WELCOME!

INCOSE Enchantment Chapter Monthly Meeting

We're glad you're here.

We respectfully request:

- Mute your audio when you are not speaking
- *6 toggle or in GlobalMeet left-side, your name

Discussion and questions are encouraged!

Put questions in the chat box or unmute yourself to speak up.

Meeting Materials

Slide presentations can be downloaded prior to start of the meeting from the Meeting Materials page of our website:

https://www.incose.org/incose-member-resources/chapters-groups/ChapterSites/enchantment/resources/meeting-materials

If recording is authorized by speaker, the video will be posted at the link above within 24 hours.

SEP Training

CSEP Courses by *Certification Training International:*

    CTI currently is offering online course offerings, see

    https://certificationtraining-int.com/incose-sep-exam-prep-course/

    Our chapter has two SEP mentors:

    Ann Hodges alhodge@sandia.gov

    Heidi Hahn drsquirt@outlook.com

Upcoming meetings

- November 10, 2021: Jennifer Russell – "Smart Cities"

- December 8, 2021: Zane Scott – "Soft Yet Crucial Skills for SEs: Conflict Management, Persuasion and Negotiation"

- January 12, 2022: David Long – "6 Vs and 3 Ts"

Introductions

- Please type your name, position, and organization in the Chat window

Photo by Adam Solomon on Unsplash

Survey

The link for the online survey for this meeting is

- www.surveymonkey.com/r/2021_10_MeetingEval

Your feedback is important!

Enchantment Chapter Monthly Meeting

Systems Engineering Evidence in Commercial Kitchens

Abstract: INCOSE has expressed interest in the application of systems engineering principles and practices in industries outside of the classic aerospace, communications, and other large system developments commonly related to the discipline. In this case, a visit to the kitchen at the Inn at Little Washington triggered thinking about how and why it was so different from other commercial kitchens. The resulting analysis of how systems engineering has significant relationship to the design of a wide variety of commercial kitchens is provided in this paper. The objective is to learn how we can see systems engineering in places it isn't normally found to both find other ways it can be applied and to help others improve their results by using systems engineering discipline.

Speaker Bio

Jim Armstrong has practiced systems engineering for 54 years, performing various roles including configuration management, test, deployment, chief engineer, program manager, and program element monitor. For the last 30 years, he taught, consulted, and appraised systems engineering in industry and government. Jim was on the author teams for most of the systems engineering standards and is a frequent presenter at INCOSE events. He has a BS in Mechanical Engineering from Rensselaer Polytechnic Institute, an MS in Systems Management from the University of Southern California, and a PhD in Systems Engineering from Stevens Institute of Technology. He has an INCOSE Expert Systems Engineering Professional certification.

30th Annual **INCOSE**
international symposium

Virtual Event
July 20 - 22, 2020

Systems Engineering Evidence in Commercial Kitchens

www.incose.org/symp2020

The Inspiration

THE GASTRONAUT'S MENU

Amuse-Bouche

A Tin of Sin:
*Imperial Osetra Caviar
with Peekytoe Crab and Cucumber Rillette
L. Aubrey Fils, 1er Cru, Jouy-les-Reims, Champagne, France (N.V.)

*Carpaccio of Herb-Crusted Elysian Fields Baby Lamb Loin
with Caesar Salad Ice Cream
Domaine Maubernard, Rosè, Bandol, France (2018)

Seafood Sausage with Tomato-Tarragon Butter
La Vizcaína, La Del Vivo, Bierzo, Spain (2016)

*Blackened Heart of Wagyu Ribeye
with Grilled Romaine and Bone Marrow Custard
*Avennia, Syrah, Arnaut, Bouchey Vineyard, Yakima Valley
Washington (2016)*

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A Lilliputian Mandarin and Vanilla Dreamsicle

Our Chocolate-Hazelnut Mousse Napoleon
*Toro Albala, Pedro Ximénez, Don PX, Gran Reserva
Montilla-Moriles, Spain (1990)*

-or-

A selection of cheese from Cameron, our "Cheese Whiz"

THE GOOD EARTH
OUR VEGETARIAN CREATIONS

Amuse-Bouche

Sweet Pea Panna Cotta with Baby Radishes, Snow Peas
and Chilled Pea Flower Consommé
*Alfred Merkelbach, Riesling, Auslese, Ürziger Würzgarten, Mosel
Germany (2016)*

Our Garden Green Bean Tartare with Tomato Vinaigrette
Alzinger, Riesling, Hollerin, Smaragd, Wachau, Austria (2016)

