MODEL RAILROAD OPERATIONS

- DEBUNKING THE MYTHS
- GETTING INVOLVED

PURPOSE OF THIS CLINIC

- Generate interest in operations and get more people involved
- Expose the world of operations to modelers
- Illustrate the various facets of operations
- Get the “creative process” going and garner interest in building modules for a portable layout that will support operations
- Maybe encourage someone to build a home layout that will support operations.

MY STORY INTO OPERATIONS

- Worked for Utah Transit Authority – TRAX and Frontrunner since 2007
  - Member of ATU Local 382
- Began in 2000
- Operated on over a dozen layouts
- Made some great friends
- Learned more about the industry from operations than almost anywhere else
- Solidified my interest in electronics, signaling, command control and communications

WHAT ARE/IS OPERATIONS?

- The operating of model trains within a miniature transportation system with the intent to mimic the operations of an analogue prototype.
- Practicing logistics, critical thinking and problem-solving skills.
- Making friends, building and refining social skills and working together in a communal atmosphere.
- Learning, learning and learning!

WHAT OPERATIONS ARE NOT

- An activity to be feared or looked at with trepidation.
- Something that only “expert modelers” do.
- “Just running trains”
- “The same thing every operating session.”
- “Goof off” time – Operating trains need a purpose

WHY PARTICIPATE IN OPERATIONS?

- A desire to learn and experience what trains were designed to do – operate.
- Become part of a fraternity that in most cases, prides itself in learning and constantly improving.
- Challenge oneself
- Learn skills and shared knowledge to apply to your own modeling and hobby interests.
- Make friends and collaborate with others (am I repeating myself?)

“SO, SHOULD I GET INTO OPERATIONS?”

WHAT TO EXPECT AT AN OPERATING SESSION

- What are some typical things that happen at an operating session?
- What kind of activities are there for the beginner?
- What do I need to know ahead of time?
- What interests me about operations?

As we go through the next set of slides, think about the questions above and let's see if we can shed some light about them.

WHAT TO EXPECT AT AN OPERATING SESSION

Yard switching and classification

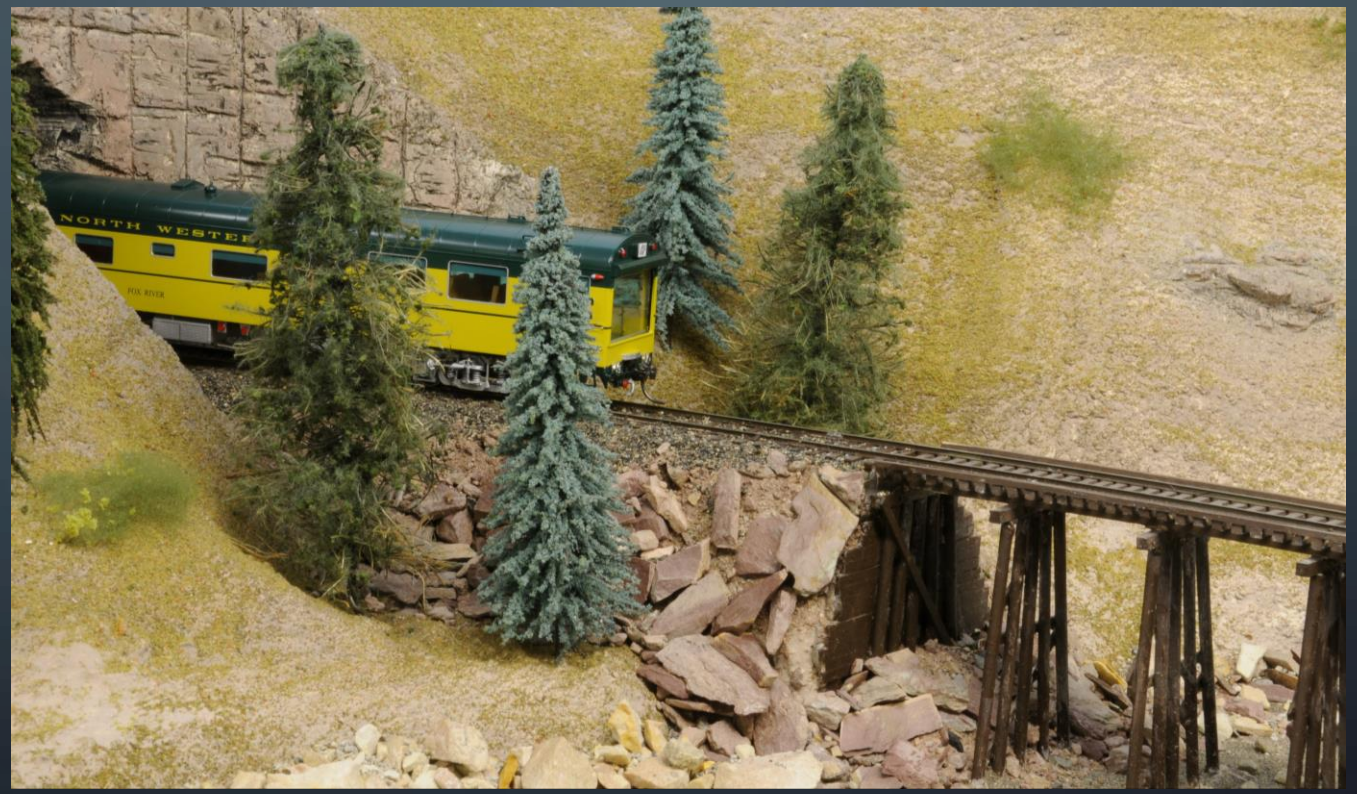
Lee Nicholas' UCW – NMRA "DOGS" - 2013

WHAT TO EXPECT AT AN OPERATING SESSION

Mainline freight trains

Gary Petersen's SLS RR – November 2013

WHAT TO EXPECT AT AN OPERATING SESSION



Passenger trains

Gary Petersen's SLS RR – November 2013

WHAT TO EXPECT AT AN OPERATING SESSION

Industry switching

Gary Petersen's SLS RR – November 2013

WHAT TO EXPECT AT AN OPERATING SESSION

Talking to the dispatcher…..

