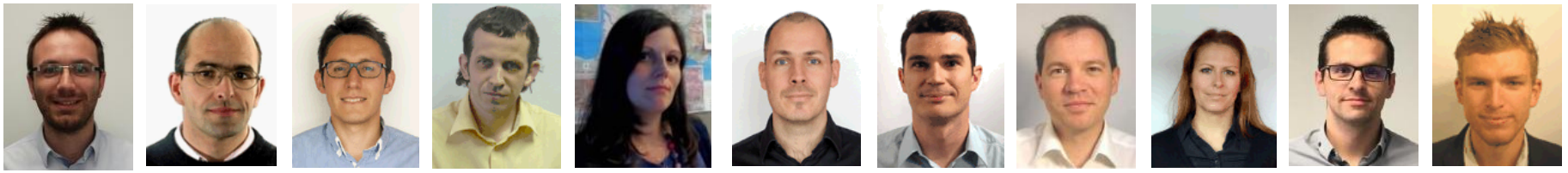
# Introduction to the I&C group at EDF SEPTEN and its activities

Ludovic Pietre-Cambacedes
I&C Group Manager, EDF SEPTEN

# The I&C team of EDF SEPTEN - Missions



## Responsible for the software qualification of…

**Class 1 systems**

**Class 2 & 3 platforms**

**Smartdevices**

| | | | | | |
|---|---|---|---|---|---|
| IAEA NS-G-1.3 | | Systems Important to Safety | | | Systems not important to safety |
| | | Safety | Safety-related | | |
| IAEA SSG-30 | Funotion | Safety oategory 1 | Safety oategory 2 | Safety oategory 3 | |
| | System | Safety olass 1 | Safety olass 2 | Safety olass 3 | |
| IEC 61226 | | Systems Important to Safety | | | |
| | I&C funotion | Category A | Category B | Category C | Non-olassified |
| | I&C system | Class 1 | Class 2 | Class 3 | |
| IEEE | | Systems Important to Safety | | | Non-safety-related |
| | | Safety-related | [5] | | |
| EUR[6] | Safety level of funotions / I&C systems | F1A | F1B | F2 | NS (non-safety) |
| *MDEP member states* | | | | | |
| Canada | | Category 1 | Category 2 | Category 3 | Category 4 |
| Franoe | | F1A | F1B | F2 | Non-olassified |
| Finland | | Class 2 | Class 3 | EYT/ STUK | EYT (olassified non-nuolear) |
| UK | | Class 1 | Class 2 | Class 3 | Non-olassified |
| United States | | Systems Important to Safety | | | (not speoified) |
| | | Safety-Related | [5] | | |
| India | | IA | IB | IC | NINS |
| Japan | | PS1/MS1 | PS2/MS2 | PS3/MS3 | Non-nuolear safety |
| Korea | | IC-1 | IC-2 | | IC-3 |
| Russia | | Class 2 | Class 3 | | Class 4 (Systems not important to safety) |
| *Others nuolear states* | | | | | |
| Switzerland | | 1 | 2 | 3 | Non-olassified |
| Germany | I&C funotion | Category 1 | Category 2 | Category 3 | Non-olassified |
| | I&C equipment | E1 | | E2 | |

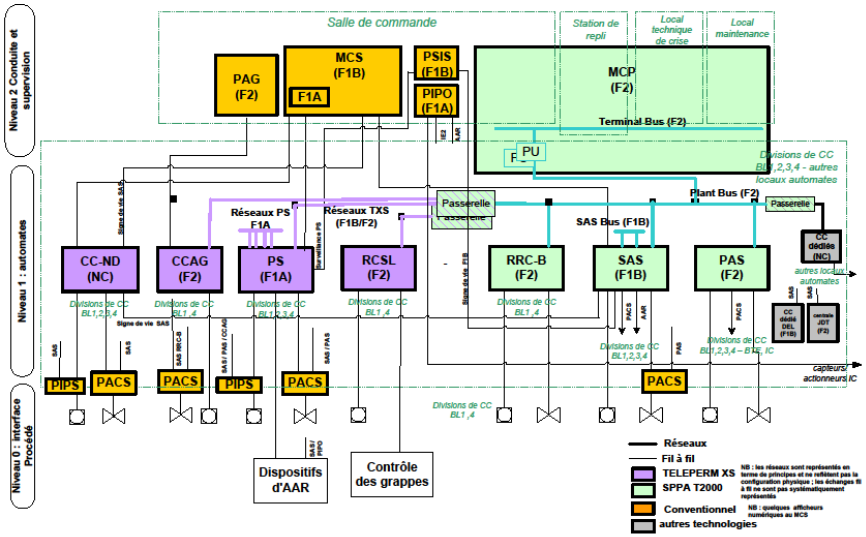
| | | | | | |
|---|---|---|---|---|---|
| IAEA NS-G-1.3 | | Safety | Systems Important to Safety | | Systems not important to safety |
| IAEA SSG-30 | Funotion | Safety oategory 1 | | gory 3 | |
| | System | Safety olass 1 | | ss 3 | |
| | I&C funotion | Category A | | y C | Non-olassified |
| | I&C system | Class 1 | | 3 | |
| | | Safety-related | | | Non-safety-related |
| EUR[6] | | F1A | | | NS (non-safety) |
| *MDEP member states* | | | | | |
| Canada | | Category 1 | | y 3 | Category 4 |
| Franoe | | F1A | F1B | F2 | Non-olassified |
| Finland | | Class 2 | Class 3 | EYT/ STUK | EYT (olassified non-nuolear) |
| UK | | Class 1 | Class 2 | Class 3 | Non-olassified |
| | | | Systems Important to Safety | | (not speoified) |
| | | | IB | IC | NINS |
| | | | PS1/MS1 | PS2/MS2 | PS3/MS3 | Non-nuolear safety |
| | | | | IC-2 | IC-3 |
| | | | Class 3 | | Class 4 (Systems not important to safety) |
| | | | 2 | 3 | Non-olassified |
| Germany | I&C funotion | Category 1 | Category 2 | Category 3 | Non-olassified |
| | I&C equipment | | E1 | E2 | |