Summer Vegetable Raviolis
with Roasted Sweet Corn and Chanterelle Mushrooms
Pahlmeyer, Chardonnay, Napa Valley, California (2017)

A Filet of Beet with Creamed Spinach, Pomme Soufflé
and Beurre Rouge
G.D. Vajra, Dolcetto d'Alba, Coste & Fossati, Piedmont, Italy (2017)

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Global Warming

A Lemon Tart Reincarnated
*Domaine des Baumard, Quarts-de-Chaume
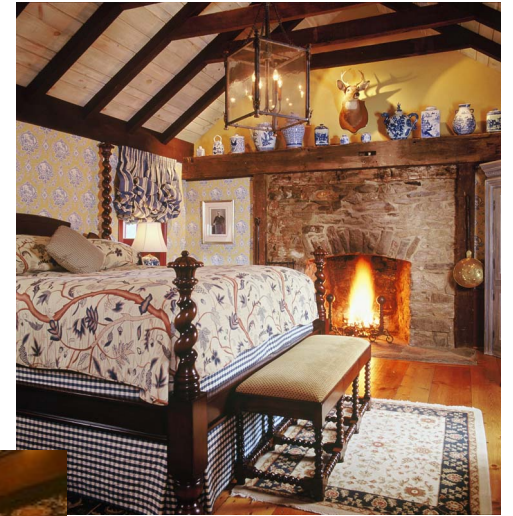Loire Valley, France (2012)*

-or-

A selection of cheese from Cameron, our "Cheese Whiz"

The Inn at Little Washington

- Remodeled from a garage
  - Designed by Joyce Conway Evens
- The Inn
- The restaurant
  - Michelin three stars
  - Eat in the kitchen option

Commercial Kitchens

- Typical commercial kitchen décor

- Exceptions for when open to front

Inn at Little Washington Kitchen

Not what I expected!

Systems Engineering Thinking?

Systems Engineering Thinking?

- Concepts

- Fine dining
- Fast food
- Take out
- Cuisine
- Which meals
- Target customer
- Etc.

Systems Engineering Thinking?