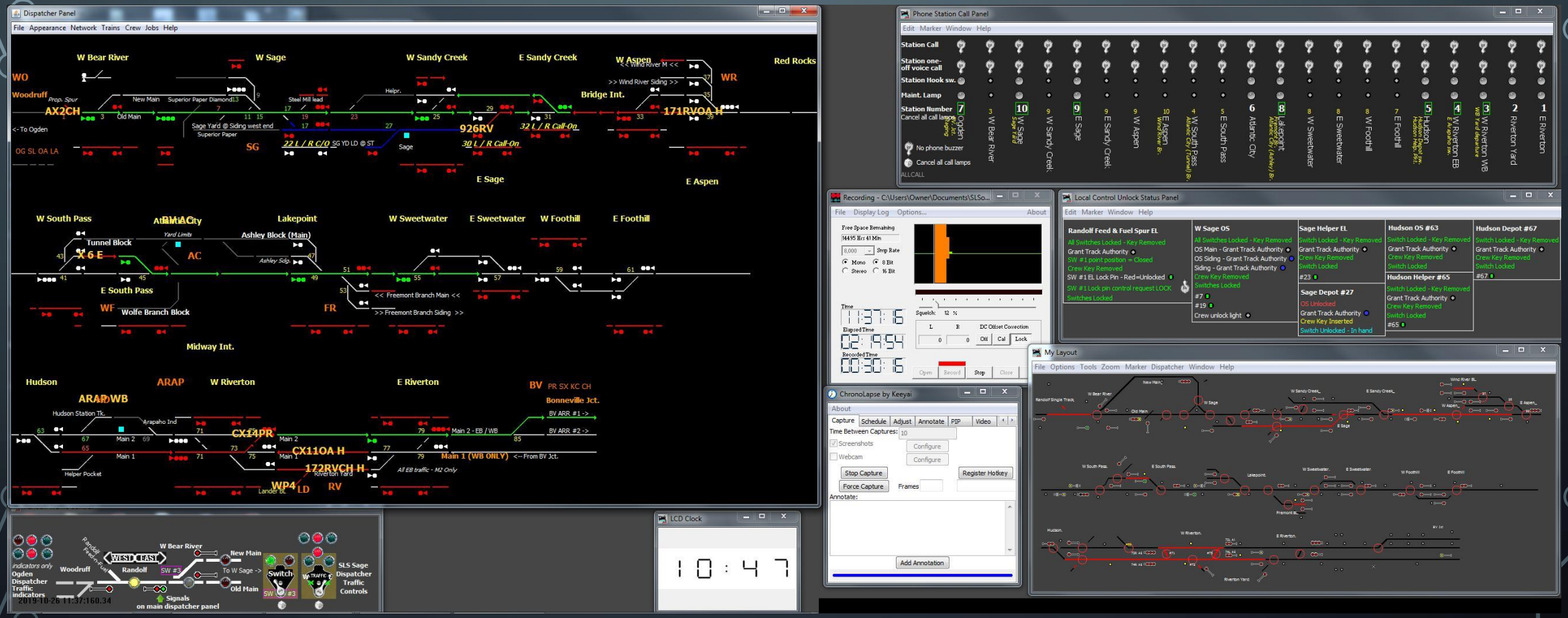
Bob Lewis on Lee Nicholas' UCW RR – 2013

WHAT TO EXPECT AT AN OPERATING SESSION

…. And the dispatcher talking to you.

