

GUI Style Guide for Control System Applications at ESS

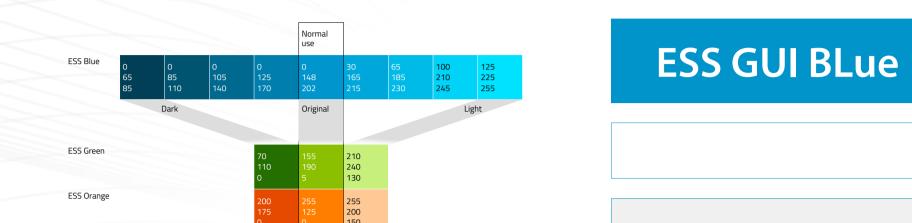
Frank Amand, Miroslav Pavleski, Mark Plesko (Cosylab, Ljubljana), Leandro Fernandez (ESS, Lund)

Abstract

To help developers create consistent-looking control system application GUIs, the European Spallation Source Integrated Control Systems group asked Cosylab to develop a Style Guide (SG) document.

Upper Girder Mode Indiv	idual 🗸 🌒 Geared	Lower Girder Mode Indiv	idual 🧹 🎯 Geared
Gap Z1	Gap Z2	Gap Z3	Gap Z4
Move by 48.5 um	Move by 14.3 um 🕂	Move by 19.7 um	Move by 248.5 um
Actual 23248.5 um	Actual 23246.4 um	Actual 43298.5 um	Actual 43298.1 u
Go Stop Reset	Go Stop Reset	Go Stop Reset	Go Stop Re
Individual axis state	Individual axis state	Individual axis state	Individual axis state
Phase X1	Phase X2	Phase X3	Phase X4
Move by 4.2 um ÷	Move by 3.1 um 🕂	Move by 48.5 um	Move by 48.5 um
Actual 3248.5 um	Actual 3248.2 um	Actual 2348.5 um	Actual 2348.2 un
Go Stop Reset	Go Stop Reset	Go Stop Reset	Go Stop Re
Axis State	Axis State	Axis State	Axis State

Signals stand out from Background



Alarms and signal changes should be very noticable. Their full saturated colors clearly stand out from the *by-design* subdued backgrounds. The included design patterns illustrate how to use moderate-sized LEDs and other indicators. This keeps a balance of bright colored signals versus sober backgrounds and maintains easthetics. (Control $GUI \neq Christmas Tree$)

Its purpose is to avoid that GUIs needlessly diverge and make the end-result of all screens combined look harmonious, even if GUIs have been developed over several years by many contributors.

Also it will speed up development, by letting developers start from design patterns, rather than starting "from a blank page".

The document defines a set of basic panel sizes, containing a 960px-style grid for consistent organization of content. It also defines color scheme and font usage, in-line with the overall ESS corporate communications manual, with the addition of signal colors.

In addition it shows example screens to serve

as GUI design patterns for typical screen types such as engineering screens, control applications and synoptic screens.

It concludes by setting rules and recommendations for the usage of automation symbols and display of engineering and physical units.

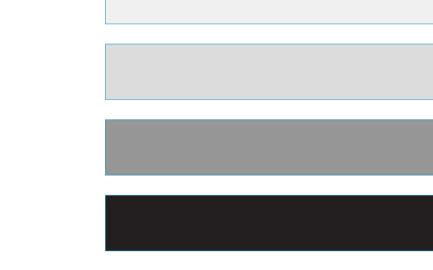
The document is further complemented by a separate document with Usability Guidelines for Human-Machine interfaces.

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Living Room					
Kitchen / Family	2	5° C	22° C	Cool	
Library		N	lode Control		
		Off Au	uto Cool H	eat	
Studio Lounge					
Master Bedroom			Fan Control		
		Off Au	uto +	-	
Playroom					
Guest Bedroom					
	Climate System	Overview			
Baby's Room	Living Room:	25° - Cool	Playroom:	27° - Off	
Office	Kitchen / Family	26° - Off	Guest Bedroom	25° - Cool	
Once	Libary: Study Lounge:	23° - Cool 23° - Cool	Baby's Room Office:	22° - Cool 23° - Cool	
	Master Bedroom:	20° - Cool	Office:	23° - Cool	

Beam Current Monitor	BCM Device Prefix BPM Device prefix
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Al channel index	メキャット 10 中一 10 中 キャックト 50 か 100 Decimation Factor
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Enable All Disable All Start	900
Pulse Characteristics	800
Charge Per Pulse	700
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Background Noise Average	<u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u></u>
Droop Compensation	(L) 500 (L) 500 Hell
Rate	300
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	0
Interlock enable On Off	-100
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	0	0	150
	110	150	250
W	210	255	225
	140	190	220
	20	0	125
	130	200	255
	0	25	110
	25	25	110
vn	100	150	210
	70	110	180
	0	20	120
	75	150	220
	75	150	220
	75	150	220
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ars from Corpo	rato	Con	omu

ESS Red



Colors from Corporate Communications Manual Control GUI Background Colors

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	Segment E1								
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	MAGQUAD:M1:10		0.000 A	0.000 A 🊔					
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Room 2	MAGQUAD:M1:20		0.000 A	0.000 A 🌲					
Room 2	MAGSTR:M1:30		0.000 A	0.000 A 🌲					
	MAGSTR:M1:40		0.000 A	0.000 A 🌲					
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Titillium + Open Sans Fonts

