ◆ The “Connected Devices” initiative aims to transform the French sector into a world leader.



Example medical application of augmented reality

AUGMENTED REALITY

◆ We want to build a France where reality is supplemented by virtual reality to provide more personalized services. ◆ Augmented reality is revolutionizing our daily lives. It is opening up new prospects in terms of improved services and processes for all, in all areas. ◆ Augmented reality superimposes virtual information and images on our natural perception of reality. In the wake of applications in the field of defense, augmented reality is poised to change our everyday lives, with mobile phones today, and connected glasses and contact lenses tomorrow. ◆ Augmented reality applications for industrial markets are booming. Virtual prototypes are designed to reduce the manufacturing cost of a real prototype. ◆ In the future, access to augmented reality for the general public will open up new bespoke services: to find the price of any object photographed by a smartphone, to create new tourism services by reconstituting lost monuments, and to offer patients better medical care, for example. ◆ In this fast-growing market, France boasts many large groups and innovative SMEs, in both content production and hardware. ◆ The “Augmented Reality” initiative will strengthen French companies - equipment manufacturers and software developers alike - support innovation and disseminate French-designed augmented reality technologies, to provide more personalized services.



Payment via a smartphone

CONTACTLESS SERVICES

◆ **We want to build a France of smart cities, where life is simpler.** ◆ The relationship between French people and their cities is on the verge of unprecedented change. The rollout of “contactless” technologies is opening up a new field of digital services to make life simpler for everyone, including new services to pay public transport subscriptions, paperless payments, and the whole contents of a wallet in a secure chip. ◆ In the future, all of these services will be interconnected, and access will be facilitated by the use of tablets and smartphones. ◆ The dynamics of smart cities are revolutionizing the urban services market. Contactless services will play a vital role in their development, for the benefit of all, facilitating accessibility across the board. ◆ France boasts numerous advantages: the existence of global construction companies and utilities, a dynamic network of digital technology companies such as Gemalto, Safran, Oberthur along with the major telecommunications operators, and local authorities, some of which have already undertaken experiments. ◆ The “Contactless Services” initiative aims to make France the global benchmark in smart cities, for all day-to-day applications (transport, payments, information, etc.). ◆ Through innovative public procurement, central government, local authorities and businesses will together be able to move up from local testing to rollouts nationwide. The construction of large-scale technology demonstrators and support for the digital transition of urban engineering players are central to the “Contactless Services” initiative.



Supercomputers, Bull

SUPERCOMPUTERS

◆ **We want to build a France of computing power and digital simulation.** ◆ France's stellar expertise in mathematics, especially applied mathematics, is acknowledged worldwide. France has long positioned itself as a leader in high-performance computing and digital simulation. The global race to build the most powerful supercomputers is primarily a question of innovation: modeling the most complex innovations and forecasting through computing power. ◆ France is one of the few countries in the world to have national players that cover the entire value chain in digital simulation. Bull can lay claim to front-ranking expertise in the design of computing systems ("supercomputers"), while Dassault Systèmes is the world leader in simulation and computer-aided design. Players in supercomputing are structured within efficient ecosystems, such as innovation clusters and the Teratec association, enabling them to work hand-in-hand with industrial users. ◆ Used in many high-tech industries such as the aerospace, automotive, energy, health and multimedia sectors, high-performance computing (HPC) simulation is a key component in innovation and the industrial processes of large groups and SMEs. The ever-increasing use of modeling and digital simulation has resulted in significant performance gains and shortened development times, and has facilitated the management of hyper-complex projects such as nuclear power plants, the A380 or space launch vehicles. ◆ Many other examples could be highlighted, in view of the importance of this activity to modern industry: high-performance computing enhances the competitiveness of oil and gas exploration and production, and the modeling of CO₂ geological storage projects. Earthquakes and car crash tests can also be simulated and modeled so as to improve safety and save the cost of physical testing. In a very different field, film-makers can now use the HPC capabilities of supercomputers to produce images and special effects. ◆ The impact of simulation using supercomputers will continue to drive corporate performance and competitiveness: it is generally estimated that mastery of HPC technologies would boost European GDP by 2-3%.



