Collaboration in Regional Civilian and Military Transportation Planning

George S. Carson
GSC Associates
carson@gscassociates.com

Ed Savacool
Enterprise Management Systems, LLC
esavacool@enterprise-management-systems.com

GSC Associates

Outline of Presentation

- The Strategic Mobility 21 (SM 21) Program
- The opportunities:
  - Regional planning
  - Military transportation planning
- Approach
- The Regional Planning Web Portal
- The Military Ship and Rail Load Planning Web Portal
- Future research

Strategic Mobility 21

- R&D effort managed by ONR
- Initial focus on Southern California regions
- Joint Power Projection Support Platform (JPPSP) at the Southern California Logistics Airport (SCLA) near Victorville

Regional planning opportunity

- Long time frames
- Hidden data and assumptions
- Hidden models and analysis tools
- Few alternatives are explored and impacts of all consequences are not evaluated
- Wicked problems

Meeting SM21 military objectives requires new dual-use infrastructure and new processes.

Example from a current report

Exhibit 12 shows the locations of over 1000 regional distribution centers (DCs). The same Ontario/Mira Loma concentration shown in the port survey data is apparent in this map. The study team developed a preliminary analysis of the potential for an inland port/rail shuttle serving this DC concentration as an indication of the overall potential of the inland port concept in reducing truck VM and emissions.

Exhibit 12: Regional Distribution Centers

Military transportation planning opportunity

- Surge deployments impact port operations
- Specific technology and process gaps to fill
- Synergy dual-use infrastructure
- Opportunity to apply commercial technology

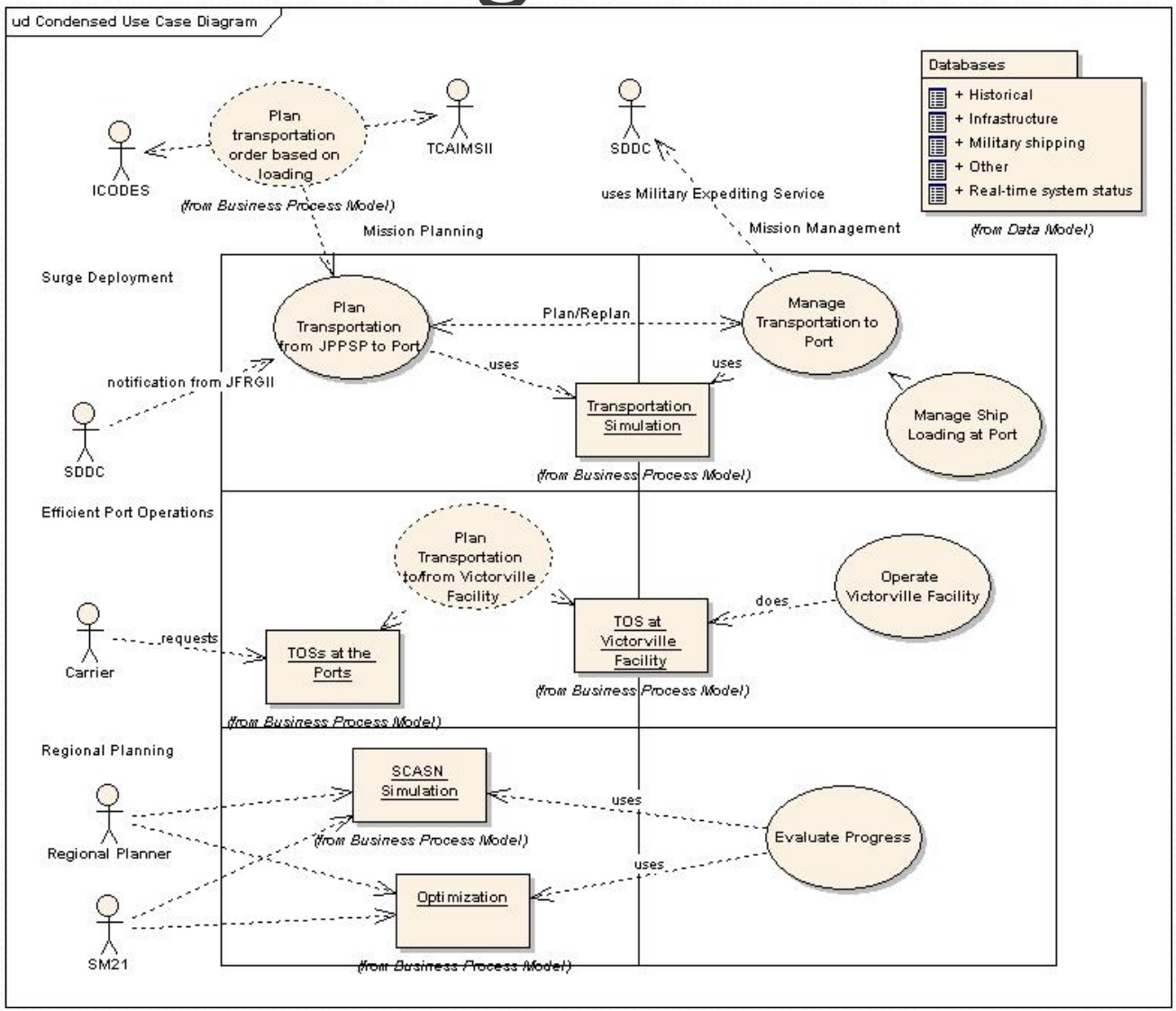
Technical approach

- State of technology
- Business process based tools orientation
- Integration of data, analysis, and presentation
- Integrated geospatial visualization
- Web based: blogs, wikis, natural data formats

