



**33<sup>rd</sup>** Annual **INCOSE**  
international symposium

hybrid event

Honolulu, HI, USA  
July 15 - 20, 2023



Panel Number

# Systems Approach to Sustainable Transport and Mobility Solutions

15-20 July - 2023

[www.incose.org/symp2023](http://www.incose.org/symp2023) #INCOSEIS



Sheard Position

# Roles for Engineering Complex Sociotechnical Systems

# Twelve SE Roles (1996)

Have these changed  
in 27 years?

**RO** Requirements Owner

**SD** System Designer

**SA** System Analyst

**VV** Validation and  
Verification Engineer

**LO** Logistics/Operations  
Engineer

**G** Glue among subsystems

**CI** Customer Interface

**TM** Technical Manager

**IM** Information Manager

**PE** Process Engineer

**CO** Coordinator

**CA** Classified Ads SE

# Recommended 2019\*

## Need to change

- Rebalancing of role importance & integration of new aspects in general
- System security in particular
- Changes in industry

## Researched

- 5 SE competency models: INCOSE, UK, NASA, BKCASE, & MITRE
- INCOSE SE Handbook
- Industry training

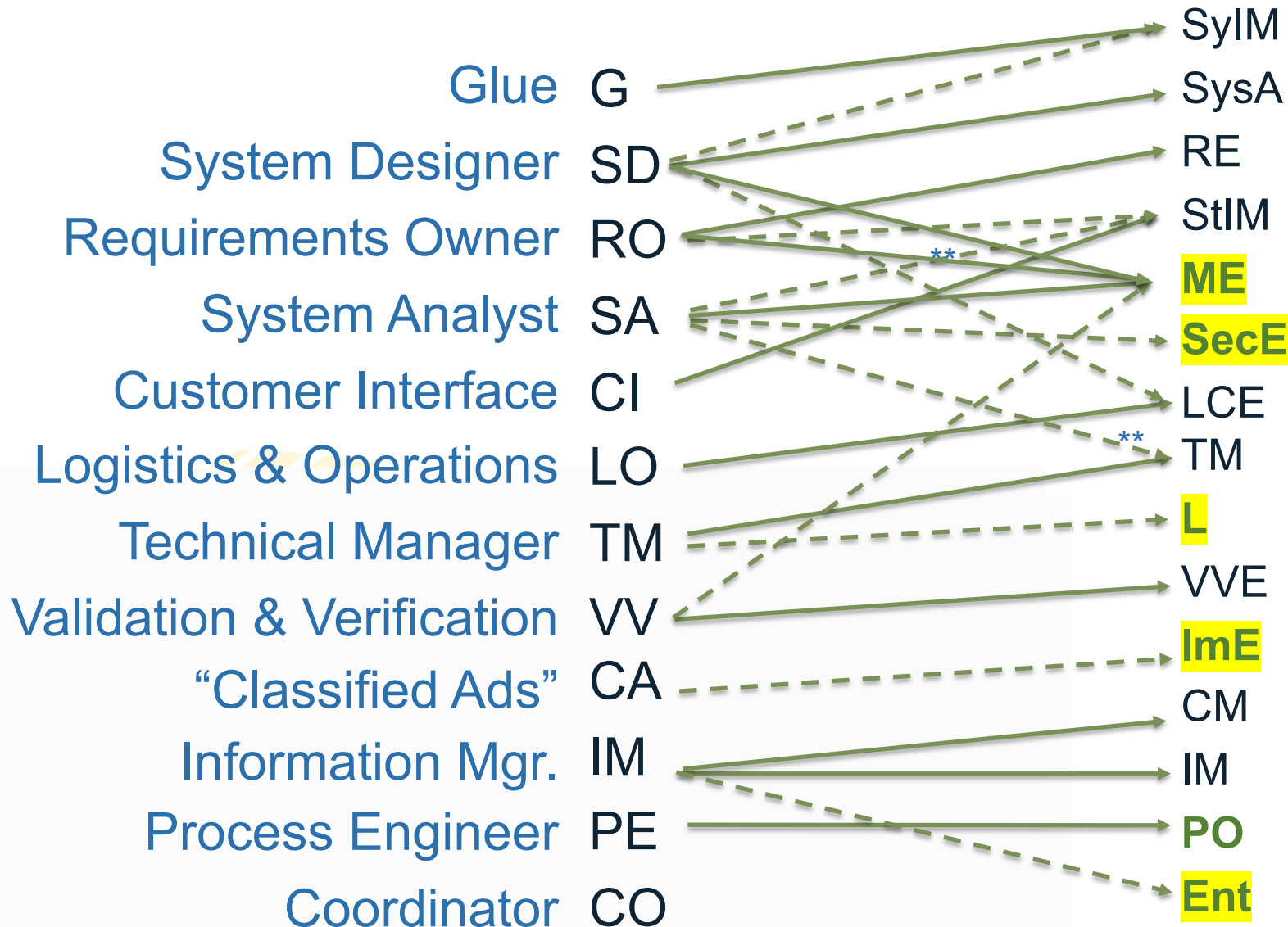
\*Gräßler, I., Oleff, C., Hentze, J. (2019) 'Role Model for Systems Engineering Application', in *Proceedings of the 22nd International Conference on Engineering Design (ICED19)*, Delft, The Netherlands, 5-8 August 2019. DOI:10.1017/dsi.2019.132

# New Roles Framework (Gräßler et al., 2019)

1. Modelling engineer
2. System Architect
3. System Interface Manager
4. Technical Manager
5. Leader
6. Stakeholder Interface Manager
7. Requirements Engineer
8. Life Cycle Engineer
9. Implementation Engineer
10. Validation and Verification Engineer
11. Security Engineer
12. Process Owner
13. Configuration Manager
14. Information Manager
15. Entrepreneur

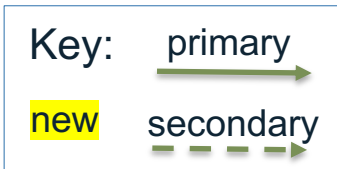


## 1996 roles

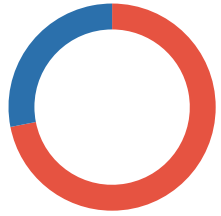


## 2019 roles

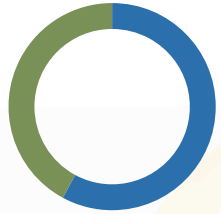
System Interface Mgr  
 System Architect  
 Requirements Engr.  
 Stakeholder Interface Mgr  
 Modeling Engr.  
 Security Engineer  
 Life Cycle Engineer\*  
 Technical Manager  
 Leader  
 Validation & Verif. Engr.  
 Implementation Engr.  
 Configuration Mgr.\*  
 Information Mgr.  
 Process Owner  
 Entrepreneur



# Notes



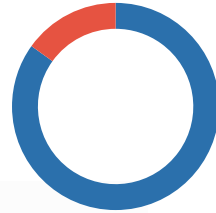
Other “response” papers have been written



Another suggested SE role is “SE Educator”



Other intriguing roles include more “socio-” side roles such as negotiator and facilitator, but historically they have not been seen as systems **ENGINEERING** roles



“The more we get into complex systems, the less technology is the big problem, and the more it is **people**.”

Yet aren’t we\* the very students who preferentially took science, math, and computer courses over sociology and political science courses because we weren’t good at dealing with people...”

— Sarah Sheard

(\*except Dr. Erika Palmer)

