

# USSOUTHCOM



Miami, Florida

## SCJ5-PAS Modeling, Simulation, and Analysis Support To USSOUTHCOM

LTC Saul A Grandinetti

Overall Classification Of  
This Briefing:  
**UNCLASSIFIED**

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# Purpose

**Present USSOUTHCOM J5-PAS  
State Of The Union Brief**

**Industry Days  
2-5 June 1999**

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# Agenda



- **USSOUTHCOM AOR And Mission**
- **J5-PAS Mission And Organization**
- **TOOLS**
  - **Description**
  - **Examples Of Use**
  - **Evaluation**
- **Future Outlook**

# USSOUTHCOM AOR



## SHAPE

**A Stable, Prosperous,  
Democratic Region Cooperating  
To Achieve Mutual Interests**

## RESPOND

**An Effective Capability And  
Will To Respond To  
Theater Challenges And  
Support Counter Drug  
Operations**

## PREPARE

**Postured To Capitalize  
On Future Opportunities**

## EXECUTE

**Accomplishing USSOUTHCOM's Mission**

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# USSOUTHCOM Mission



**USSOUTHCOM Shapes The Environment Within Its Area Of Responsibility By Conducting Theater Engagement And Counterdrug Activities In Order To Promote Democracy, Stability And Collective Approaches To Threats To Regional Security: When Required Responds Unilaterally Or Multilaterally To Crisis That Threaten Regional Stability Or National Interests, And Prepares To Meet Future Hemispheric Challenges.**

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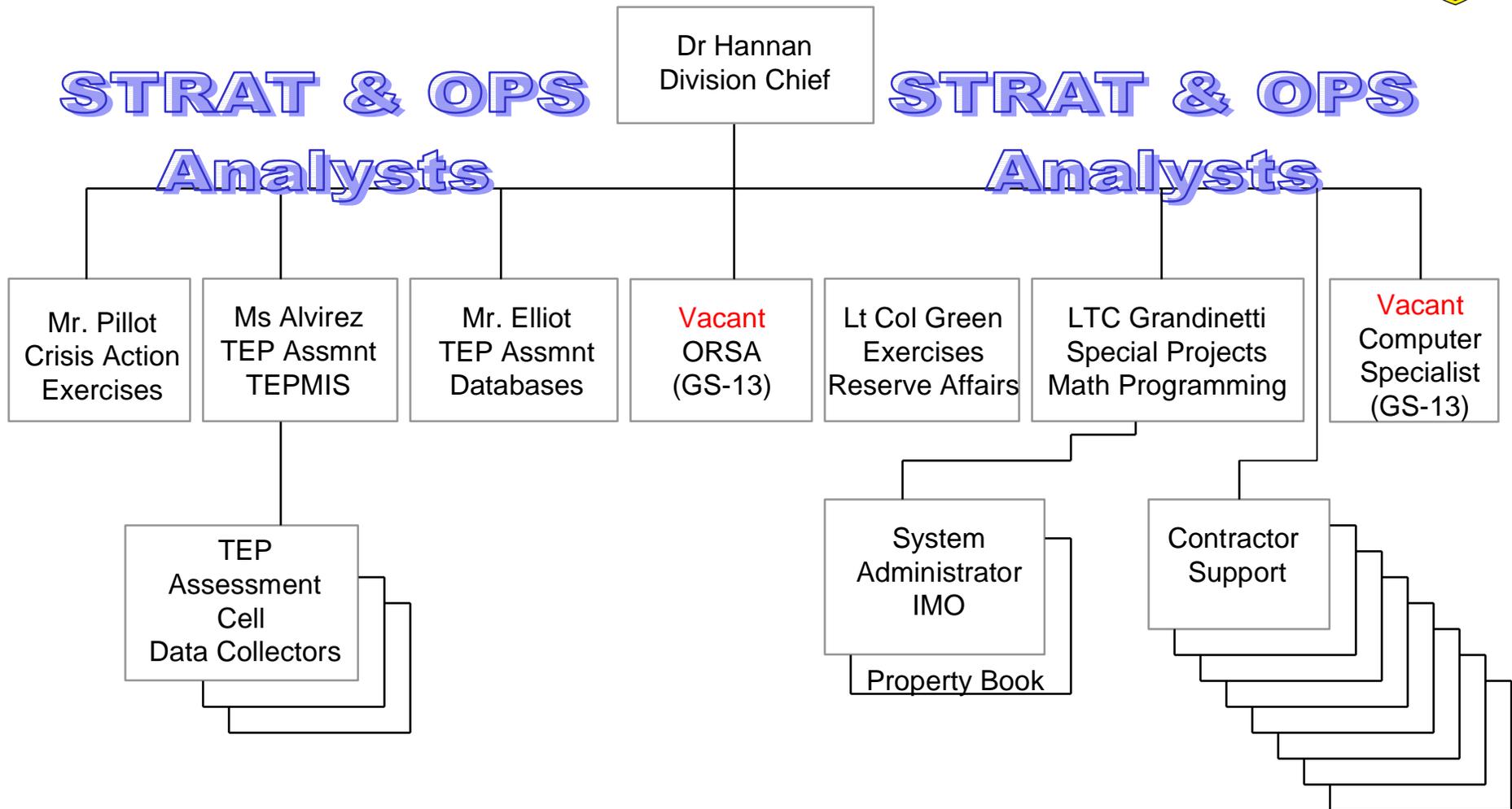
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# PAS Mission