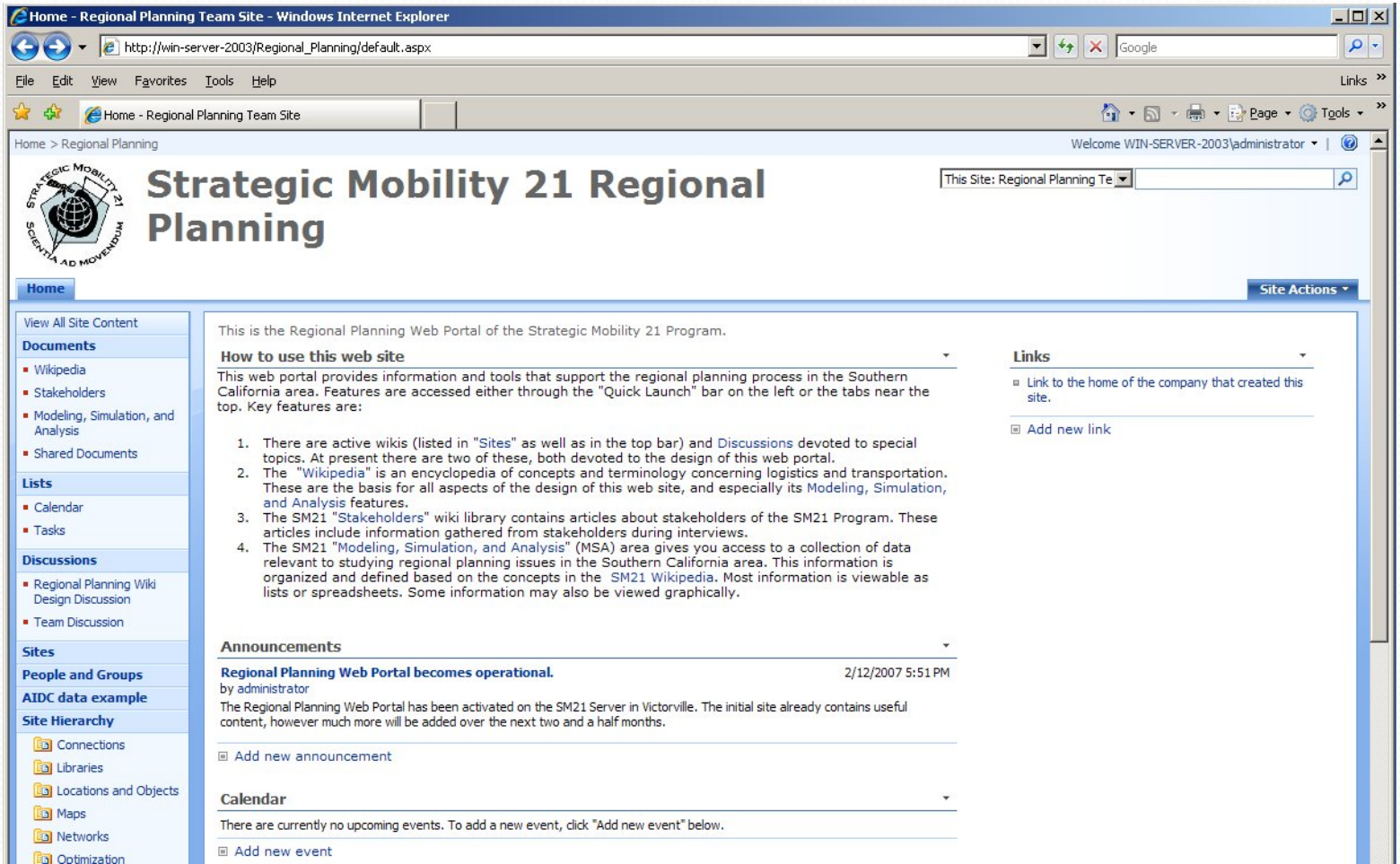
"Technology for technology's sake is nothing. It must be accompanied by skilled people and efficient processes."