Design Patterns and Other Reuse

Climate Control SSSS-BBBB:DDDD-IIII	
Select Room Living Room	
Living Room Room Temp Target Temp Mode	
Kitchen / Family 25° C 22° C Cool	
Library Mode Control	
Studio Lounge Off Autoin Cool Heat	
Auto mode is the best choice for most common use Master Bedroom The system will choose heating or cooling mode, based the current Room Temperature	s.
Playroom Off A and the desired Target Temperature.	
Guest Bedroom	
Climate System Overview Baby's Room United Room 25° - Cool Playroom 27° - Off	
Baby S KOOM Living Room: 25° - Cool Playroom: 27° - Off Kitchen / Family 26° - Off Guest Bedroom 25° - Cool	
Office Libary: 23°-Cool Baby's Room 22°-Cool	

The SG defines **Titillium** for titles (only). This Open Source font is the ESS corporate font and has nice distinctive features.

But to maximise readability for the body of the GUIs, also at smaller sizes, **Open Sans** is chosen. This Google font is a modern, *humanist* sans-serif (i.e. NOT just another Arial)

Control Screens matching ESS Brand

 Study Lounge:
 23* - Cool
 Office:
 23* - Cool

 Master Bedroom:
 20* - Cool

GUI colors and fonts were chosen to match he ESS color scheme as defined in the ESS corporate communications manual.

This way the GUIs will also be harmonious when used in conjunction with web-based applications that are made in style of the ESS website.

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Go Stop Reset	Go Stop Reset	Go Stop Reset	Go Stop Reset							
Axis State	Axis State	Axis State	Axis State							
	Device State	Interlock Status	Motors							
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75 keV Accelerat The ESS accelerat roton pulse at 3	3.6 MeV	90 MeV 216 to provide a 2.86 m z. This represents 5	MeV 561 MeV	ACCELERAT Organis: Project Docume Events	eV TOR ation and Staff ints
75 keV Accelerat he ESS accelerat roton pulse at verage beam p	3.6 MeV OC ator high level requirements are 2 GeV at repetition rate of 14 Hz ower with a 4% duty cycle on tar	90 MeV 216 to provide a 2.86 m 2. This represents 5 rget.	MeV 561 MeV Is long MW of	ACCELERAT Organis: Project Docume Events ESS Acco	eV TOR ation and Staff ints elerator Collaborations
75 keV Accelerat he ESS accelerat roton pulse at i verage beam p he ion source prod	3.6 MeV COT ator high level requirements are 2 GeV at repetition rate of 14 Hz ower with a 4% duty cycle on tar uces a proton beam that is transported	90 MeV 216 to provide a 2.86 m z. This represents 5 get. through a Low Energy B	MeV 561 MeV Its long MW of eam Transport	ACCELERAT Organis: Project Docume Events ESS Acco	eV TOR ation and Staff ints
75 keV Accelerat roton pulse at i verage beam p he ion source prod LEBT) section to thi .6 MeV. In the Med	3.6 MeV OC ator high level requirements are 2 GeV at repetition rate of 14 Hz ower with a 4% duty cycle on tar	90 MeV 216 to provide a 2.86 m z. This represents 5 rget. through a Low Energy B here it bunched and acce tion the transverse and	MeV 561 MeV Is long MW of eam Transport lerated up to longitudinal	ACCELERAT Organis: Project Docume Events ESS Acco	eV TOR ation and Staff ints elerator Collaborations

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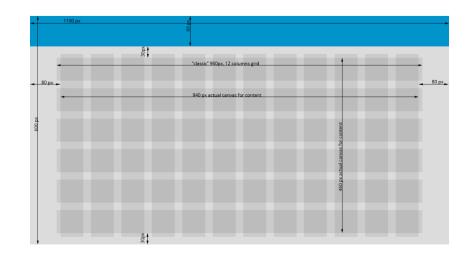


Various design patterns reuse best practices from other projects on the design of

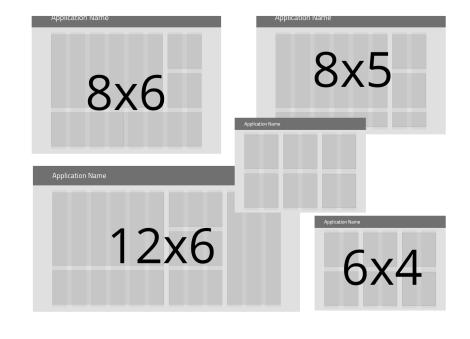
- control screens
- diagnostics screens
- synoptic views
- automation symbols (from ITER CODAC)
- browsing and navigation

SUMMARY AND CONCLUSIONS

Default Panel Sizes and a Grid



A grid is a proven technique for creating consistent looking GUIs e.g. in web-design. The style guide defines a "960 pixel grid" in 12 colums.



From this basis, 2,3,4 and 6 column layouts can be derived and combined

The style guide also provides patterns for smaller screens/dialogs. For full screen applications it recommends combining smaller grid-based elements. A. Style guide is the right first step towards designing for high usability. It is a must to achieve consistent looking GUIs.

About Me

- B. A logical next step is a Usability Guidelines Document to also cover dynamic behavior of GUIs. Cosylab also delivered this at the request of ESS.
- C. The final step in high usability design is applying the principles of goal directed interaction design consistently throughout the software development project.



ID: WEPGF146

ICALEPCS 2015, Melbourne, Australia