Pat Bray on Lee Nicholas' UCW RR US&S CTC Machine – 2013

WHAT TO EXPECT AT AN OPERATING SESSION

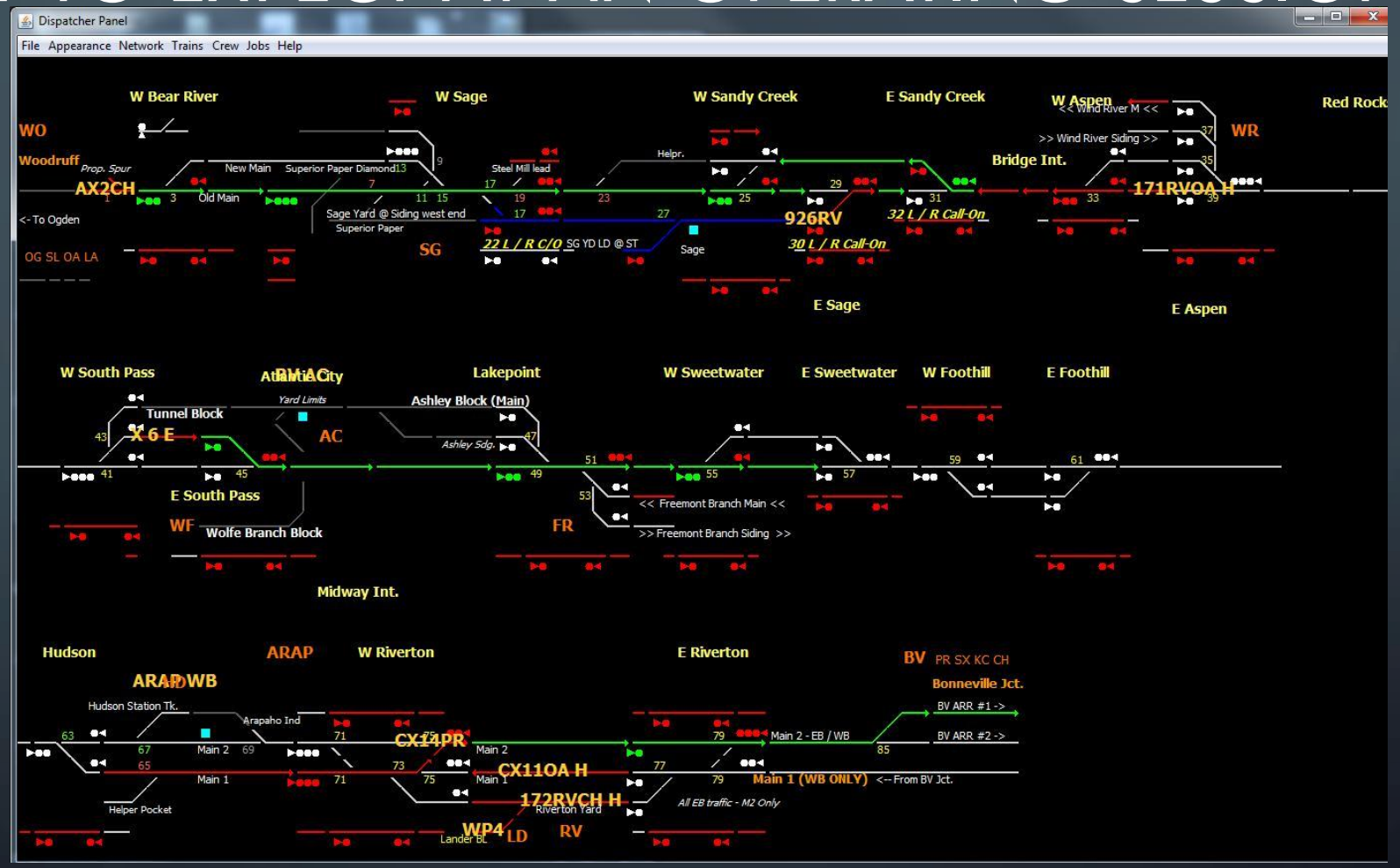


Modern dispatcher control system

Modern Dispatch software - JMRI with CATS overlay

Gary Petersen's SLS RR - 2019

WHAT TO EXPECT AT AN OPERATING SESSION

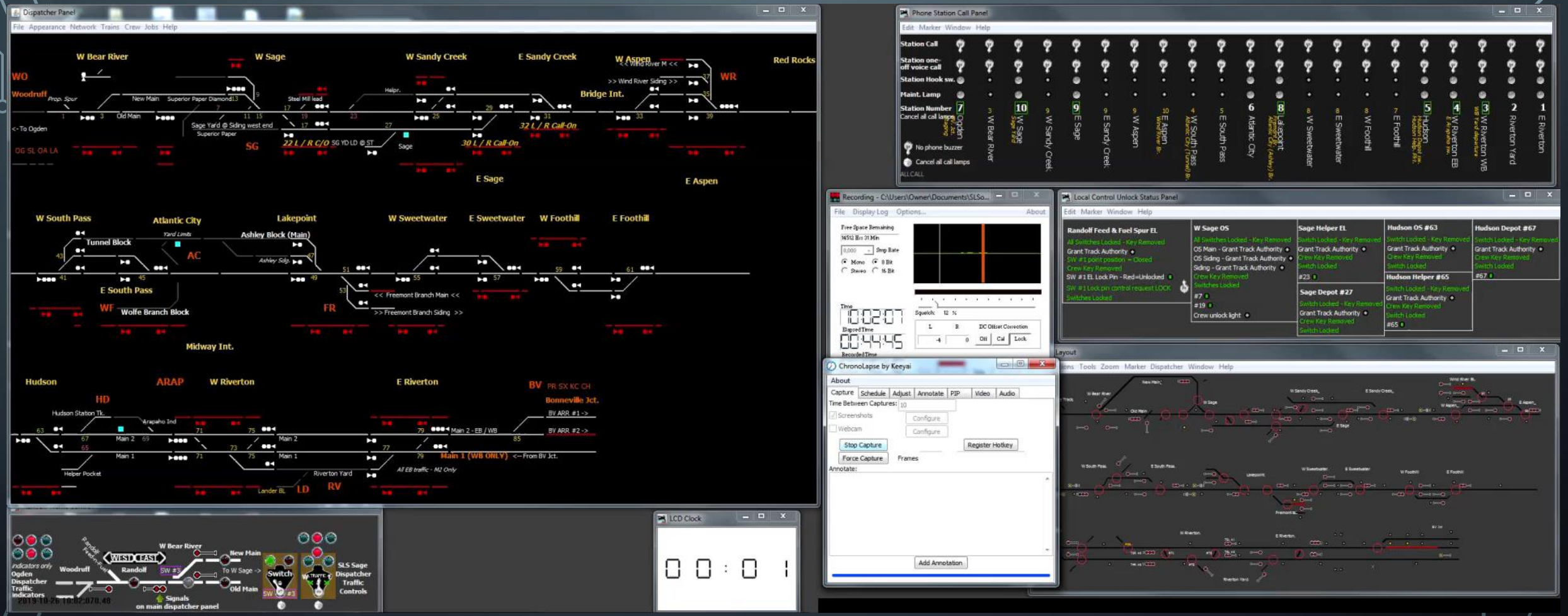


Modern dispatcher control system

Modern Dispatch software - JMRI with CATS overlay

Gary Petersen's SLS RR - 2019

WHAT TO EXPECT AT AN OPERATING SESSION

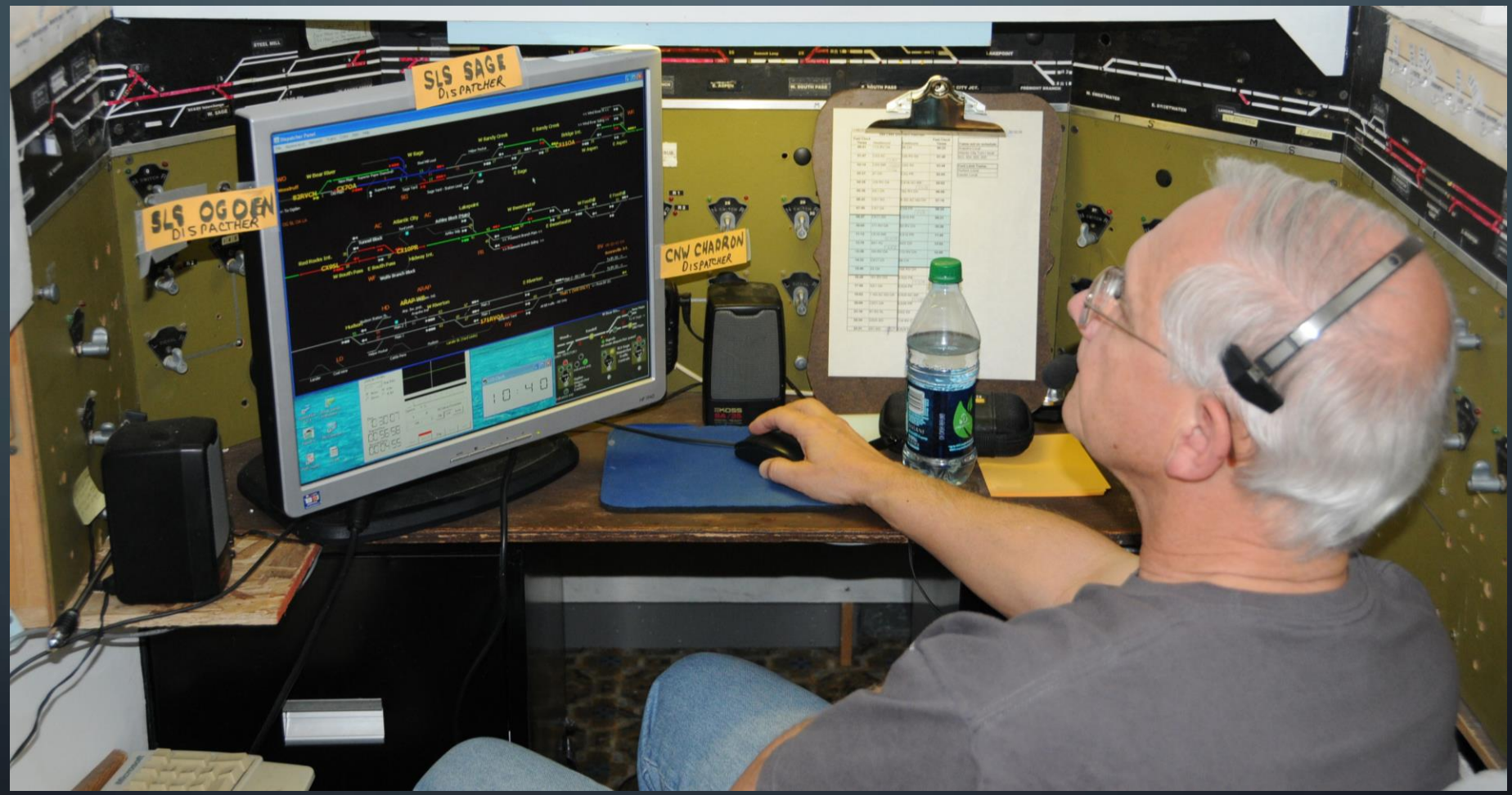


Modern dispatcher control system

Modern Dispatch software - JMRI with CATS overlay

Gary Petersen's SLS RR - 2019

WHAT TO EXPECT AT AN OPERATING SESSION



Modern dispatcher control system

Rodney Black – Creator of CATS dispatching

Gary Petersen's SLS RR - 2014

WHAT TO EXPECT AT AN OPERATING SESSION

Vintage US&S CTC Machine

Lee Nicholas' UCW RR - 2019

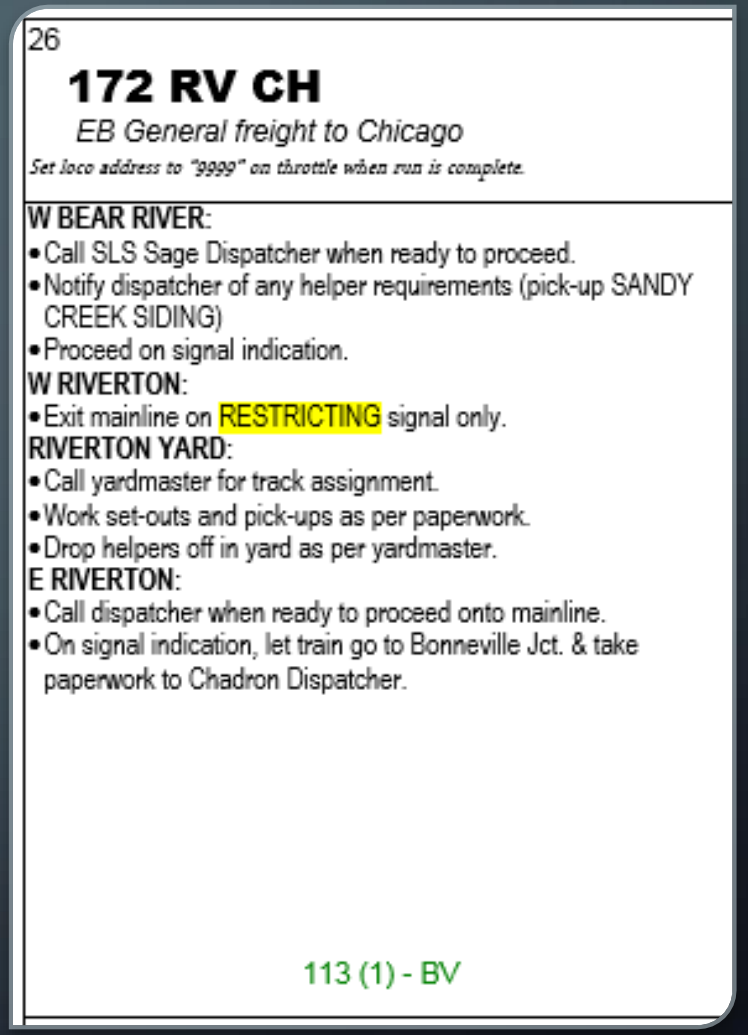
WHAT MAKES UP AN OPERATING SESSION?

- Operators
- An operating “scheme”, “playbook”, “scenario” or some variant thereof
- Employee Timetables
- A car forward system (car cards, switchlists, color tabs, etc.)
- Trains (rolling stock, motive power, non-revenue equipment)