# The I&C team of EDF SEPTEN - Missions

## Software and hardware qualification EDF technical rules


# The I&C team of EDF SEPTEN - Missions

## Expertise on I&C architectures and technologies

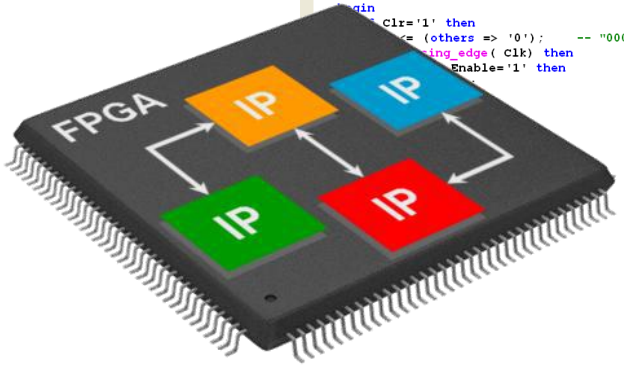



```
library IEEE;
use IEEE.STD_LOGIC_1164.ALL;
use IEEE.STD_LOGIC_ARITH.ALL;
use IEEE.STD_LOGIC_UNSIGNED.ALL;

entity Test_Counter_VHDL is
    Port ( Clk_xxxHz :          in  std_logic;
           Step_Clk :           in  std_logic;
           Select_Clk :         in  std_logic;
           Clr, Count_Enable :  in  std_logic;
           Bcd0,Bcd1,Bcd2,Bcd3 : out std_logic_vector(3 downto 0));
end Test_Counter_VHDL;

architecture Behavioral of Test_Counter_VHDL is
   Signal Q:   std_logic_vector( 15 downto 0);
   Signal Clk: std_logic;
begin
   -- 2x1bit multiplexer: Clk_xxx or Step_Clk = [Btn0]
   Clk <= Clk_xxxHz when Select_Clk='1' else
          Step_Clk;

   process( Clk, Clr)
   begin
      if Clr='1' then
         Q <= (others => '0');     -- "0000000000000000"
      elsif rising_edge( Clk) then
         if Count_Enable='1' then
```



# The I&C team of EDF SEPTEN - Activities

## National and international codes and standards

afcen

EUR

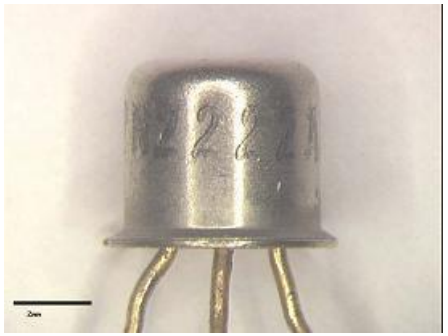
IEC

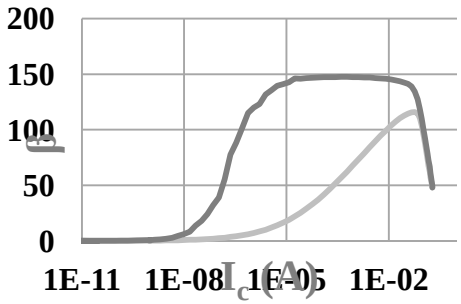
# The I&C team of EDF SEPTEN - Activities

