



HSE  
Occupational Health & Safety  
and Environmental Protection unit

# CROME Workshop 2022

## RAMSES Consolidation with CROME

Daniel Perrin on behalf of the project team

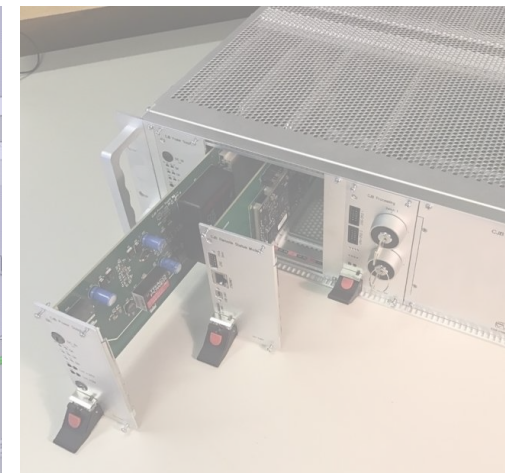
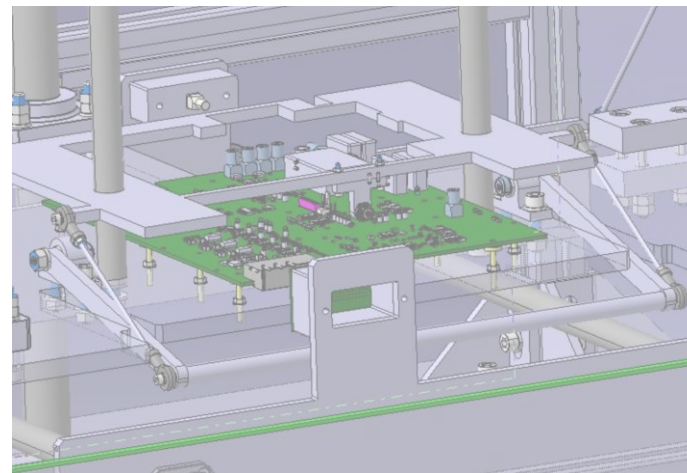
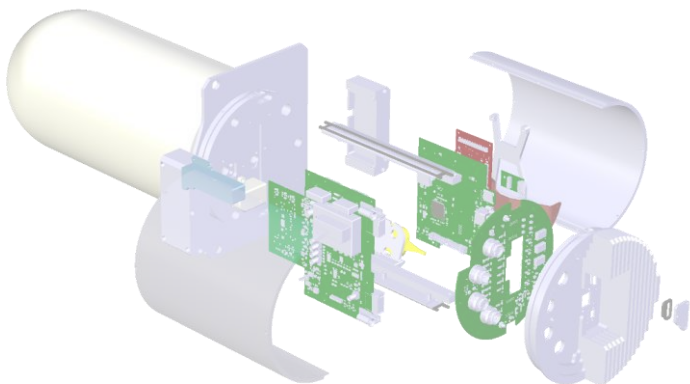
5<sup>th</sup> December 2022

EDMS 2802283

# CROME WORKSHOP 2022

## RAMSES Consolidation with CROME Project (R2C)

5<sup>th</sup> December 2022



# CERN Radiation Environmental and Monitoring System (REMS)

Consisting of three sub-systems with currently 805 active radiation monitors in use