- Track authority – how trains and their movements are governed on a given section of track
- Control system – (DCC, Cab Control, proprietary control)
- Communication systems (radio, telephone, intercom)

WHAT MAKES UP AN OPERATING SESSION?

Train / Job instructions

- May be accompanied by car-cards, switchlists or other paperwork
- A simple track diagram may also accompany
- Check both sides of all paperwork to make sure nothing is missed
- Ask questions if unsure about instructions



26

172 RV CH

EB General freight to Chicago

Set loco address to "9999" on throttle when run is complete.

W BEAR RIVER:
- Call SLS Sage Dispatcher when ready to proceed.
- Notify dispatcher of any helper requirements (pick-up SANDY CREEK SIDING)
- Proceed on signal indication.

W RIVERTON:
- Exit mainline on RESTRICTING signal only.

RIVERTON YARD:
- Call yardmaster for track assignment.
- Work set-outs and pick-ups as per paperwork.
- Drop helpers off in yard as per yardmaster.

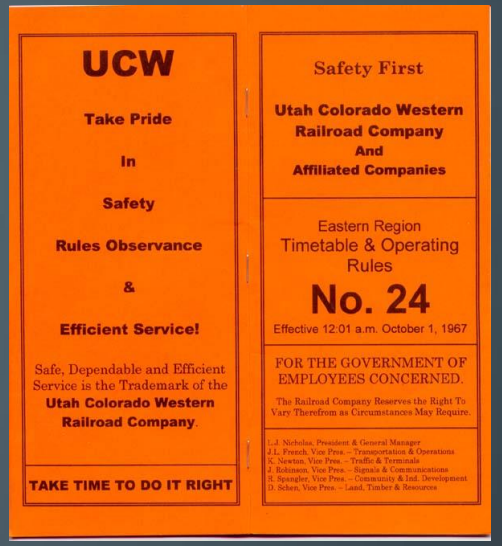
E RIVERTON:
- Call dispatcher when ready to proceed onto mainline.
- On signal indication, let train go to Bonneville Jct. & take paperwork to Chadron Dispatcher.

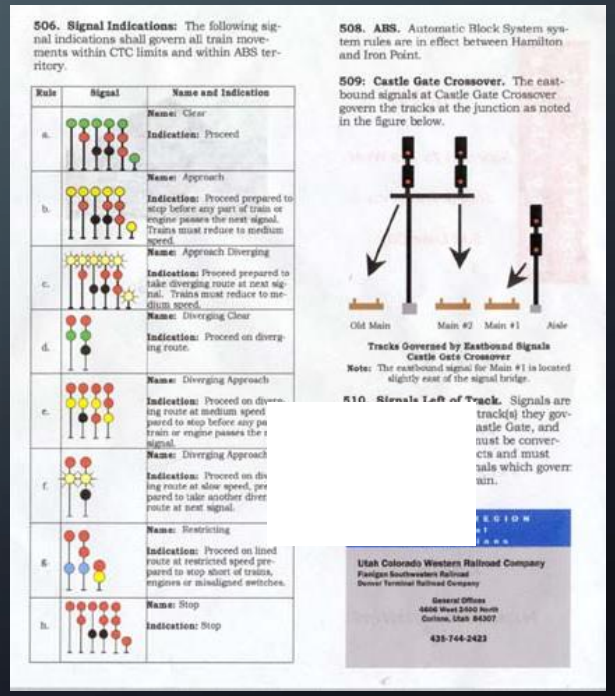
113 (1) - BV

WHAT MAKES UP AN OPERATING SESSION?