- **Provide Modeling Simulation And Analysis Oversight And Support To CINC, Staff, And Components In:**
  - **Theater Engagement Planning**
  - **Deliberate Planning**
  - **Crisis Action Planning**
  - **Exercise Program**
  - **Special Projects**

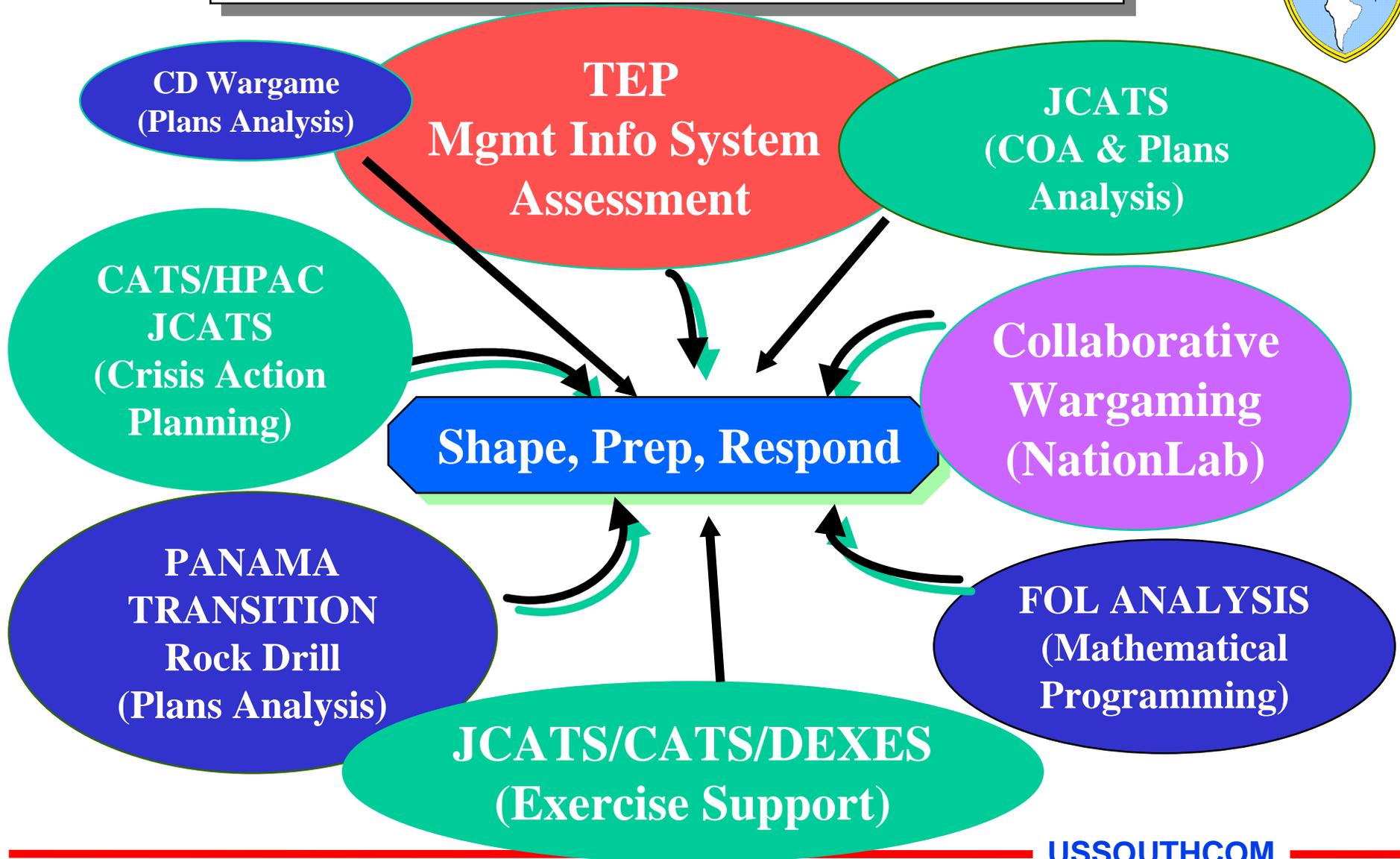
# PAS Organizational Chart



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# Types Of Missions



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# Tools

- **EXCEL**                      **Spreadsheet**
- **CATS**                      **Consequences Assessment Tool Set Model**
- **JCATS**                      **Joint Conflict And Tactical Simulation Model**
- **DEXES**                      **Deployable Exercise System**
- **NATIONLAB**              **Custom Model (STELLA Software)**

# EXCEL Spread Sheet



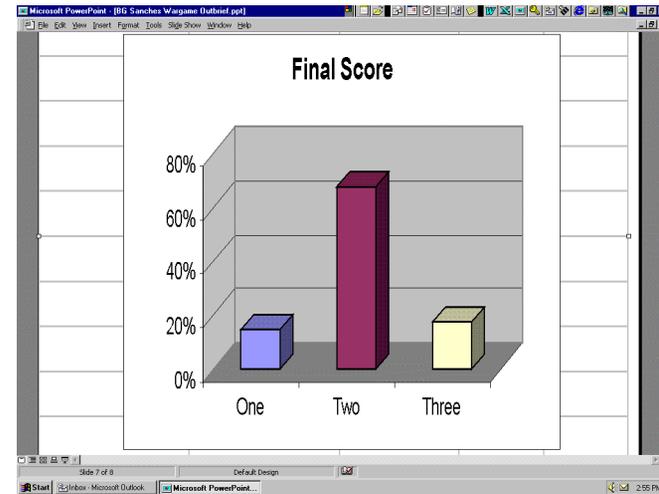
- **Real World Support And Analysis**
  - **Panama Transition ROCK Drill Analysis**
  - **Course Of Action Comparisons**
  - **Forward Operating Location Analysis**
  - **Other**



# COA Comparison



<u>Verbal Preference</u>	<u>Rating</u>
<b>Extremely preferred</b>	<b>9</b>
<i>Very strongly to extremely</i>	<b>8</b>
<b>Very strongly preferred</b>	<b>7</b>
<i>Strongly to very strongly</i>	<b>6</b>
<b>Strongly preferred</b>	<b>5</b>
<i>Moderately to strongly</i>	<b>4</b>
<b>Moderately preferred</b>	<b>3</b>
<i>Equally to moderately</i>	<b>2</b>
<b>Equally preferred</b>	<b>1</b>



<u>Final Score</u>						
	<u>Attribute #1</u>	<u>Attribute #2</u>	<u>Attribute #3</u>	<u>Attribute #4</u>	<u>Attribute #5</u>	<u>Final Score</u>
<b>One</b>	7%	7%	22%	7%	9%	15%
<b>Two</b>	70%	74%	69%	66%	62%	68%
<b>Three</b>	23%	19%	9%	27%	29%	17%
<b>Total</b>	100%	100%	100%	100%	100%	100%