**RAMSES**  
512 monitors

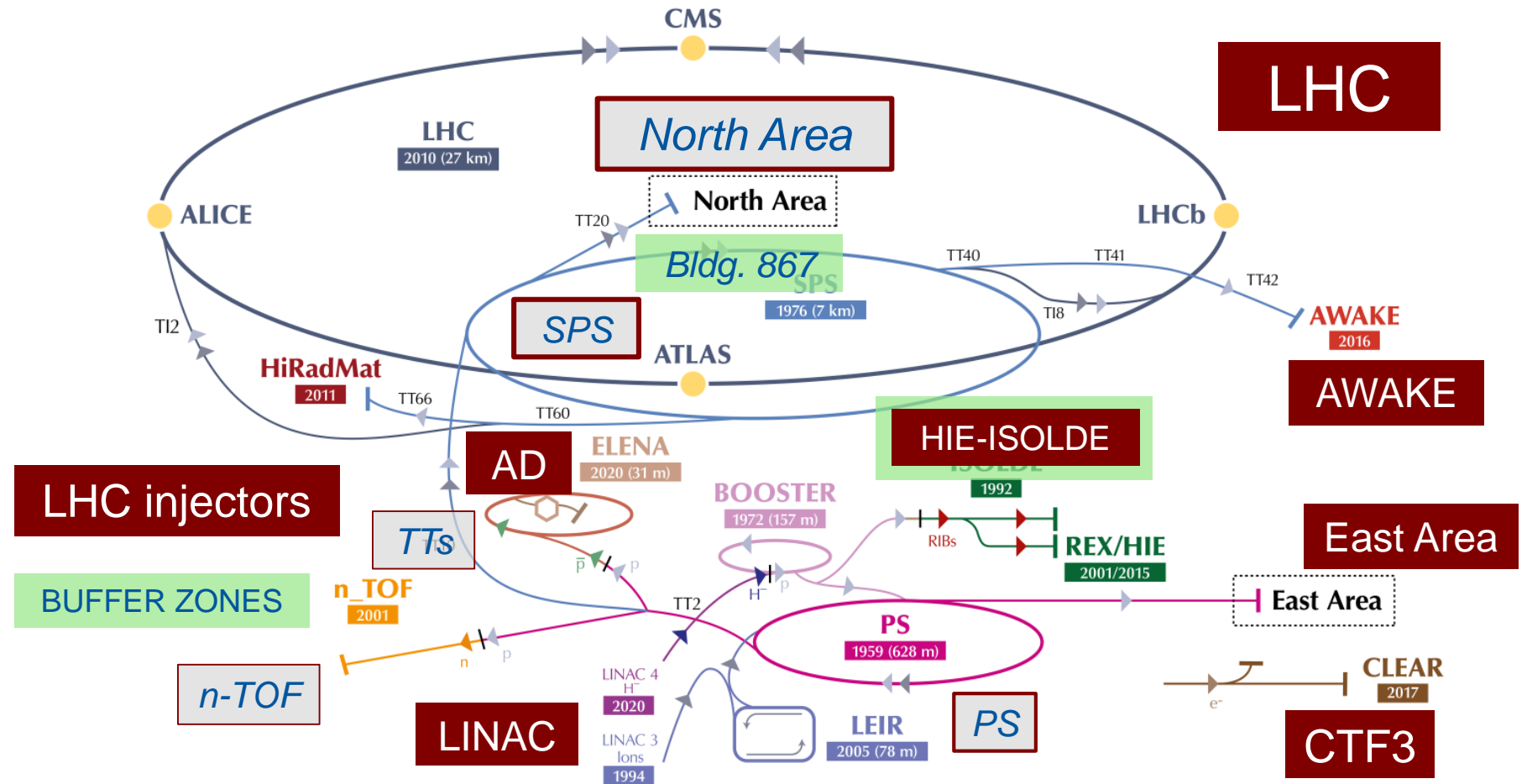
**CROME**  
153 monitors

**GRAMS**  
140 monitors

2006

2021

2013



Description of CERN REMS, see EDMS 1723230

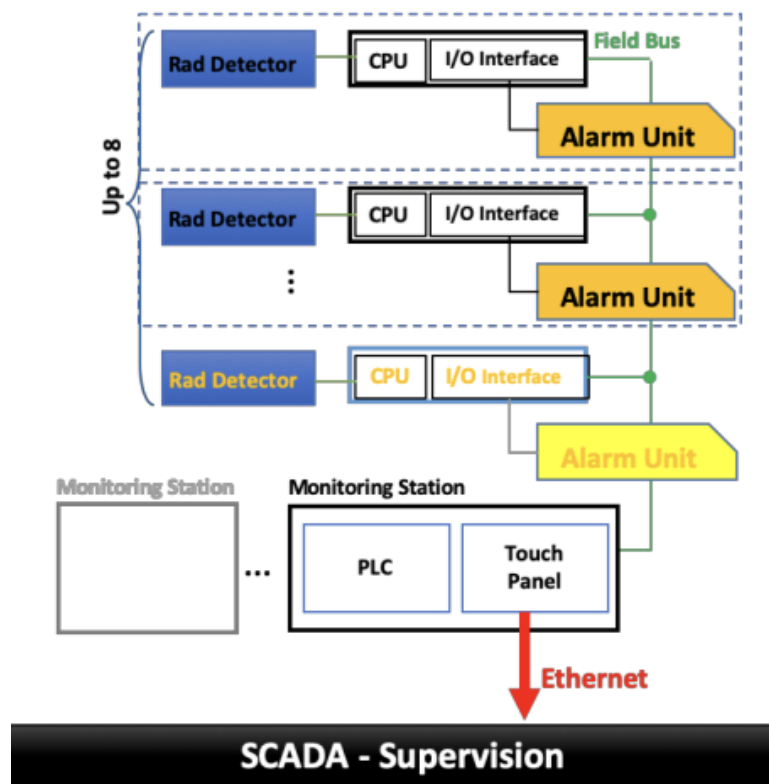


# RAMSES\* main sub-system of the CERN REMS



## RAMSES

### Federated Architecture



436 radiation monitors for HSE-RP

- 170 Alarm Units
- 43 interlock signals
- 152 signals on repeaters

76 radiation monitors for HSE-ENV

Outsourced system – Contract in 2004

Deployed since 2006

### Measuring electronics



- Early 2000 design