Employee Timetables

- Contain General Rules, Definitions, Special Instructions, and other items pertinent to a given railroad
- Not all model railroads have them
- Request one, if available, and read it – the operation will make more sense

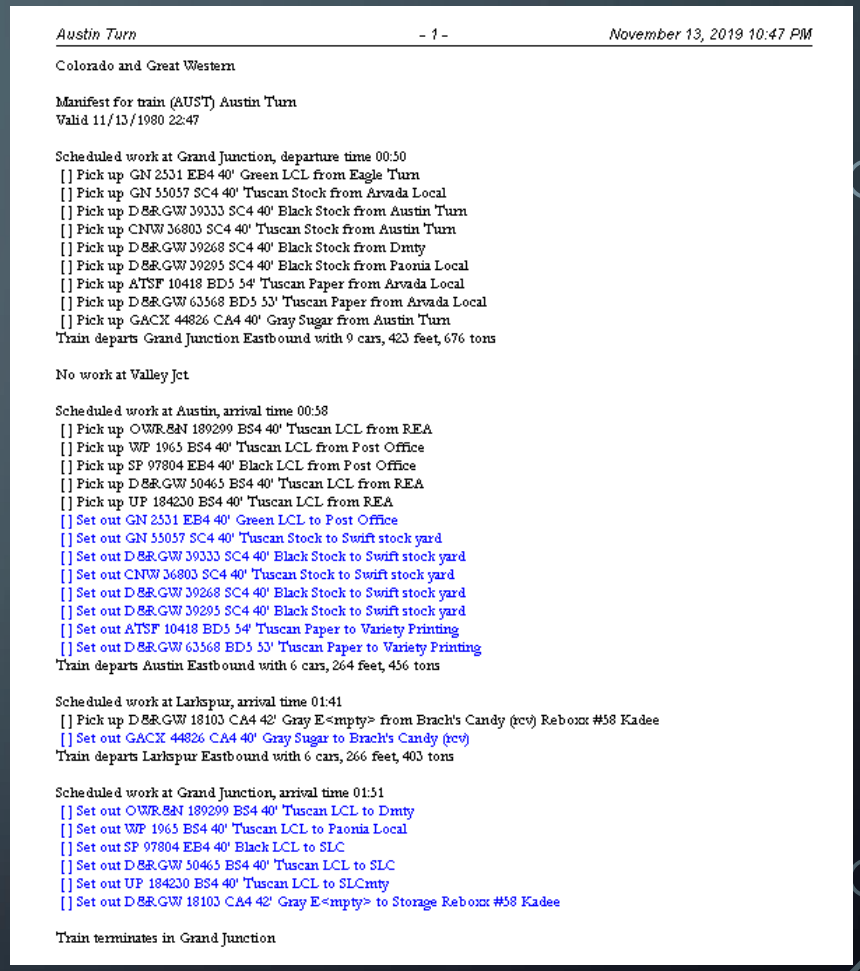




WHAT MAKES UP AN OPERATING SESSION?

Switch lists

- Almost always computer generated
- Read before departing terminal
- Check both sides of all paperwork to make sure nothing is missed
- Ask questions if unsure about instructions



Austin Turn - 1 - *November 13, 2019 10:47 PM*

Colorado and Great Western

Manifest for train (AUST) Austin Turn
Valid 11/13/1980 22:47

Scheduled work at Grand Junction, departure time 00:50
[ ] Pick up GN 2531 EB4 40' Green LCL from Eagle Turn
[ ] Pick up GN 55057 SC4 40' Tuscan Stock from Arvada Local
[ ] Pick up D&RGW 39333 SC4 40' Black Stock from Austin Turn
[ ] Pick up CNW 36803 SC4 40' Tuscan Stock from Austin Turn
[ ] Pick up D&RGW 39268 SC4 40' Black Stock from Dmty
[ ] Pick up D&RGW 39295 SC4 40' Black Stock from Paonia Local
[ ] Pick up ATSF 10418 BD5 54' Tuscan Paper from Arvada Local
[ ] Pick up D&RGW 63568 BD5 53' Tuscan Paper from Arvada Local
[ ] Pick up GACX 44826 CA4 40' Gray Sugar from Austin Turn
Train departs Grand Junction Eastbound with 9 cars, 423 feet, 676 tons

No work at Valley Jct

Scheduled work at Austin, arrival time 00:58
[ ] Pick up OWR&N 189299 BS4 40' Tuscan LCL from REA
[ ] Pick up WP 1965 BS4 40' Tuscan LCL from Post Office
[ ] Pick up SP 97804 EB4 40' Black LCL from Post Office
[ ] Pick up D&RGW 50465 BS4 40' Tuscan LCL from REA
[ ] Pick up UP 184230 BS4 40' Tuscan LCL from REA
[ ] Set out GN 2531 EB4 40' Green LCL to Post Office
[ ] Set out GN 55057 SC4 40' Tuscan Stock to Swift stock yard
[ ] Set out D&RGW 39333 SC4 40' Black Stock to Swift stock yard
[ ] Set out CNW 36803 SC4 40' Tuscan Stock to Swift stock yard
[ ] Set out D&RGW 39268 SC4 40' Black Stock to Swift stock yard
[ ] Set out D&RGW 39295 SC4 40' Black Stock to Swift stock yard
[ ] Set out ATSF 10418 BD5 54' Tuscan Paper to Variety Printing
[ ] Set out D&RGW 63568 BD5 53' Tuscan Paper to Variety Printing
Train departs Austin Eastbound with 6 cars, 264 feet, 456 tons

Scheduled work at Larkspur, arrival time 01:41
[ ] Pick up D&RGW 18103 CA4 42' Gray E<mpty> from Brach's Candy (rcv) Reboxx #58 Kadee
[ ] Set out GACX 44826 CA4 40' Gray Sugar to Brach's Candy (rcv)
Train departs Larkspur Eastbound with 6 cars, 266 feet, 403 tons

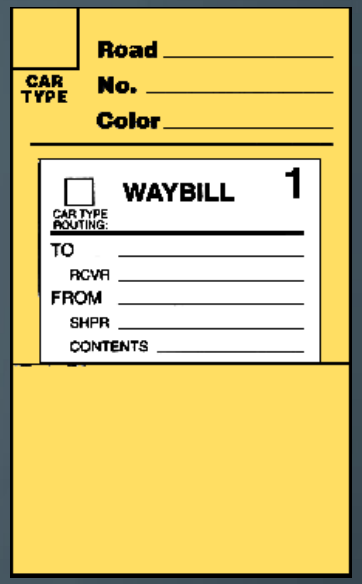
Scheduled work at Grand Junction, arrival time 01:51
[ ] Set out OWR&N 189299 BS4 40' Tuscan LCL to Dmty
[ ] Set out WP 1965 BS4 40' Tuscan LCL to Paonia Local
[ ] Set out SP 97804 EB4 40' Black LCL to SLC
[ ] Set out D&RGW 50465 BS4 40' Tuscan LCL to SLC
[ ] Set out UP 184230 BS4 40' Tuscan LCL to SLCmty
[ ] Set out D&RGW 18103 CA4 42' Gray E<mpty> to Storage Reboxx #58 Kadee