Nao robot, Aldebaran Robotics

ROBOTICS

◆ **We want to build a France of advanced robotics.** ◆ Robotics is key to maintaining and relocating production and industrial jobs in France. It also provides a technological response to major societal challenges such as ageing, health, transport, education and independence.

◆ The “Robotics” initiative aims to make France a major player in service robotics and enable it to close the gap in industrial robotics. ◆ Already present and recognized in specialist markets thanks to a network of medium-sized enterprises, cutting-edge start-ups and some of the best public-sector research laboratories in the world, France has real potential to take strategic positions in this promising market that is projected to grow to €100 billion in 2020 in service robotics alone. ◆ France has the key strengths and players to enable it to develop products and solutions that can be mass-produced and exported worldwide. The “Robotics” initiative aims to unite stakeholders and support their development projects, by providing capital and assistance in the delicate process of transition from prototype to demonstrator, and then to mass production of French robotic solutions. Its purpose is to coordinate efforts at all levels - those of research laboratories, innovative businesses, innovation clusters and large groups - and to foster the development of new solutions and technology transfers from academic research to industry. ◆ The support structure developed will also help stimulate public and private investment to create conditions conducive to the growth of French SMEs and mid-size companies with the potential to take their place among tomorrow’s global leaders.



Secure information exchange

CYBERSECURITY

◆ **We want to build a France of digital security and confidence.** ◆ Cybersecurity ensures the availability, integrity and confidentiality of digital data. Issues concerning society, strategy, independence and national sovereignty are at the heart of the “Cybersecurity” initiative. Developing computer systems for the secure exchange of information will enable the development of significant digital business activities, but will also provide a guarantee to the entire French population that their data will be protected within France’s borders. ◆ The digital economy and society must be built on trust. This will require the security of information systems to be upgraded in line with progress in digital technology. ◆ France boasts several global industrial players including Cassidian, Thales and, in the field of smart cards, Gemalto and Oberthur. The growing significance of ANSSI (National Information Systems Security Agency), with its defining role in support of public policy and shaping the ecosystem, is a notable advantage for France. ◆ The aim of the “Cybersecurity” initiative is to provide answers to some of the critical issues of the future, such as how better to structure domestic demand to guide public and private R&D in the national market and conquer international markets, how to develop projects showcasing the rollout of cybersecurity solutions, and how to expand French companies in new sovereignty technologies.



Robotic arm, Jules Verne Technological Research Institute


INDUSTRIAL PLANT OF THE FUTURE

◆ We want to anchor the third industrial revolution in France. ◆ With fewer than 35,000 production robots operating in France, compared with more than 150,000 in Germany and around 65,000 in Italy, France has a lower rate of industrial employment compared with its competitors and needs to close the gap. ◆ To regain its place in the global battle, enhance its competitiveness, attract more manufacturing and maintain industrial employment, France faces the dual challenge of modernizing its manufacturing facilities while designing and developing the production processes of the future. ◆ The industrial plant of the future will need to be more environmentally friendly, using production methods that consume fewer resources and generate less waste. It will need to be smarter, using increasingly sophisticated production methods that redefine the human-machine interface. It will need to be more flexible, able to produce goods that are more attuned to market needs, moving from custom-built to mass-market goods. It will also need to be better integrated, connected to the very core of local communities and geographically close to its stakeholders (customers, subcontractors and suppliers), helping revitalize networks and local economies. ◆ The “Industrial Plant of the Future” initiative will enable France to rise to the challenge of rapid prototyping, the convergence of social networks, corporate hyperconnectivity, human-machine interfaces, robotics, augmented reality, digital technology, 3D printing, artificial intelligence and design.