- Not available since 2014
- Single source

### Monitoring stations



- Obsolete industrial control equipment
- Microsoft deprecated technologies



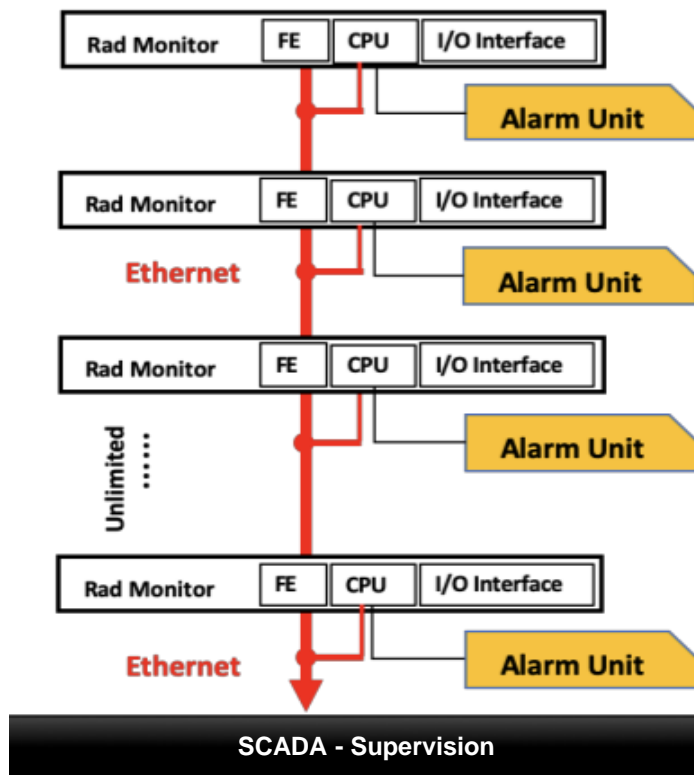
\* RAdiation Monitoring System for the Environment and Safety

# CROME\* the new generation of sub-system of the CERN REMS



## CROME

### Modular Architecture



**153** radiation monitors for HSE-RP

- **66** Alarm Units
- **57** interlock signals
- **65** signals on repeaters

### CERN in-house system

Successfully developed

to replace of **ARCON\*\***  
(LS2)