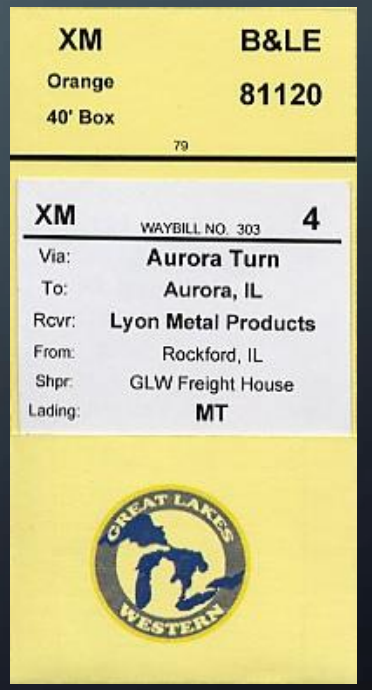
Train terminates in Grand Junction

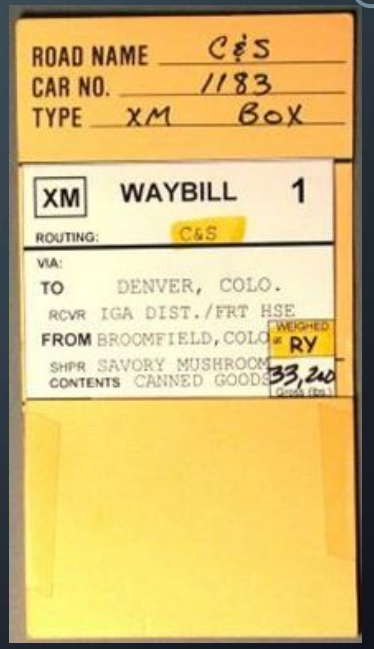
WHAT MAKES UP AN OPERATING SESSION?

Car Cards and Waybills

- Easy to use – easy to fix mistakes
- Car card designates the car – waybill designates the destination
- A stack of car cards will usually accompany train instructions when beginning a run
- Don't put them in your pocket
- Cards stay with cars – you'll be swapping car cards at yards and industries as cars are dropped off and picked up
- Some experienced operators hand-write a switch list out using information from car cards







WHAT MAKES UP AN OPERATING SESSION?

Track authority – *"Who's track is this anyway?"*

- All track should have some sort of authority assigned to it. These can include:
  - Time table & Train order
  - Track Warrant Control (TWC)
  - Direct Traffic Control (DTC)
  - Centralized Traffic Control (CTC)
  - Yard limits
  - "Other than main track" – *"Sandbox" mode*

WHAT MAKES UP AN OPERATING SESSION?

Signaling (wayside)

- Signals and their operation can be “boiled” down to three methods:
  - Automatic Block Signal (ABS)
  - Absolute Permissive Block (APB)
  - Centralized Traffic Control (CTC)
    - Centralized Traffic Control is/was, at least historically, the only signal discipline whereby the signal and the aspect it displayed conveyed authority to a train to occupy a given section of track.

WHAT MAKES UP AN OPERATING SESSION?

Signaling (wayside)

Automaitc Block Signals (ABS)

- Mostly used on track that has a primary direction for traffic – dual mainline for example
- Without unique configuration, ABS doesn't provide for head-to-head collision avoidance *(see me later if you want more info on this)*
- Used to help keep trains "spaced" and from running into the back of another train
- Automatic – No connection or control by the dispatcher or other personnel
- Signals respond to track block occupancy, switch point positions, rock slide fences and other items that need to be monitored
- Used with some form of "track authority" system – ABS signals do not convey authority
- ABS signals are considered "permissive" – Red signals may be passed "after a stop and proceed"
- Signals will try to "float" to the highest favorable aspect possible

WHAT MAKES UP AN OPERATING SESSION?

Signaling (wayside)

Absolute Permissive Block (APB)

- Usually used on single, mainline track with sidings
- Provides for head-to-head collision avoidance
- Keeps trains traveling in the SAME direction safely spaced similar to ABS
- Some APB signals can be passed when red with a “stop and proceed” - Others may only be passed on an aspect other than RED
- Other aspects of it are similar to that of ABS
  - Automatic – No connection or control by the dispatcher or other personnel
  - Signals respond to track block occupancy, switch point positions, rock slide fences and other items that need to be monitored
  - Used with some form of “track authority” system – APB signals do not convey authority
  - Signals will try to “float” to the highest favorable aspect possible

WHAT MAKES UP AN OPERATING SESSION?

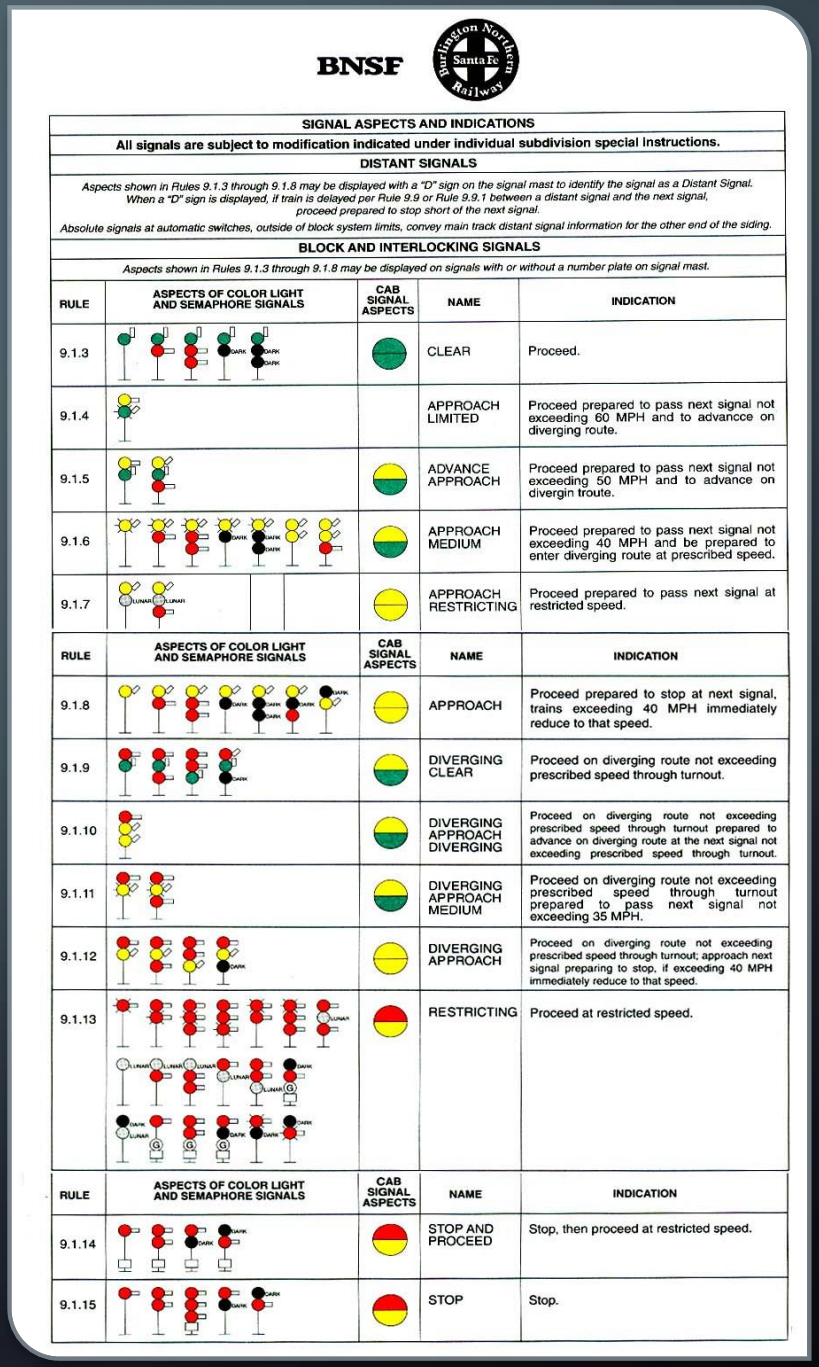
Signaling (wayside)