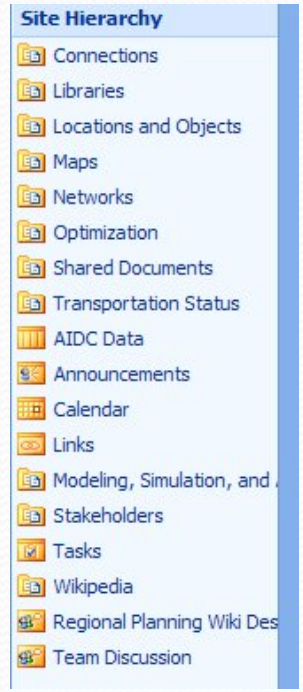
Journal of Commerce, 26 March 2007, page 52

Use case diagram



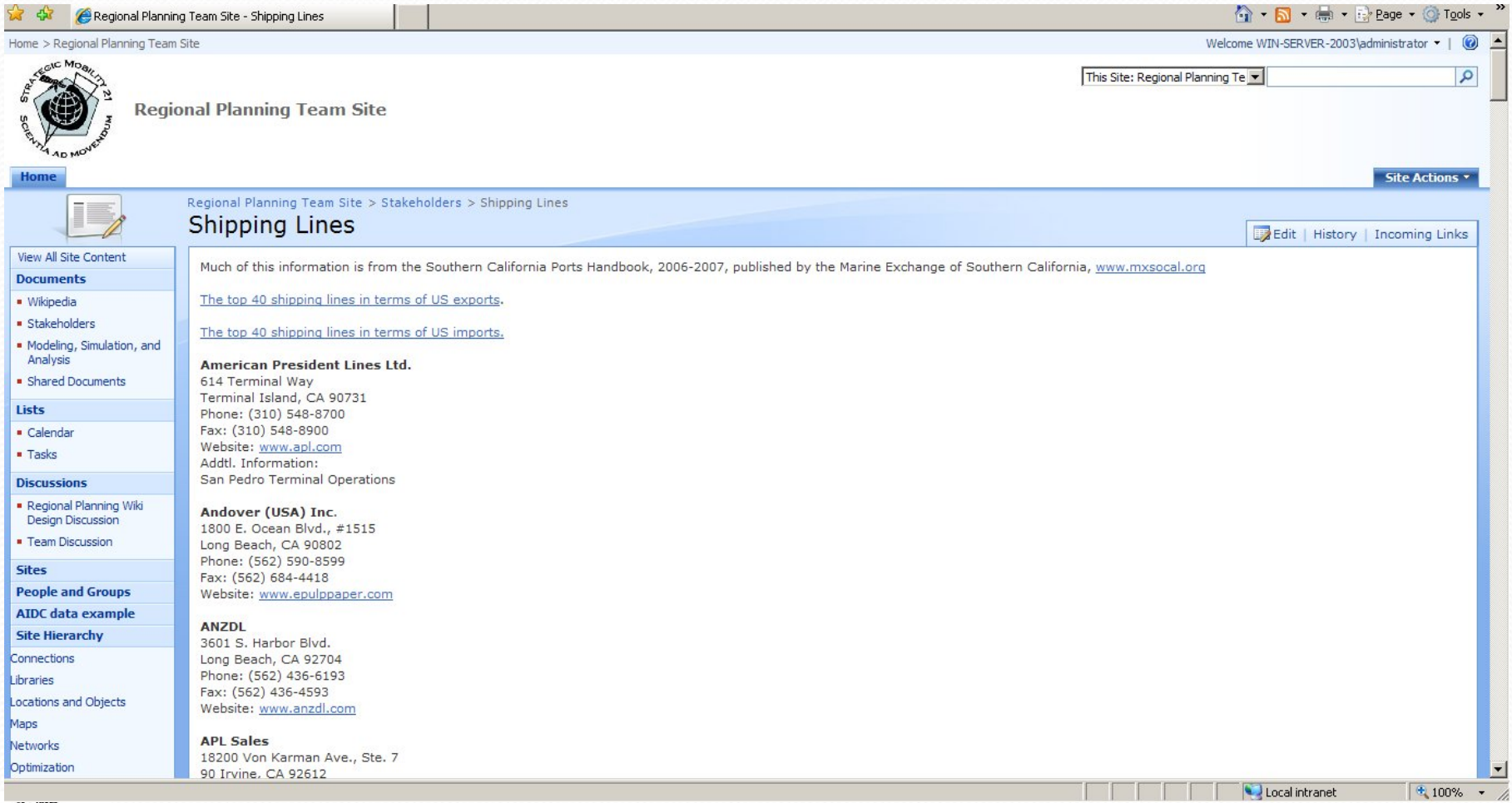
The Regional Planning Web Portal



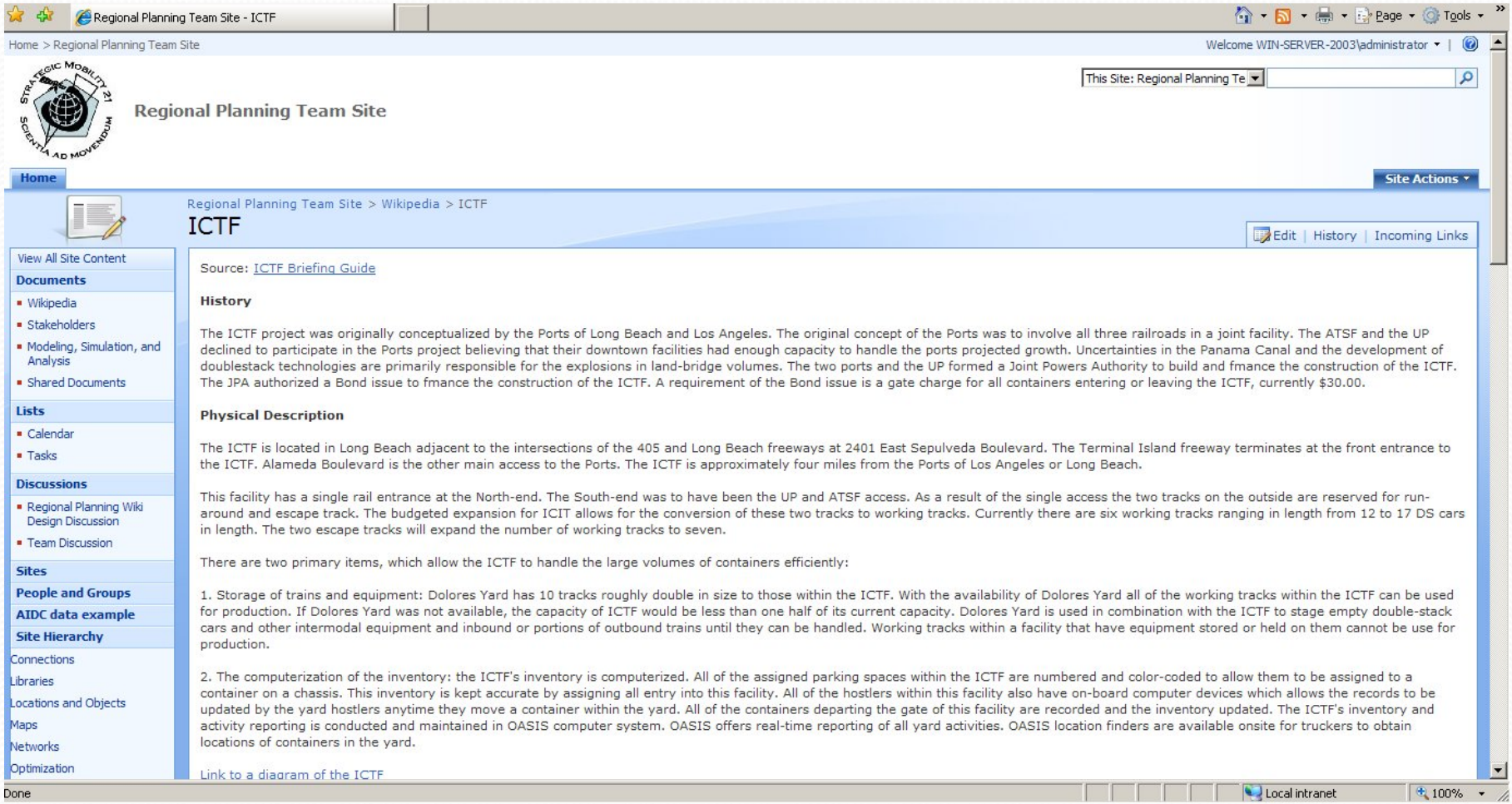


GSC Associates

Example: stakeholder data

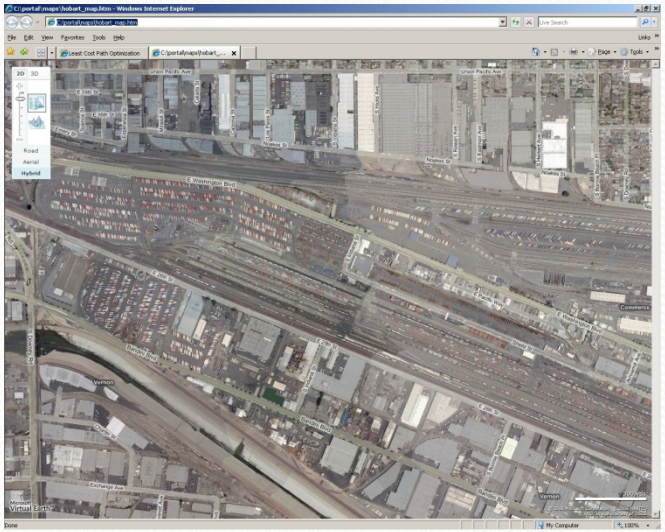


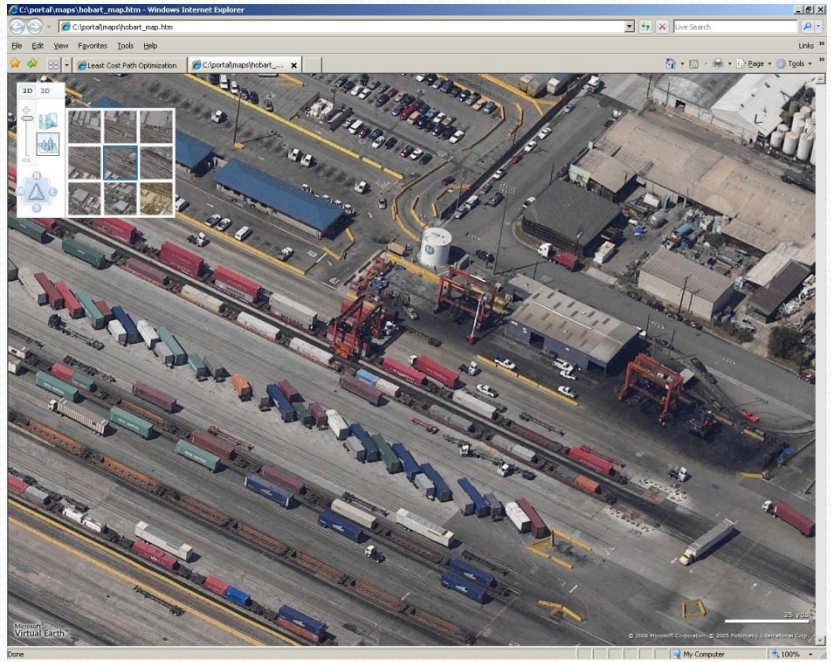
Example: wiki article

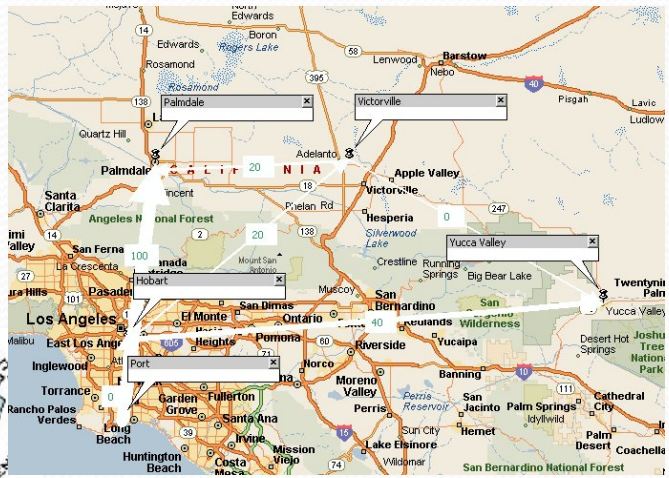


GSC Associates

Geo-spatial visualization