(<https://crome.web.cern.ch/home>)

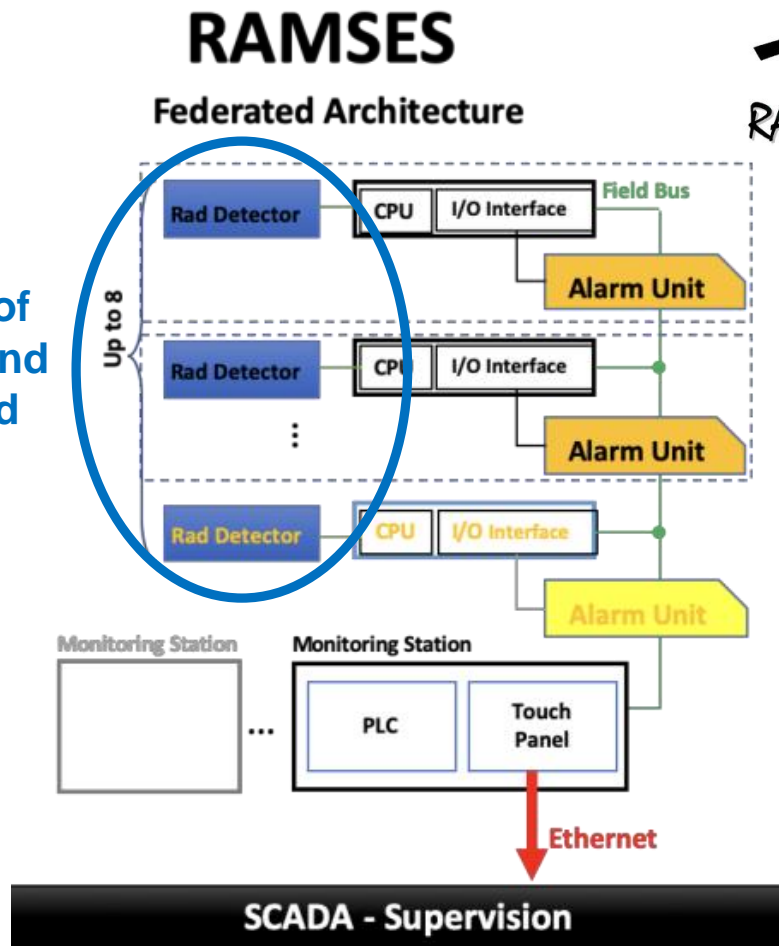


\* CERN RadiatiOn Monitoring Electronics

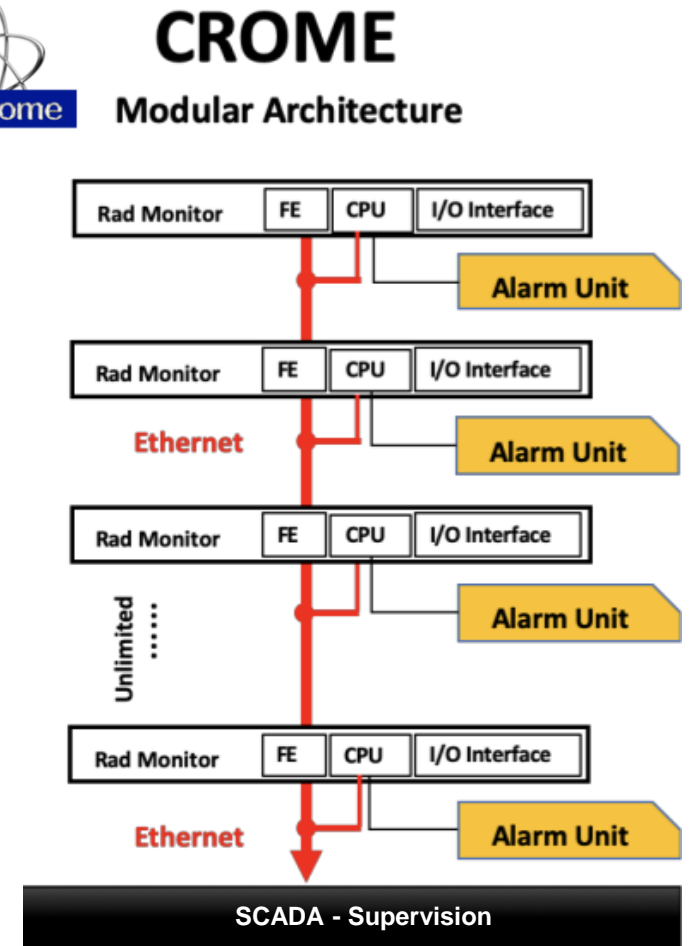
\*\* Former Area CONTroller, CERN in-house system (1985) for LEP...