Centralized Traffic Control (CTC)

- System of Signals and Switches controlled by a dispatcher or controller at a centralized location
- Signals are held at “STOP” (RED) and the dispatcher sends “requests” to the various field stations (control points) and if the request determined safe, then the system will perform the request
- CTC provides for conveying “track authority” to trains directly, via signals with out the need of written or verbal orders
- Depending on the area, time period modeled, rules and other factors, signal aspects can vary considerably. Know the territory you’re operating in.

WHAT MAKES UP AN OPERATING SESSION?

Centralized Traffic Control (CTC)



BNSF

SIGNAL ASPECTS AND INDICATIONS

All signals are subject to modification indicated under individual subdivision special Instructions.

DISTANT SIGNALS

Aspects shown in Rules 9.1.3 through 9.1.8 may be displayed with a "D" sign on the signal mast to identify the signal as a Distant Signal. When a "D" sign is displayed, if train is delayed per Rule 9.9 or Rule 9.9.1 between a distant signal and the next signal, proceed prepared to stop short of the next signal.

Absolute signals at automatic switches, outside of block system limits, convey main track distant signal information for the other end of the siding.

BLOCK AND INTERLOCKING SIGNALS

Aspects shown in Rules 9.1.3 through 9.1.8 may be displayed on signals with or without a number plate on signal mast.

RULE	ASPECTS OF COLOR LIGHT AND SEMAPHORE SIGNALS	CAB SIGNAL ASPECTS	NAME	INDICATION
9.1.3			CLEAR	Proceed.
9.1.4			APPROACH LIMITED	Proceed prepared to pass next signal not exceeding 60 MPH and to advancce on diverging route.
9.1.5			ADVANCE APPROACH	Proceed prepared to pass next signal not exceeding 50 MPH and to advance on divergin troute.
9.1.6			APPROACH MEDIUM	Proceed prepared to pass next signal not exceeding 40 MPH and be prepared to enter diverging route at prescribed speed.
9.1.7			APPROACH RESTRICTING	Proceed prepared to pass next signal at restricted speed.

RULE	ASPECTS OF COLOR LIGHT AND SEMAPHORE SIGNALS	CAB SIGNAL ASPECTS	NAME	INDICATION
9.1.8			APPROACH	Proceed prepared to stop at next signal, trains exceeding 40 MPH immediately reduce to that speed.
9.1.9			DIVERGING CLEAR	Proceed on diverging route not exceeding prescribed speed through turnout.
9.1.10			DIVERGING APPROACH DIVERGING	Proceed on diverging route not exceeding prescribed speed through turnout prepared to advance on diverging route at the next signal not exceeding prescribed speed through turnout.
9.1.11			DIVERGING APPROACH MEDIUM	Proceed on diverging route not exceeding prescribed speed through turnout prepared to pass next signal not exceeding 35 MPH.
9.1.12			DIVERGING APPROACH	Proceed on diverging route not exceeding prescribed speed through turnout; approach next signal preparing to stop, if exceeding 40 MPH immediately reduce to that speed.
9.1.13			RESTRICTING	Proceed at restricted speed.

RULE	ASPECTS OF COLOR LIGHT AND SEMAPHORE SIGNALS	CAB SIGNAL ASPECTS	NAME	INDICATION
9.1.14			STOP AND PROCEED	Stop, then proceed at restricted speed.
9.1.15			STOP	Stop.

WHAT MAKES UP AN OPERATING SESSION?

Centralized Traffic Control (CTC)

WHAT MAKES UP AN OPERATING SESSION?

Centralized Traffic Control (CTC)

WHAT MAKES UP AN OPERATING SESSION?

Centralized Traffic Control (CTC)

WHAT MAKES UP AN OPERATING SESSION?

Centralized Traffic Control (CTC)

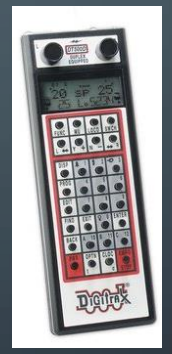
WHAT MAKES UP AN OPERATING SESSION?

Centralized Traffic Control (CTC)

WHAT MAKES UP AN OPERATING SESSION?

Control system (DCC or “otherwise”)

- In Northern Utah, most model railroads use Command Control – of those, the most prevalent systems in use are:
  - Digitax (DCC)
  - NCE (DCC)
  - Rail-lynx (proprietary – Infar-red direct-to-engine)
  - Rail-Pro (proprietary – radio direct-to-engine)



WHAT MAKES UP AN OPERATING SESSION?

Control system (DCC or "otherwise") - continued

- If you are interested in operating, try to learn basic operation of the two most popular DCC systems in use – Digitrax and NCE
- Some layouts use various features with some slight deviations but don't become overly concerned by that
- There is no "best" system out there - They all have their drawbacks
- Some DCC systems do better than others in certain situations, focus on the operation – not the DCC system

If someone wants to debate command control systems after the meeting, be sure to bring your "engineering boxing gloves"……..

WHAT MAKES UP AN OPERATING SESSION?