# FOL Analysis



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	All	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5	Zone #6	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5	Zone #6	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5	Zone #6
3	Aircraft / Location	FOL#1	FOL#1	FOL#1	FOL#1	FOL#1	FOL#1	FOL#2	FOL#2	FOL#2	FOL#2	FOL#2	FOL#2	FOL#3	FOL#3	FOL#3	FOL#3	FOL#3	FOL#3
4	C-130	4.667	3.333333	2	8	4.6667	3.33333	4	6.6667	0.6667	7.3333	5.3333	4.6667	3.3333	6	0	6.6667	6	4.6666667
5	C-141	7.429	6.285714	5.142857	10.2857	7.4286	6.28571	6.8571	9.1429	4	9.7143	8	7.4286	6.2857	8.57143	3.4286	9.1429	8.57143	7.4285714
6	C5	7.6	6	4.4	11.6	7.6	6	6.8	10	2.8	10.8	8.4	7.6	6	9.2	2	10	9.2	7.6
7		19.7	15.61905	11.54286	29.8857	19.695	15.619	17.657	25.81	7.4667	27.848	21.733	19.695	15.619	23.7714	5.4286	25.81	23.7714	19.695238
8																			
10	Coverage Per Sortie		C-130					C-141					C5						
11	From/To	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5	Zone #6	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5	Zone #6	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5	Zone #6
12	FOL#1	4.667	3.333333	2	8	4.6667	3.33333	7.4286	6.2857	5.1429	10.286	7.4286	6.2857	7.6	6	4.4	11.6	7.6	6
13	FOL#2	4	6.666667	0.666667	7.33333	5.3333	4.66667	6.8571	9.1429	4	9.7143	8	7.4286	6.8	10	2.8	10.8	8.4	7.6
14	FOL#3	3.333	6	0	6.66667	6	4.66667	6.2857	8.5714	3.4286	9.1429	8.5714	7.4286	6	9.2	2	10	9.2	7.6
15	FOL#4	2.667	5.333333	0	6	6.6667	4	5.7143	8	2.8571	8.5714	9.1429	6.8571	5.2	8.4	1.2	9.2	10	6.8
16	FOL#5	2	4.666667	0	5.33333	7.3333	4	5.1429	7.4286	1.7143	8	9.7143	6.8571	4.4	7.6	0	8.4	10.8	6.8
17	FOL#6	1.333	4	0	4.66667	8	4	4.5714	6.8571	0.5714	7.4286	10.286	6.8571	3.6	6.8	0	7.6	11.6	6.8
18																			
20	Number Of Sorties ?		C-130					C-141					C5						
21	From/To	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5	Zone #6	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5	Zone #6	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5	Zone #6
22	FOL#1	0	0	0	0	0	0	15.941	0	4.6667	0	0	0	5.9975	0	0	3.5172	0	0
23	FOL#2	0	0	0	0	0	0	0	0	0	0	0	3.3923	0	1.2	0	0	0	0
24	FOL#3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	FOL#4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	FOL#5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	FOL#6	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	17.2853
28																			
29	Total					Total	18					Total	24					Total	28
30	Max					Max	18					Max	24					Max	28
31																			
33	Total Coverage		C-130					C-141					C5						
34	From/To	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5	Zone #6	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5	Zone #6	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5	Zone #6
35	FOL#1	0	0	0	0	0	0	118.42	0	24	0	0	0	45.581	0	0	40.8	0	0
36	FOL#2	0	0	0	0	0	0	0	0	0	0	0	25.2	0	12	0	0	0	0
37	FOL#3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	FOL#4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	FOL#5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	FOL#6	0	0	0	0	144	0	0	0	0	0	0	0	0	0	0	0	0	200.509
41																			
43			C-130					C-141					C5						
44	Calculated Coverage	0	0	0	0	144	0	118.42	0	24	0	0	25.2	45.581	12	0	40.8	200.509	0
45																			
46																			
47																			
48						Total Required Coverage	164	12	24	40.8	344.51	25.2		Total					
49						Additional Coverage	164	12	24	40.8	42	25.2		610.51					
50							7E-10	2.3E-11	6E-13	6E-10	302.51	-1E-09		HRS					
51																			
52																			
53																			
54																			

# EXCEL Spreadsheet



- **Strengths Of Tool:**
  - User Friendly
  - Quickly Solves Small Mathematical Problems (Solver)
  - Easily Adaptable To Graphical Displays
- **Weaknesses Of Tool:**
  - Limited Modeling Capabilities
  - Limited Flexibility
- **Challenges Of Employment/Operations:**
  - Recognition Of Tool's Potential
  - Understanding Existing Models
  - Maintaining Proficiency In Modeling

# Consequence Assessment Tool Set (CATS)



- **Real World And Training Support Analysis**
- **Predicts and Displays the Damages, Casualties, and Effects Of:**
  - **Natural Disasters**
  - **Man-made Disasters**
- **Developed by U.S. Federal Emergency Management Agency (FEMA)  
And U.S. Defense Special Weapons Agency (DSWA)**