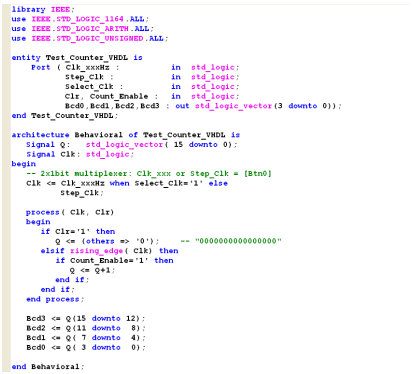
## R&D strategy and activity management

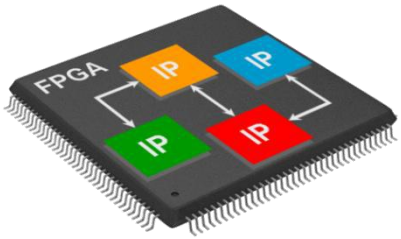

frama C

Software Analyzers



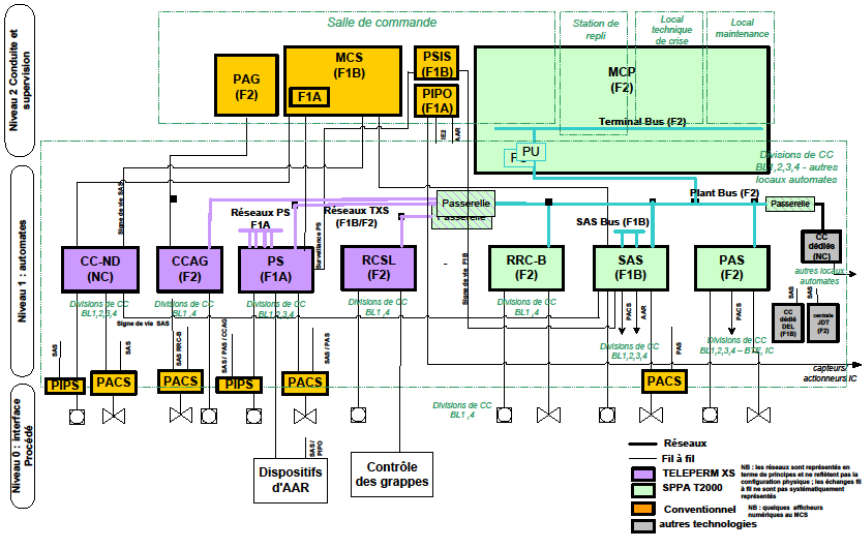




# The I&C team of EDF SEPTEN - Activities

## Expertise on I&C architectures and technologies

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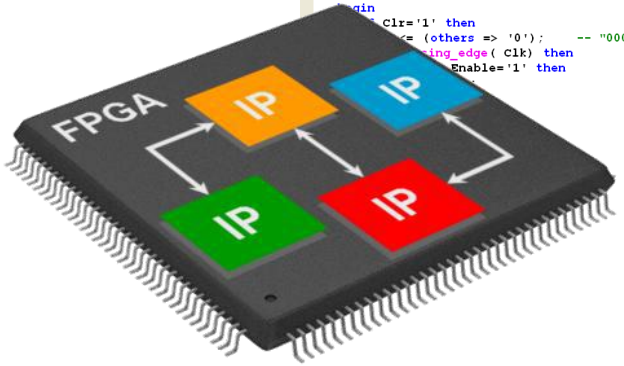
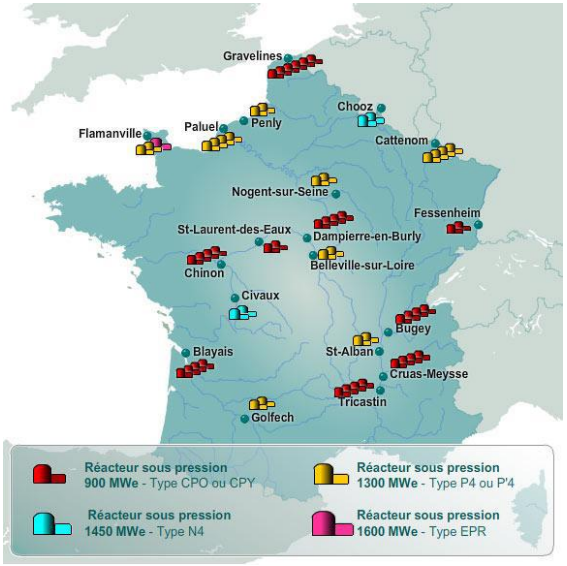


# The I&C team of EDF SEPTEN - Activities

## I&C qualification and expertise for present and future fleet





thank you
merci
danke
謝謝
gracias
obrigado
dziękuję
bedankt
go raibh maith agat
teşekkür ederim
ngiyabonga
спасибо
рахмат
Баярлалаа
tapadh leat
dank je
terima kasih
kop khun krap
sukriya
arigatô
dakujem
grazie
tack
mersi
barka
welalin
spas
kia ora
vinaka
faafetai lava
blagodaram
misaotra
matondo
paldies
grazzi
mahalo
kiitos
dankie
nanni
nandri
dhanyavad
mauruuru
köszönöm
hvala
grăçie
bayarlalaa
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didi madloba
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ありがとう
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rahmet
grazie
diolch
dhanyavadagalu
shukriya
takk
mercé
мерси
trugarez
তোমাকে ধন্যবাদ
감사합니다
xièxie
ευχαριστώ