- Concepts

- Functions

- Cook

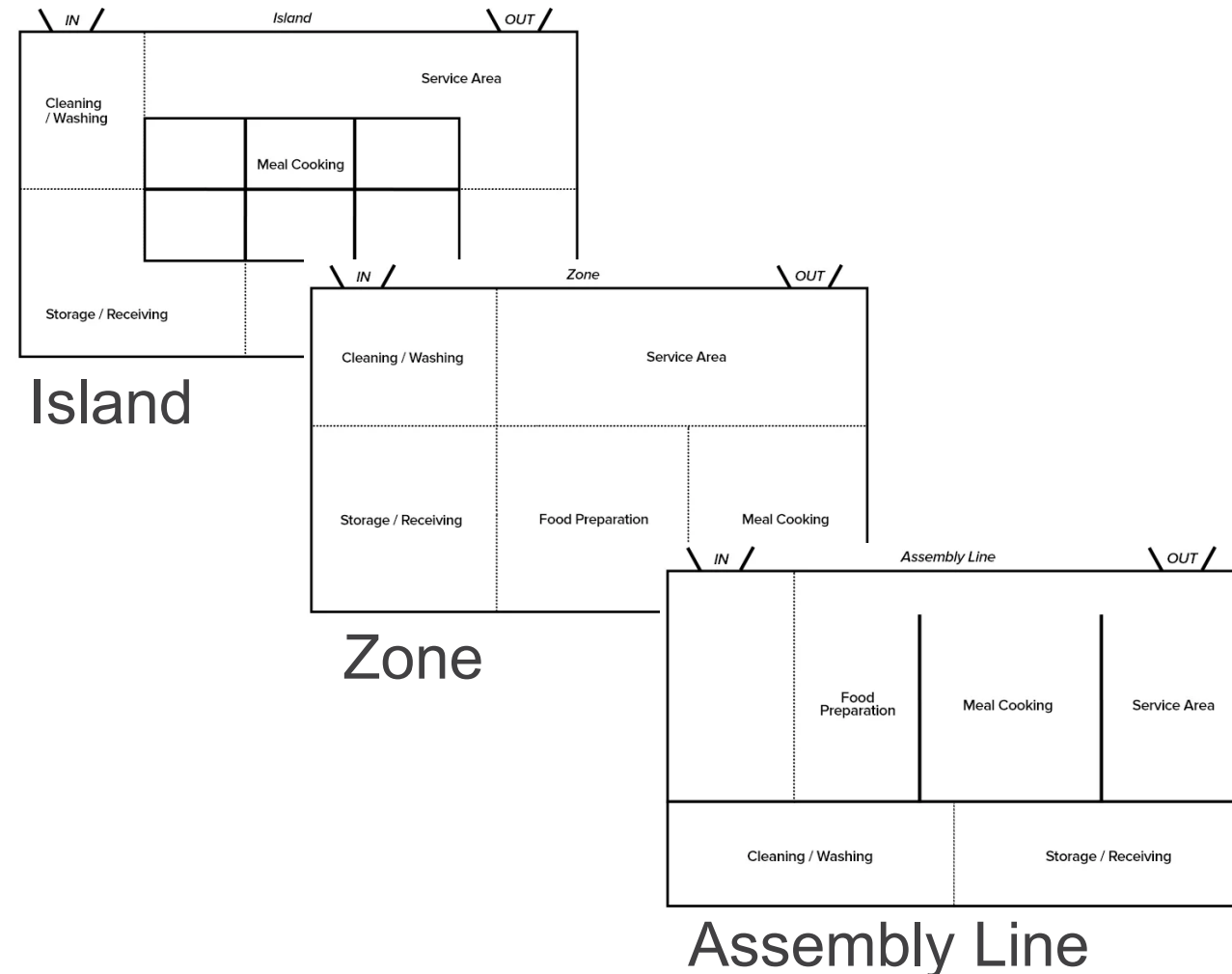- Store

- Maintain

- Serve

- Manage

Systems Engineering Thinking?

- Concepts
- Functions
- Requirements

- Cuisine
- Quality
- Appearance
- Volume
- Speed
- Safety
- Laws
- Human interface
- External interfaces
- Etc.

Systems Engineering Thinking?

- Concepts
- Functions
- Requirements
- Architecture

Island

Zone

Assembly Line

Systems Engineering Thinking?

- Concepts
- Functions
- Requirements
- Architecture

Island, zone, and assembly line aspects

Systems Engineering Thinking?

- Concepts
- Functions
- Requirements
- Architecture
- Models

- Ray Kroc for speed
- Student concept

Comparison

Current Facility Layout   New! Facility Layout

Systems Engineering Thinking?

- Concepts
- Functions
- Requirements
- Architecture
- Models
- Integration

- Components
- Humans
- Front end
- Business
- Facility
- Utilities
- Supply chain
- Etc.

Systems Engineering Thinking?

- Concepts
- Functions
- Requirements
- Architecture
- Models
- Integration
- Verification

- Equipment tests
- Licensing
- Test runs
- Ratings

Systems Engineering Thinking?

- Concepts
- Functions
- Requirements
- Architecture
- Models
- Integration
- Verification
- Validation

- Market surveys
- Trial openings

- Business volume is ultimate validation

Variations on the Theme

- Fast Food
- Cafeterias
- Hotels
- Schools
- Food trucks
- Boats
- Planes

Fast Food – Functional Sequence Change

- Restaurant sequence: Order, cook, eat, pay, leave.

- Fast food: order, pay, cook, pick up, eat, leave. Or, leave then eat.

- NJTP BK: cook, put out, pick up, pay, eat.
  - Kitchen staff must monitor supply and respond to orders if missing on shelves

Menu Driven Design

- Pizza

- Octopus

- Dumplings

- Steaks

Sandwich Shop Allocation Variation

- Customer is more involved in preparation and decisions are made while in progress

Cafeteria - Time Line

- Longer between preparation and serving

- Impacts menu

- Impacts kitchen components

School Cafeterias

- Requirements may have more specific details
  - Number and types of equipment
- Involvement of employees
  - More early validation

Hotel Requirement drivers

- Size of hotel
- Clientele
- Breakfast only to support of banquets
- Dinner support for extended stay guests

Food Truck Considerations

- Durable, non-slip, inflammable floors like commercial grade laminate or vinyl

- Proper ventilation in the form of a hood fan and roof vent, with additional windows if you can swing it

- Room for staff to move around freely while carrying hot pots and pans

- Easy access to inventory and ease of transition between workstations

- Emergency exits

-Regaudie, 2019?

At Sea

- Safety – fuel selection
- Motion control
  - Aegis max turn test during lunch
  - Sailboat galleys
- Submarine Space

Airplane Galley

Kitchen External Integration

- United employee kitchen at Denver International
- Exhaust upwind from terminal air intake
- Grill odors strong in the terminal

Epilogue – Mannequins at the Inn

So what?

- Even commercial kitchens reflect the same considerations as classic systems engineering
- We can learn from other disciplines and products
- We can also be able to speak their language to be able to apply better SE practices where needed.

Questions?