PROJECT LEADERS FOR THE 34 SECTOR-BASED INITIATIVES

◆ **RENEWABLE ENERGIES** Jean-Claude Andréini ◆ **UNIVERSAL CARS CONSUMING LESS THAN 2 LITERS PER 100 KM** Gilles Le Borgne, Jean-Michel Billig ◆ **ELECTRIC CHARGING STATIONS** Francis Vuibert ◆ **BATTERY LIFE AND POWER** Florence Lambert ◆ **DRIVERLESS VEHICLES** Carlos Ghosn ◆ **ELECTRIC PLANES AND NEXT-GENERATION AIRCRAFT** Jean Botti ◆ **HEAVY-LIFT AIRSHIPS** Jean-Yves Longère ◆ **EMBEDDED SOFTWARE AND SYSTEMS** Éric Bantegnie ◆ **ELECTRIC-PROPULSION SATELLITES** Jean-Yves Le Gall ◆ **HIGH-SPEED TRAIN OF THE FUTURE** Jérôme Wallut ◆ **ENVIRONMENTALLY FRIENDLY SHIPS** Laurent Castaing ◆ **TECHNICAL AND SMART TEXTILES** Yves Dubief ◆ **WOOD INDUSTRY** Franck Mathis, Dominique Weber ◆ **RECYCLING AND GREEN MATERIALS** Antoine Frérot ◆ **THERMAL RENOVATION OF BUILDINGS** Jacques Pestre, Marcel Torrents ◆ **SMART GRIDS** Dominique Maillard ◆ **WATER QUALITY AND SCARCITY MANAGEMENT** Christophe Chevillion, Jean-Louis Chaussade ◆ **GREEN CHEMICALS AND BIOFUELS** Pascal Barthélémy ◆ **MEDICAL BIOTECHNOLOGIES** André Choulika ◆ **DIGITAL HEALTHCARE** Christian Niebourel, Mireille Faugères ◆ **MEDICAL DEVICES AND NEW HEALTHCARE EQUIPMENT** Sacha Loiseau, André-Michel Ballester ◆ **INNOVATIVE PRODUCTS FOR SAFE, HEALTHY AND SUSTAINABLE FOOD** Jean-Philippe Girard ◆ **BIG DATA** Paul Hermelin, François Bourdoncle ◆ **CLOUD COMPUTING** Thierry Breton, Octave Klaba ◆ **E-LEARNING** Déborah Elalouf, Jean-Yves Hepp ◆ **TELECOM SOVEREIGNTY** Philippe Keryer ◆ **NANO-ELECTRONICS** Laurent Malier ◆ **CONNECTED DEVICES** Éric Carreel ◆ **AUGMENTED REALITY** Vincent Marcatté ◆ **CONTACTLESS SERVICES** Olivier Piou ◆ **SUPERCOMPUTERS** Gérard Roucairol ◆ **ROBOTICS** Bruno Bonnell ◆ **CYBER-SECURITY** Patrick Pailloux ◆ **INDUSTRIAL PLANT OF THE FUTURE** Frédéric Sanchez, Bernard Charlès



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◆ ENVIRONMENTALLY FRIENDLY SHIPS ◆ TECHNICAL AND SMART TEXTILES ◆ WOOD INDUSTRY ◆ RECYCLING AND GREEN MATERIALS
◆ THERMAL RENOVATION OF BUILDINGS ◆ SMART GRIDS ◆ WATER QUALITY AND SCARCITY MANAGEMENT ◆ GREEN CHEMICALS
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SOVEREIGNTY ◆ NANO-ELECTRONICS ◆ CONNECTED DEVICES ◆ AUGMENTED REALITY ◆ CONTACTLESS SERVICES ◆ SUPER-
COMPUTERS ◆ ROBOTICS ◆ CYBERSECURITY ◆ INDUSTRIAL PLANT OF THE FUTURE