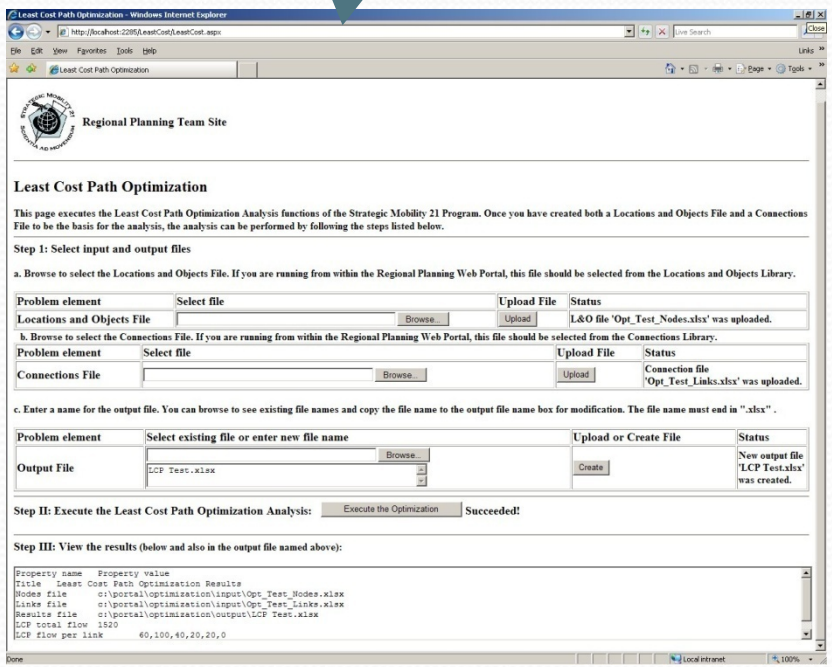
Example: Least Cost Path Optimization

Opt_Test_Nodes.xlsx

	A	B	C	D	E	F	G	H	I	J	K	L
1	Name	Property name	Property value	Property name	Property value	Property name	Property value	Property name	Property value	Property name	Property value	
2	Ports	Node cost	0	Supply/Demand	160	Node capacity UB	200	Node Capacity LB	0	Geolocation	lon=-118.238811, lat=33.756315, datum=WGS84	
3	Hobart	Node cost	0	Supply/Demand	0	Node capacity UB	200	Node Capacity LB	0	Geolocation	lon=-118.205168, lat=34.013112, datum=WGS84	
4	Palmdale	Node cost	0	Supply/Demand	-120	Node capacity UB	200	Node Capacity LB	0	Geolocation	lon=-118.111782, lat=34.576831, datum=WGS84	
5	Yucca Valley	Node cost	0	Supply/Demand	-40	Node capacity UB	200	Node Capacity LB	0	Geolocation	lon=-116.43362, lat=34.101571, datum=WGS84	
6	Victorville	Node cost	0	Supply/Demand	0	Node capacity UB	200	Node Capacity LB	0	Geolocation	lon=-117.292957, lat=34.537672, datum=WGS84	
7												
8												