# CATS



- **Combines State-of-art Hazard Forecasting Algorithms, Graphics And Weather Inputs**
  - **Eg, Estimates Damages In Hurricane's Projected Path**
- **Processes Databases Including Population Density, Terrain Elevation, Road Systems, Airfields to:**
  - **Forecast And Display Number Of Displaced Personnel**
  - **Forecast And Display Damages To Structures**
  - **Identify Airfields, Hospitals, Etc. (Staging Operations)**

# CATS



- **Near Real-time Information**
- **Crisis Action Team**
  - **Expected Time Of Hurricane Over Population Centers**
  - **Expected Damage (Graphically)**
- **OPG**
  - **Closest Relief Sites To The Damage Area**
  - **Determine Size Of JTF**
  - **Forecast Relief Supplies Needed**
- **Alert MILGP - Prepare Request For Assistance**

# CATS



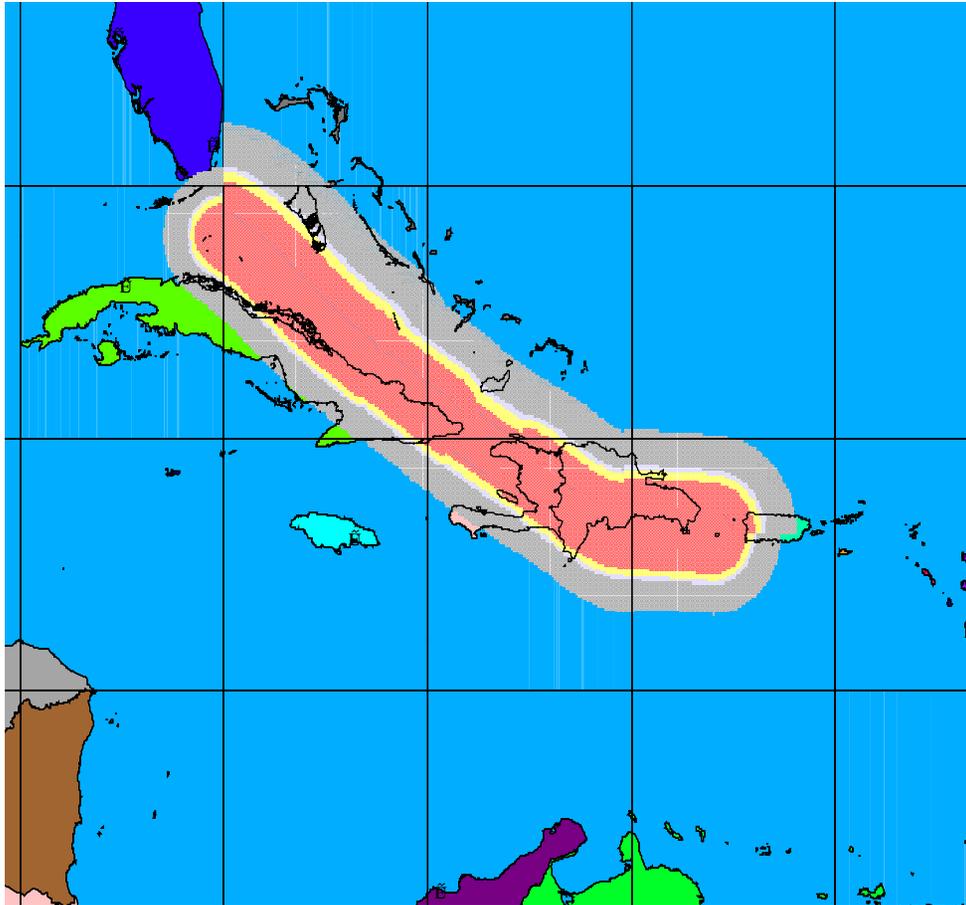
- **Hurricane Georges**
- **Hurricane Mitch**
- **Blue Advance 98**
- **Other**

