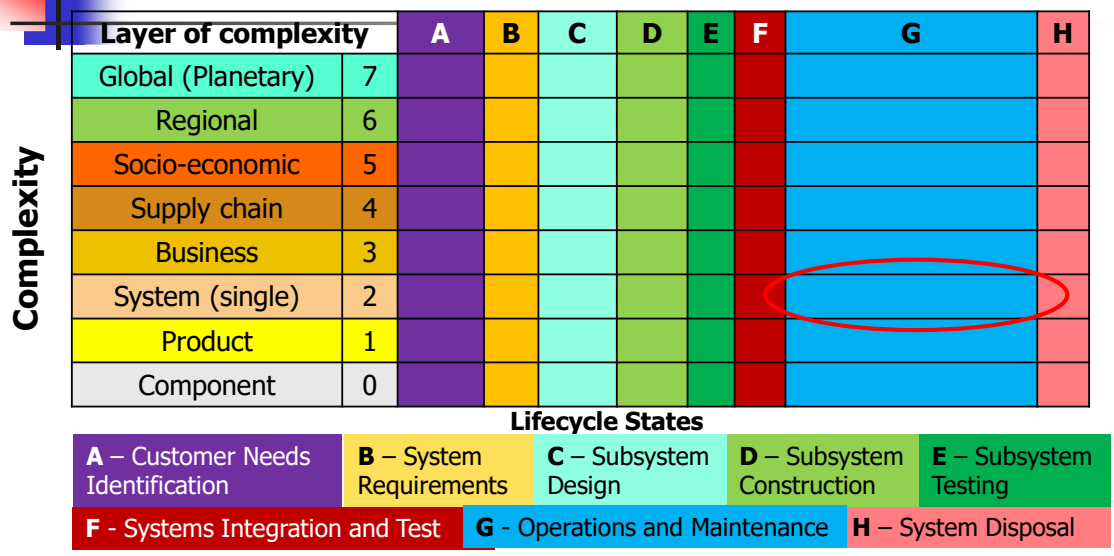
Module 13: Modelling, simulation and using models in building a model over the SDP
Session 7 of 7

Rev 2.0.0

Operations and Maintenance State



Operating the simulation

- Development schedule slipped
  - simulation was not ready until after contest
- Knowledge gained in developing propagation prediction and population models [understanding] allowed operator to contact 74 out of 75 Sections in the contest

Bragging

Maryland - D.C.

W3LPL(N8RC,opr)	180,264-1218-74-24-B
WA3KCY	166,648-1126-74-23-B
K2PLF/3	164-016-1139-72-24-B
K3TA(N3TR,opr)	162,936-1116-73-24-B
WA3VUQ	152,588-1031-74-22-B
W1FLM/3	136,456- 922-74-17-B
K3ZZ	133,344- 926-72-24-B
N3RL	124,616- 842-74-19-B
W3MR	119,732- 809-74-17-B
N3GB	118,400- 800-74-18-B
WA3UPH	103,968- 722-72-13-B
K3SA	103,600- 700-74-15-B
KB3EI	102,712- 694-74-24-B
W3UJ	84,388- 578-73-12-B
N3AVA	54,528- 384-71-19-A
N3II	52,966- 373-71- 8-A
G3ZCZ/W3	48,988- 331-74-20-B
N3AGH	42,884- 302-71-21-B
W3IDT	42,612- 318-67-11-A
K3ZJ	41,888- 308-68- 5-B
W3GNQ	41,752- 307-68- 8-B
KD5M/3	39,054- 283-69-17-A
K3ZNV	34,860- 249-70-10-A
W3HVM	25,200- 200-63- 7-B
AG3S	15,180- 115-58- 9-A

Operating the simulation

- Serial I/O terminal device just about usable [circa 1978 technology]
- Printed logs were not that useful in operation
  - Were useful in testing
- Lost interest in playing with the system
- Rewrote in 1989 in structured BASIC
  - Not RAM limited, more user friendly text-based user interface
  - Disk drives available
  - Still not that interesting
  - Lost interest

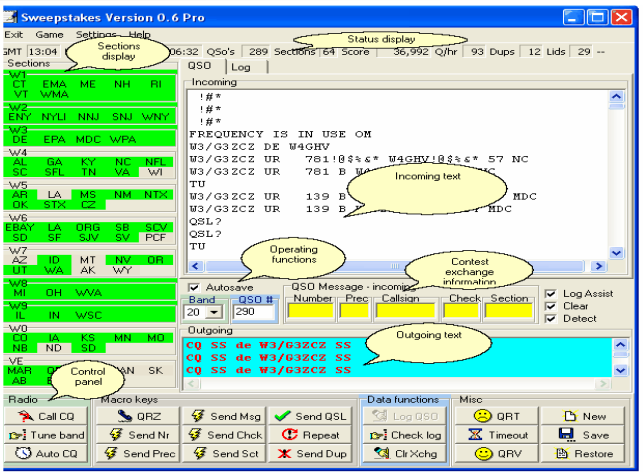
Upgrade to 2005 technology (Delphi)