Operators

- Operators come from all walks of life
- Make a point to introduce yourself if operating on a layout for the first time
- Watch, listen and carefully observe – use your intuition
- Some people train/mentor better than others – don't be afraid to ask to be placed with someone else if you're not "getting it" from a mentor
- Take photos / video (where appropriate) of other operators and the operating process to study later

WHAT MAKES UP AN OPERATING SESSION?

Communications system

- Radios
  - Quick, simple and normally adequate for small, low volume communication needs.
  - FRS (family radio service) is the most popular
  - Fairly good audio quality
  - Some brands and models are better than others
  - Learn how to use them – practice using
  - Stay away from the “Call” or “page” button
  - Look at the radio when transmitting (PTT) – make sure the batteries are good and you’re not talking to a “dead” radio.

WHAT MAKES UP AN OPERATING SESSION?

Communications system (continued)

- Radios (cont.)
  - Some pick up other, nearby radios not associated with the operation
  - If you will be a regular operator on a given layout that uses FRS radios, consider buying a radio and a headset, if available
  - Don't get a radio with all sorts of "bells and whistles"

WHAT MAKES UP AN OPERATING SESSION?

Communications system (continued)

- Phones / intercom
  - Phones at the layout - layout provided
  - Be careful not to stretch cords to far
  - Listen before pressing PTT button or talking
  - Hang up after complete
  - If a phone is called, it's typical practice for any crew who observes a call lamp or bell ringing to answer and then grab the attention of the party being called
  - Don't "overuse" the phone

IN CLOSING….


WHERE THERE'S A WILL
THERE'S A WAY.
GIVE.
ADVOCATE.
VOLUNTEER.
LIVE UNITED

IN CLOSING….


WHERE THERE'S A WILL
THERE'S A WAY.
GIVE.
ADVOCATE.
VOLUNTEER.
comcast
dream big
LIVE UNITED
United Way

IN CLOSING….

IN CLOSING….

IN CLOSING….

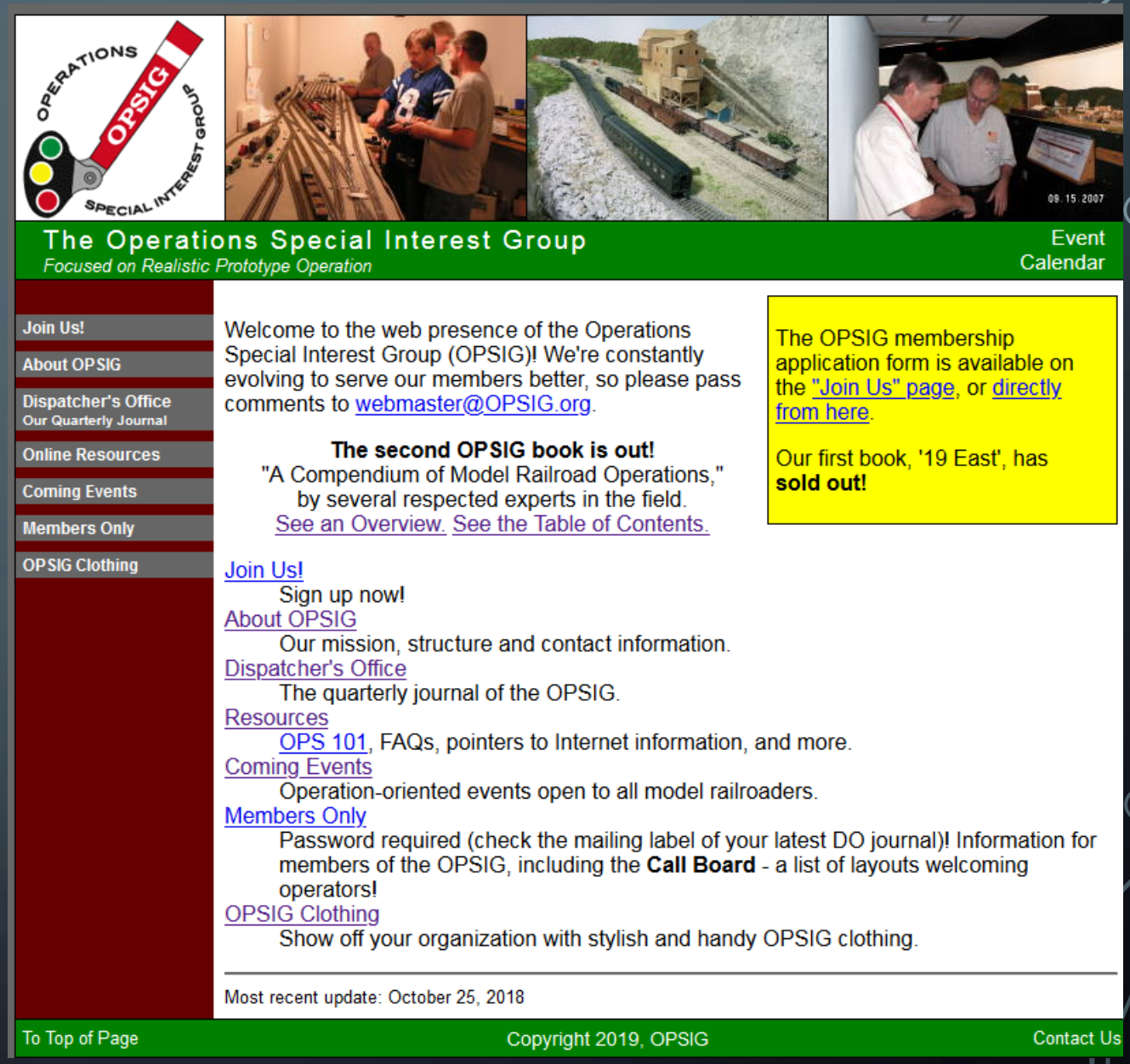
IN CLOSING….

IN CLOSING….

IN CLOSING….

MORE INFORMATION

http://www.opsig.org/



MODULAR, OPERATIONS-BASED LAYOUT

http://www.free-mo.org/

- Based on Free-mo standards
- Prefer it to be 100% Free-mo standards but leg height could be lowered if operating as a lone group
- Free-mo standards encourage the most prototypical fidelity of any standard in use today
- The standard provides for better visual interest and module interfacing is clean and smooth
- At normal standard height, 50’ is more ergonomic and permits easier manipulation of models on and off the layout
- Free-mo has active owners in the Northern Utah area
- The two largest layouts at the 2019 National Train Show were Free-mo (HO & N)

IN THE FUTURE….

- I'm happy to discuss operations
- Do smaller, more intense get-togethers and focus on operations, signaling, switching and other facets of operations
- Work on home layouts to support operations
- Do some "tune-up" sessions to work, repair and tune up rolling stock and motive power
- Get a Decoder Pro users group going and refine DCC programing

QUESTIONS?

THANKS FOR YOUR INTEREST