# Consolidation of RAMSES with CROME (R2C) project

Recovery of detectors and associated cables



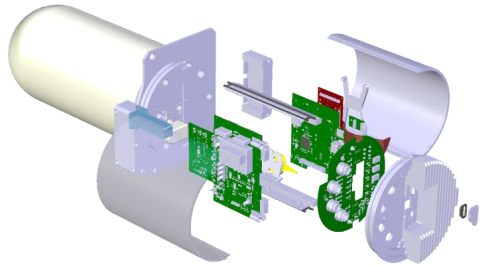
Replacement of measuring electronics and Removal of monitoring stations



# CROME equipment to be produced or procured

(including R2C for RP and ENV, Strategic stock, Spares RUN4, HL-LHC WP17.4)

Some **3200** Electronic boards of 23 types



**CMPU-W, PC, WD**  
(293)



**CAU**  
(190)



**CUPS-W**  
(250)



**CMPU-R**  
(285)

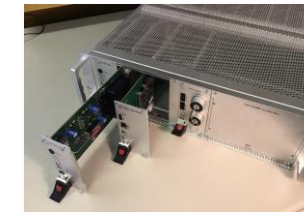
<b>CMPU-W</b>	200
<b>CMPU-PC</b>	58
<b>CMPU-WD</b>	35
<b>CAU</b>	190
<b>CUPS-W</b>	250
<b>CMPU-R</b>	285
<b>CUPS-R</b>	45
<b>CCH *</b>	65
<b>CESW *</b>	48
<b>CCH Fan *</b>	65
<b>Support CMPU-W, PC, WD</b>	290
<b>CJB</b>	15
<b>Repeater</b>	22

\* COTS (178)

**1568**  
pieces of equipment



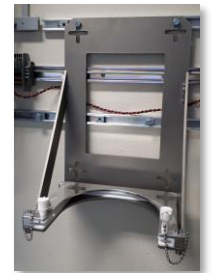
**CCH\***  
(65)