Opt_Test_Links.xlsx

	C	D	E	F	G	H	I	J	K
1	Start	End	Property name	Property value	Property name	Property value	Property name	Property value	
2	Ports	Hobart	Cost	1	Capacity UB	150	Capacity LB	0	
3	Ports	Palmdale	Cost	9	Capacity UB	100	Capacity LB	0	
4	Hobart	Yucca Valley	Cost	8	Capacity UB	60	Capacity LB	0	
5	Hobart	Victorville	Cost	9	Capacity UB	100	Capacity LB	0	
6	Victorville	Palmdale	Cost	3	Capacity UB	100	Capacity LB	0	
7	Victorville	Yucca Valley	Cost	5	Capacity UB	60	Capacity LB	0	
8									
9									



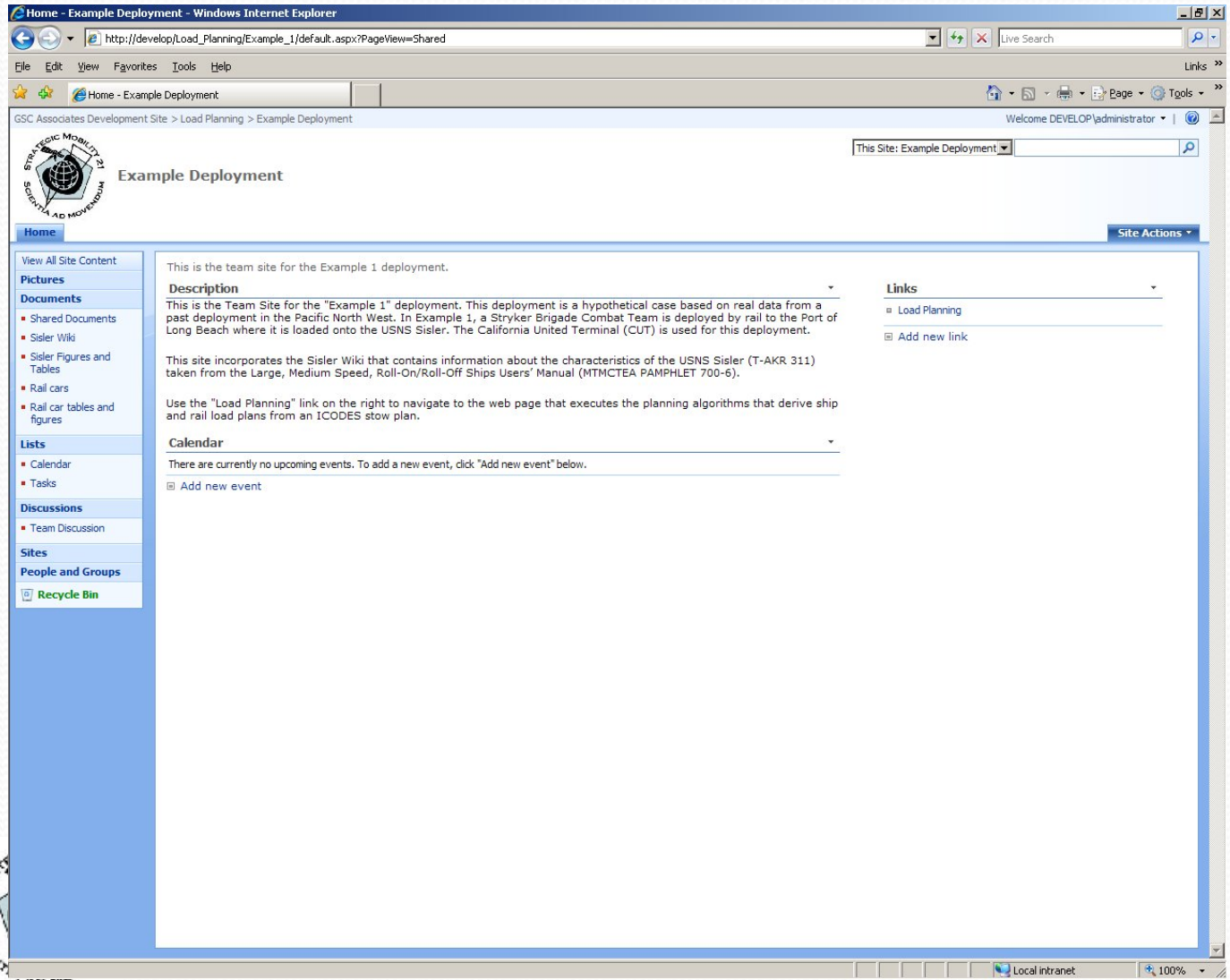
LCP Test.xlsx

	A	B	C
1	**Property name**	**Property value**	
2	Title	Least Cost Path Optimization Results	
3	Nodes file	c:\portal\optimization\input\Opt_Test_Nodes.xlsx	
4	Links file	c:\portal\optimization\input\Opt_Test_Links.xlsx	
5	Results file	c:\portal\optimization\output\LCP Test.xlsx	
6	LCP total flow	1520	
7	LCP flow per link	60,100,40,20,20,0	
8			

The Military Ship and Rail Load Planning Web Portal

- Apply today's collaboration, planning, and algorithm technologies
- Selective process improvements
- Adapt legacy systems (SOA?)
- Fill gaps with existing technologies, new algorithms, and process revisions
- Support building a JPPSP in Victorville