- Windows Platforms
- Colour displays
- Graphic displays possible
- Non-serial I/O
  - No more scrolling
- Other languages available
  - Visual Basic
  - Delphi (Visual Pascal)
  - Etc.
- Software libraries
- Not RAM limited

25 years later

Upgraded version

- Colourful
- Delphi
- Static displays
- Section display position optional
  - Left and right handed people
- Nice to use
- Boring
  - No sounds ?
  - Non real-time?



https://therightrequirement.com/sfar/CQSS.htm

Temporal Changes: Factors to consider

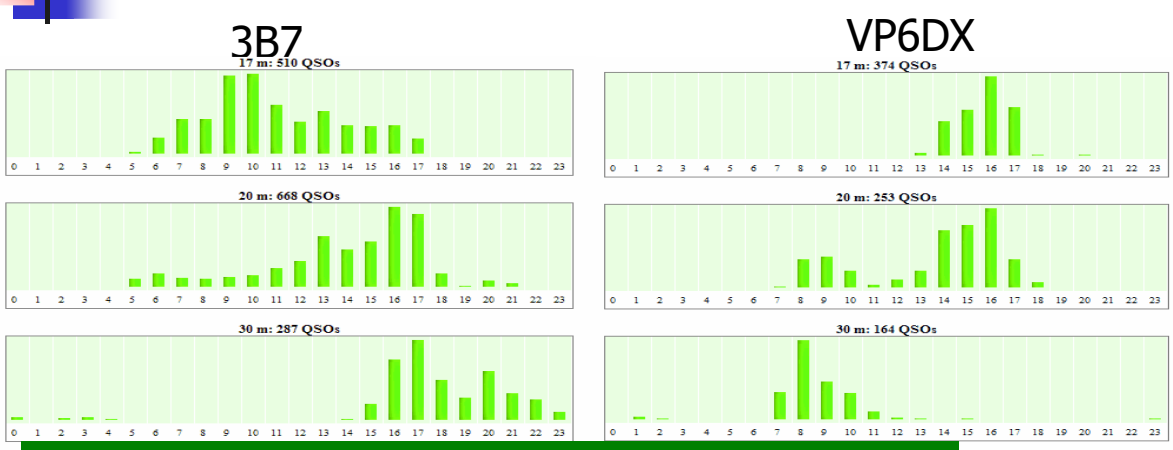
- Use of graphics
- Static display in areas of screen
- Different ways to display Sections contacted
- Conversion from BASIC to other language
  - Pascal or C?
- Innovative or incremental changes
- **Ways to compute callsigns**

Ways to compute callsigns

- 1977
  - Punched paper tape was storage medium
  - Options
    - **Compute at initialization**
    - Compute on the fly
- 1989
  - Floppy disks and hard drives
  - New option
    - **Create and use data file**
- Lesson learned
  - Technology availability influences design decisions

Temporal HTP

Example similar displays: Best time to make a contact (possible upgrade)



For 13 Sections on 5 bands? This is for two

Future Modifications ?

- Version to test endgame strategies
- Try automating various strategies to maximize score
  - Call CQ
    - The fishing for Section approach
  - Tune for calls
  - Mixture
    - Depends on band, time and Sections needed
  - Remote spotters via Packet Radio or Internet
  - Help make decision to call CQ or tune
- Real-time version for use in Sweepstakes contest
  - Not interested, contest is US only
- Application in "virtual contest" without causing interference on the air

2009

- Windows 7 introduced
- Delphi platform not compatible
- Some runtime features (in exe file) do not work
- Obsolescence applies to software as well as hardware

Lessons learned

- Simulations should be realistic enough to enable successful completion of mission at the appropriate time
- The same problem solving process is used in all states of the SDP
- Problem statement influenced decision
- Successful systems engineering needs knowledge and experience in/of
  - Systems engineering, application (problem and solution) domain, implementation domain
- The customer/user needs to be involved in the development
  - Application domain knowledge
- The need to focus on what is important
  - In M&S it is "the understanding"
    - Simulations don't provide answers, they [should] provide understanding

More lessons learned

- Functional flow diagrams may not be best tool to create relationships between functions
- N^2 charts are powerful and versatile tools
- Incorrect aggregation leads to aggravation
- Obsolescence applies to software as well as hardware
- We probably don't need as many system level requirements as we think we do
- The wording of requirements affects the design
- Recursiveness and self-similarity of problem solving process
- Technology influences design decisions
- There is knowledge in the development team that is not delivered with the solution system
- Work should be, and can be, fun

Meeting the objectives

1. Showed the iterative nature of the problem-solving process in the SDC
2. Illustrated the decision-making process in system development
3. Showed how the implementation domain can affect the realized system
4. Provided a case study of developing a model (system) through the states of the SDP

Any questions ?

1. Best
2. Worst
3. Missing

Email: beyondsystemsthinking@yahoo.com
Subject: <class title> BMWQ Session #