**CJB**  
(15)



**CUPS-R**  
(45)

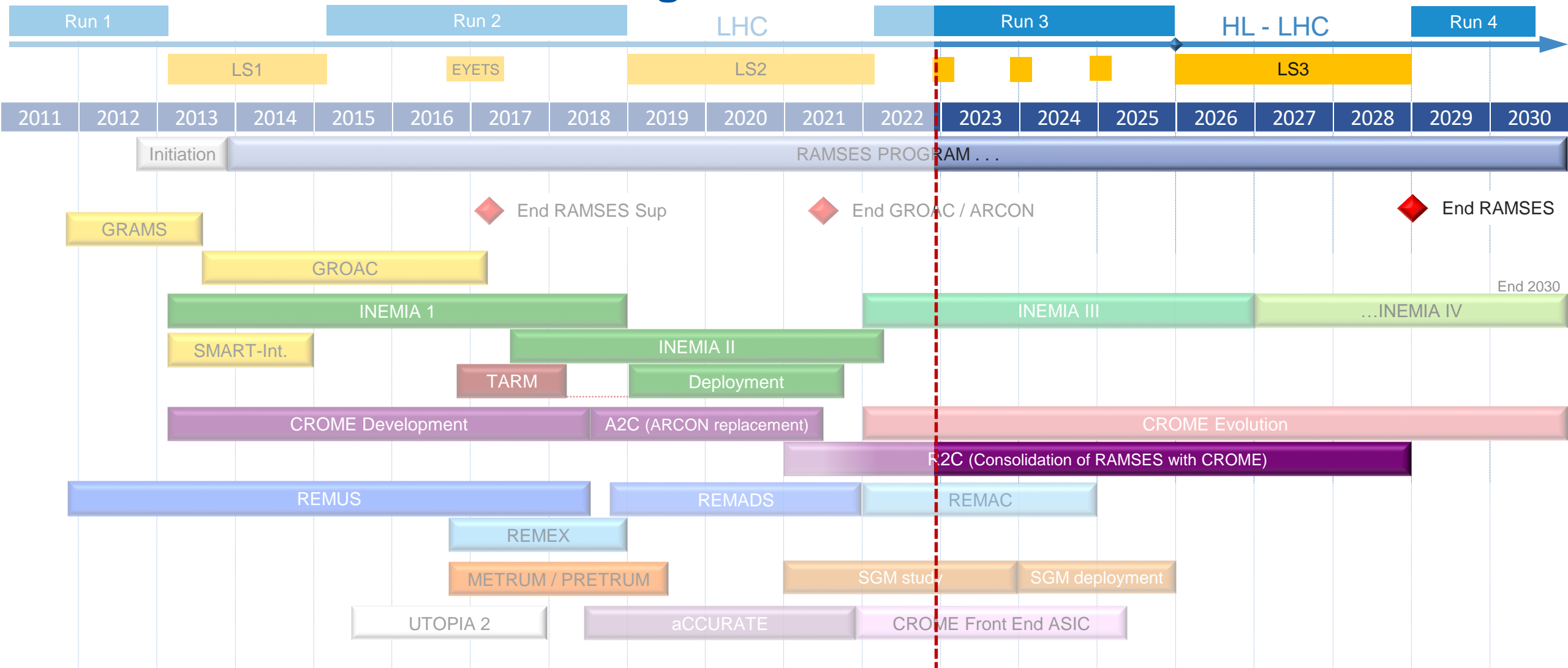


**Support CMPU-W**  
(290)



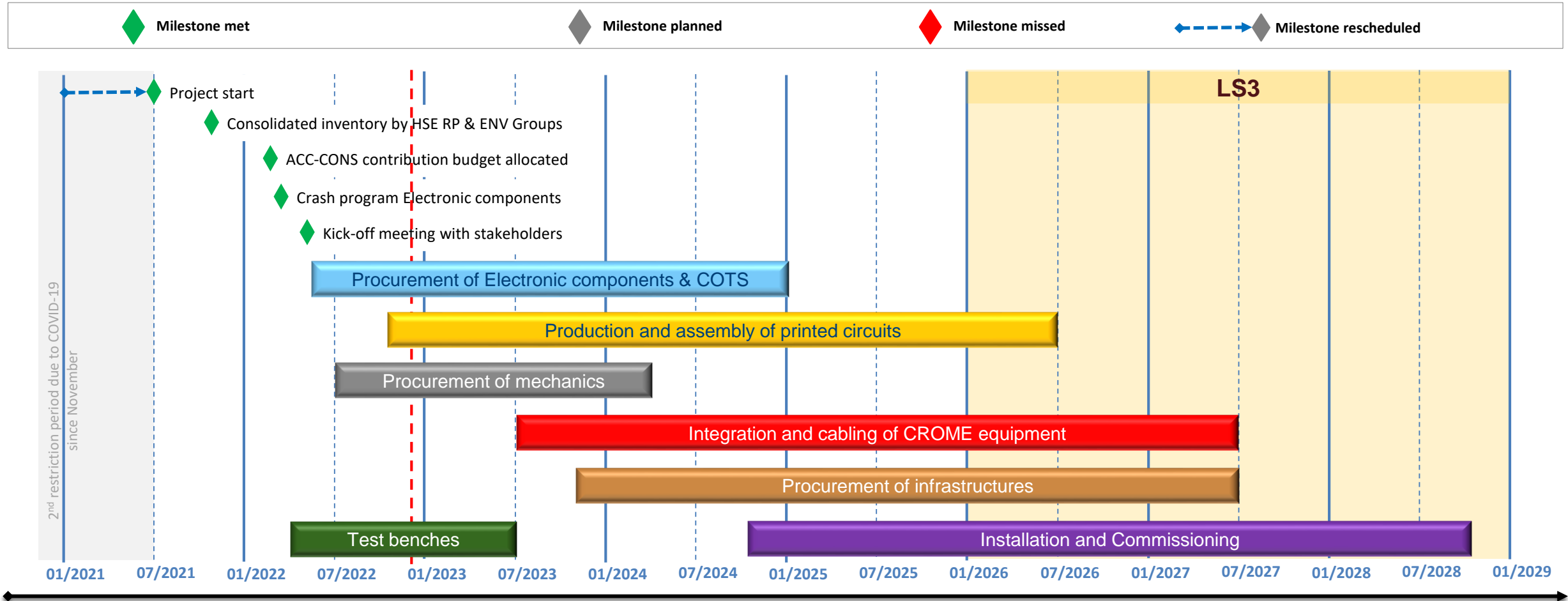
**Alarm Repeater**  
(22)

# RAMSES Program – timeline overview





# RAMSES Consolidation with CROME (R2C) project milestone plan



The time bars correspond to an estimated period of spread by category of activity, not necessarily continuous.

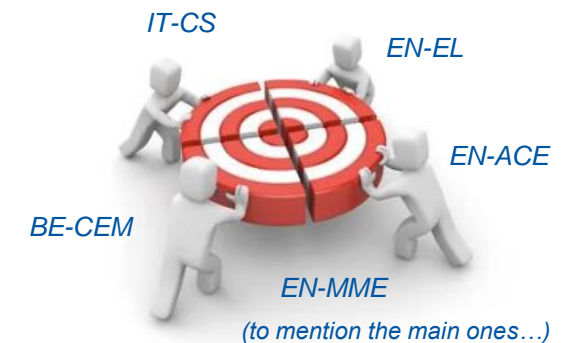
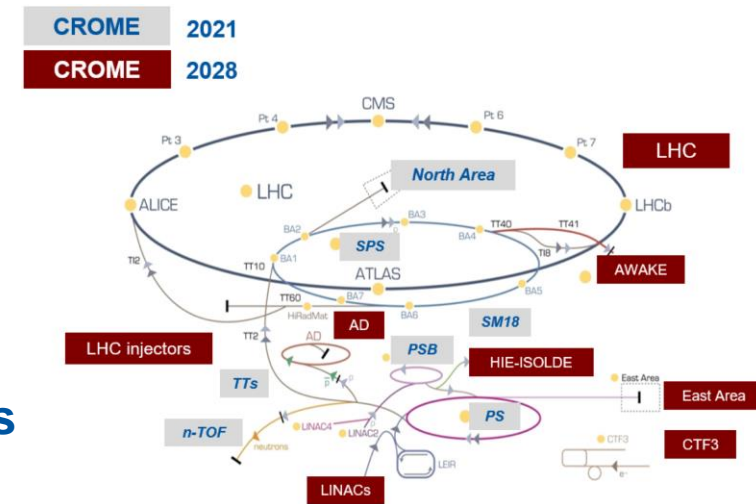
## A challenging project...