Example deployment



Rail car wiki

Example Deployment - Home - Windows Internet Explorer

http://develop/Load_Planning/Example_1/Rail%20cars/Home.aspx

File Edit View Favorites Tools Help

Example Deployment - Home

GSC Associates Development Site > Load Planning > Example Deployment

Welcome DEVELOP\administrator

This Site: Example Deployment

Example Deployment

Home

Site Actions

Example Deployment > Rail cars > Home

Home

Edit | History | Incoming Links

View All Site Content
Pictures
Documents
- Shared Documents
- Sisler Wiki
- Sisler Figures and Tables
- Rail cars
- Rail car tables and figures

Lists
- Calendar
- Tasks

Discussions
- Team Discussion

Sites
People and Groups
Recycle Bin

Recent Changes
- Home
- How To Use This Wiki Library

View All Pages

Welcome to the Rail Car wiki library!

You can get started and add content to this page by clicking **Edit** at the top of this page, or you can learn more about wiki libraries by clicking How To Use This Wiki Library.

Extracted from Tiedown Handbook For Rail Movements (TEA PAM 55-19)

Section IX. Flatcar Types

A relatively few types of chain-equipped flatcars serve the bulk of the military's needs. Flatcar lengths fall into two main categories: 60 to 68 feet and 89 feet. The shorter cars are typically about 10 to 10-1/2 feet wide and the 89-foot cars are 9 to 9-1/2 feet wide. Most of the commercial flatcars are nominally 70-ton capacity cars, while the DOD-owned cars (DODX) are 100-ton cars for the DODX 41000- and 42000-series (figs 16 and 17) and 140-ton cars for the DODX 40000-series (fig 18). The weight each flatcar can actually carry, and which you must not exceed, is stenciled on the side as the load limit (LD LMT). Additional information is published in MIL-STD-1366 available at http://assist2.daps.dla.mil/quicksearch/ or at https://www.tea.army.mil/pubs/res/deploy/transinstruction/MIL-STD-1366D.pdf starting on page 17.

Among the commercial flatcars, the majority are owned by TTX Company with the others being owned by the various railroads. The OTTX (fig 19), most ITTX (fig 20), and similar flatcars are equipped with 3/8-inch chains, which are suitable for the generally lighter military vehicles. The HTTX (fig 21), TTDX (fig 22), and some ITTX cars are equipped with 1/2-inch chains suitable for all military vehicles that will fit on each car type. These TTX cars will reach the end of their 50-year life and will be scrapped around 2015.

Figure 19. OTTX 60-foot flatcar.

B. FLATCAR SUPPLY

1. You will likely encounter both DODX and non-DODX flatcars.
2. DODX 40000-series flatcars (6-axle, 68') can carry two heavy tracked vehicles and DODX 41000-series flatcars (4-axle, 68') can carry one; these are the only flatcars authorized to carry heavy tracked vehicles. Their 68-foot length also makes them useful to carry tractortrailer combinations such as the HET and the Patriot.
3. DODX 40000-, 41000-, and 42000-series (4-axle, 89') flatcars all have 1/2-inch chain tiedown assemblies for vehicles and container attachment points for 20-foot ISO containers. DODX 48000-series flatcars (4-axle, 89') have only container attachment points.

Done

Local intranet

100%

GSC Associates

Example: Ship Load Planning

Shughart.xls

	A	B	C	D	E	F
1	Ship	Stow Area	Model Number	Description	Bumper Number	TCN
298	USNS SHUGHART v.2006074	2BDX	M1129E	MORTAR CARR/STRYKER	HHC93	AWH9ST0$0D00610XX
299	USNS SHUGHART v.2006074	2BDX	M1130	COMMAND VEH/STRYKER	HQ28	AWJHST0$0D00140XX
300	USNS SHUGHART v.2006074	2BDX	M1130	COMMAND VEH/STRYKER	HQ63	AWH9ST0$0D00180XX
301	USNS SHUGHART v.2006074	2BDX	M1131	FIRE SUPT	B71	AWH9QB0$0D00710XX
302	USNS SHUGHART v.2006074	2BDX	M1133	MED EVAC VEH/STRYKER	HQ79	AWASMT0$0D00110XX
303	USNS SHUGHART v.2006074	2BDX	XM1126	INF CARR VEH/STRYKER	NBN	AWH9SA0$0D04240XX
304	USNS SHUGHART v.2006074	2BDX	XM1126	INF CARR VEH/STRYKER	B75 (2-1	AWH9SA0$0D04300XX
305	USNS SHUGHART v.2006074	2BDX	XM1126	INF CARR VEH/STRYKER	NBN	AWH9SA0$0D04320XX
306	USNS SHUGHART v.2006074	2BDX	XM1130	COMMAND VEH/STRYKER	HQ88 (BD	AWD8XAA$0D04270XX
307	USNS SHUGHART v.2006074	2BDX	XM1132	ENG SQD VEH/STRYKER	EN 213	AWD77AA$0D04250XX
308	USNS SHUGHART v.2006074	2BDX	XM1133	MED EVAC VEH/STRYKER	HQ73(1-1	AWH9QT0$0D04280XX