- Various types of **CROME** equipment to be produced in large numbers
- Exposure to **shortage** of some **electronic components** and **raw materials**
- Stepwise production scheme to comply with **budget profile**
- A spread of **monitors** over the **whole accelerator complex** and many **experimental areas**
- **To be completed by the end of LS3** for RUN4 → HL-LHC

*However, we can build on the experience and professionalism of parties involved:*

- To anticipate and **perform adequate coordination and reporting** of production
- To **keep communication channels short** between stakeholders
- To **trace all activities, parts and equipment at all stages**

**...achievable, with the appropriate interdepartmental collaboration as demonstrated with success for the ARCON replacement by CROME project...**



## and a committed experienced Project Team !!!

**Michel Pangallo**

*Production of CMPU and chassis, test tools development*

**Gaël Ducos**

*Production of CAU, CUPS, CJB, test tools development*

**Guillaume Michet**

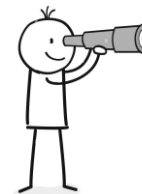
*Production of Alarm Repeater*

**Hamza Boukabache**

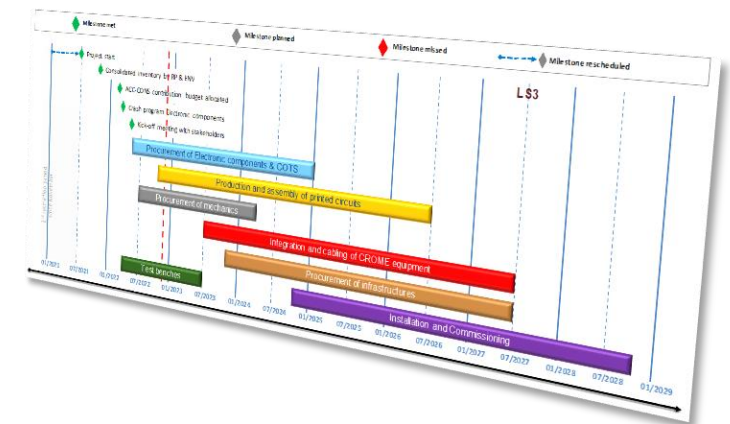
*CROME processing & control*

**Jeremy Rosset-Lanchet**

*Documentation, Infrastructures, Installation & Commissioning coordinator*



*Project Leader  
Your servant*





Thank you

*« Pour ce qui est de l'avenir, il ne s'agit pas de le prévoir,  
mais de le rendre possible... »*

Antoine de Saint-Exupéry

A2C Project - CROME @ SM18 June 2020





[www.cern.ch](http://www.cern.ch)



# Backup slides

# Acronyms

Backup slide

Acronyms	Definition
<b>A2C</b>	ARCON to CROME
<b>ARCON</b>	Area Controller
<b>CAU</b>	CROME Alarm Unit
<b>CCH</b>	CROME Chassis
<b>CJB</b>	CROME Junction Box
<b>CMPU-PC</b>	CROME Core Monitoring and Processing Unit - for Proportional Counter
<b>CMPU-R</b>	CROME Core Monitoring and Processing Unit - Rack version
<b>CMPU-W</b>	CROME Core Monitoring and Processing Unit - Wall version with detector
<b>CMPU-WD</b>	CROME Core Monitoring and Processing Unit - wall version Without Detector
<b>COTS</b>	Component-Off-The-Shelf
<b>CROME</b>	CERN Radiation Monitoring Electronics
<b>CUPS-R</b>	CROME Uninterruptible Power Supply – Rack version
<b>CUPS-W</b>	CROME Uninterruptible Power Supply – Wall version
<b>GRAMS</b>	Gamma Radiation Area Monitoring System
<b>R2C</b>	RAMSES to CROME Consolidation
<b>RAMSES</b>	RAdition Monitoring System for the Environment and Safety
<b>REMS</b>	Radiation & Environmental Monitoring System



*« Pour ce qui est de l'avenir, il ne s'agit pas de le prévoir,  
mais de le rendre possible... »*

Antoine de Saint-Exupéry

A2C Project - CROME @ SM18 June 2020

*Thank you*

Let's celebrate this great achievement