	A	B	C
1	**Property name**	**Property value**	
2	Ship file	Sisler decks and holds.xlxs	
3	Terminal file	POLB CUT.xlsx	
4	Equipment file	Example 1 v1 equipment list.xlsx	
5	Rail cars file	Example 1 v1 rail.xlsx	
6	Hoist cargo delay	0	
7	Upper decks delay	5	
8			

	A	B	C	D	E	F	G
1	Reference Number	Deck Name	Hold Name	ICODES Stow Area	WP Load Area	WP Flow Path Order	
2	45	G Deck	4	4GDX	G Deck Hold 4 Port	2	
3	45	G Deck	4	4GDX	G Deck Hold 4 Starboard	3	
4	44	Ramp G To F	3	3RGF	Ramp G To F Hold 3	7	
5	43	G Deck	3	3GDX	G Deck Hold 3 Port	1	
6	43	G Deck	3	3GDX	G Deck Hold 3 Starboard	4	
7	42	G Deck	2	2GDX	G Deck Hold 2 Port	6	
8	42	G Deck	2	2GDX	G Deck Hold 2 Starboard	5	
9	41	F Deck	4	4FDX	F Deck Hold 4 Port	9	
10	41	F Deck	4	4FDX	F Deck Hold 4 Starboard	11	
11	40	Ramp F To E	3	3RFE	Ramp F To E Hold 3	16	
12	39	F Deck	3	3FDX	F Deck Hold 3 Port	8	

Least Cost Path Optimization - Windows Internet Explorer

http://localhost:2285/LeastCost/LoadPlanning.aspx

File Edit View Favorites Tools Help

Least Cost Path Optimization

Load Planning Team Site

Load Planning

This page executes the Load Planning functions of the Strategic Mobility 21 Program. The only required input data is a Deployment File that contains links to all the other data needed to plan the rail and ship loading, including the Ship Stow Plan (from ICODES), the associated Ship Configuration File (created from TEA data), the Rail Transportation Plan (from TC-AIMSII), and the Terminal File. The Output file is automatically named based on the name of the Deployment File.

Step I: Select deployment

a. Browse to select the Deployment File. If you are running from within the Regional Planning Web Portal, this file should be selected from the Deployment Library.

Problem element	Select file	Upload File	Status
Deployment File	Browse...	Upload	L&O file 'Example 1 v1.xlsx' was uploaded.

Step II: Execute the Load Planning Function: Plan the Loading

Step III: View the results (below and also in the output file):

```
The Load Planning function was successfully executed.
Output file Example 1 v1 Output.xlsx was created
```

Done Local intranet 100%

	C	D	E	F	G	H	I	J	K	L
1	Description	Quantity	Area sq.feet	POD	POE	Symbol Name	UIC	UIC Noun	WP Load Area	WP Load order
2	TRK UTIL, HVY HMMWV	1	121	PN3	###	SMTK00001	FFHNV0		F Deck Hold 1 Starboard	10
3	CHASSIS,TRAILER CARG	1	84	PN3	###	LGTR00039	FFHNV0		F Deck Hold 1 Port	12
4	TRUCK UTILITY 4X4	1	112	PN3	###	SMTK00001	FFHNV0		F Deck Hold 3 Starboard	13
5	TRUCK UTILITY 4X4	1	112	PN3	###	SMTK00001	FFHNV0		Ramp F To E Hold 3	16
6	TRK UTIL, HVY HMMWV	1	114	PN3	###	SMTK00001	FFHNV0		E Deck Hold 4 Port	18
7	GEN SET GED TLR MTD	1	76	PN3	###	LGTR00038	FFHNV0		E Deck Hold 4 Starboard	20
8	TRK UTIL, HVY HMMWV	1	114	PN3	###	SMTK00001	FFHNV0		Ramp E To D Hold 3	25
9	TRK UTIL CRG/TRP CAR	1	125	PN3	###	SMTK00001	FFHNV0		D Deck Hold 1 Starboard	31
10	TRK UTIL CRG/TRP CAR	1	114	PN3	###	SMTK00001	FFHNV0		D Deck Hold 1 Port	32
11	TRUCK CARGO TACTICAL	1	134	PN3	###	SMTK00008	W27P21	W27P PEO	G Deck Hold 4 Port	2
12	TRUCK CARGO TACTICAL	1	134	PN3	###	SMTK00008	W27P21	W27P PEO	G Deck Hold 4 Starboard	3
13	TRAILER CARGO 3/4-TO	1	76	PN3	###	SMTR00019	W27P21	W27P PEO	G Deck Hold 2 Port	6
14	GENERATOR SET	1	74	PN3	###	LGTR00038	W27P21	W27P PEO	F Deck Hold 3 Port	8

STRATEGIC MOBILITY 21 SCIENTIA AD MOVENDUM

GSC Associates

Future research

- Apply the Load Planning Web Portal to an upcoming deployment
- Add to datasets, wikis, and tools
- Apply the Regional Planning Web Portal to several specific regional issues
- Add rail operation planning to the Load Planning Web Portal
- Study wiki use by communities of interest in “solving” wicked problems