# Hurricane Georges (Track #28)



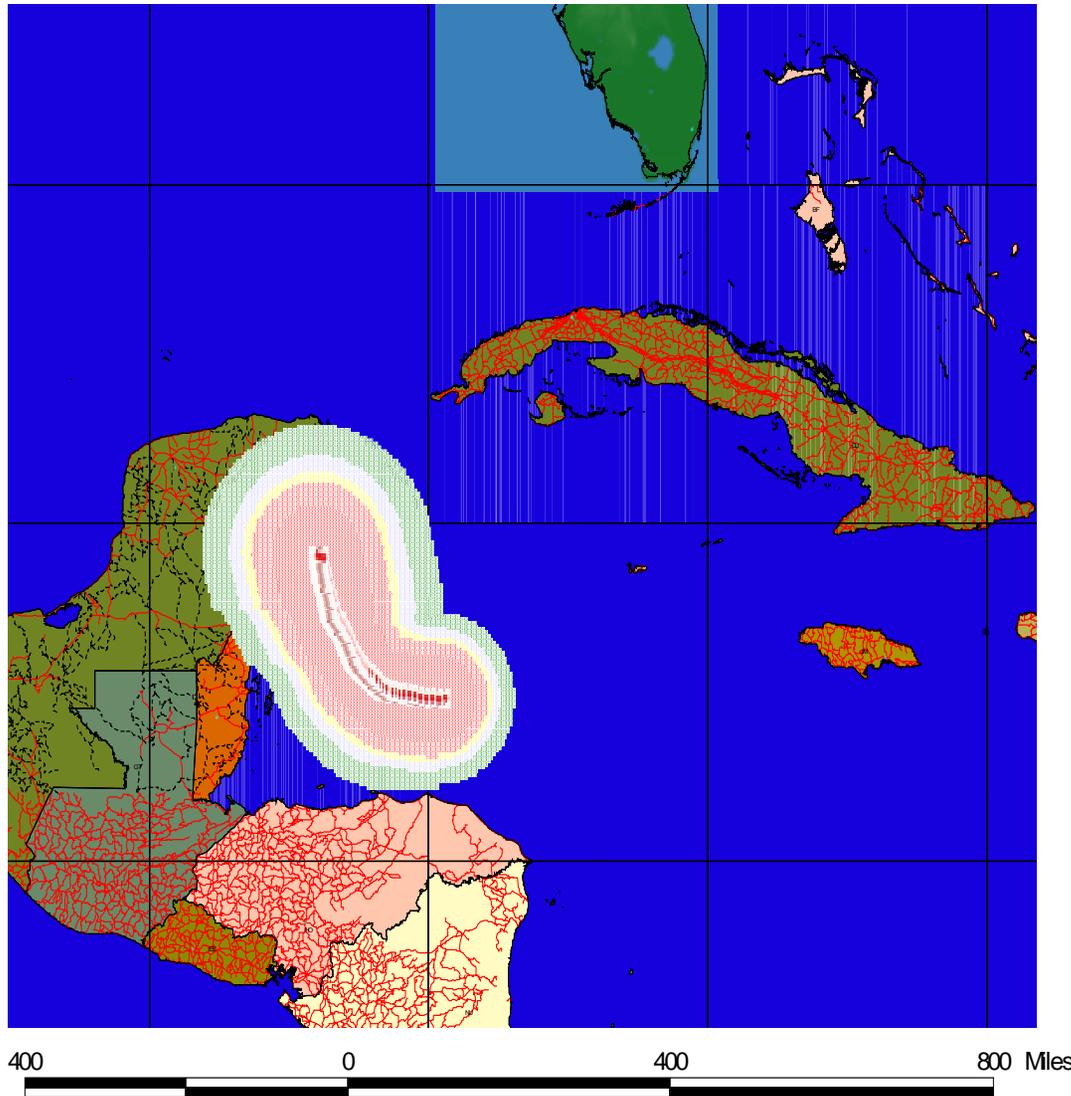
**All Times Are Local**

# Projected Affected Population



	<u>Displaced</u>
Haiti	3,305,494
Dom Rep	3,899,398
Puerto Rico	1,880,321
Virgin Islands	57,627
Antigua/Barbuda	42,997
<i>Total:</i>	<b>9,185,837</b>

# HURRICANE MITCH



0900Z 27 OCT 98  
WS=155KT GUSTS=185KT

LOC= 17.4N 84.8W  
SPEED 7KT DIR 270 DEGREES

# CATS



- **Strengths Of Model**
  - **Graphical Display Of Data**
  - **Intervals Of Information**
  - **Display Of Relief Centers Compared To Disaster Site**
  - **Tied To Real Time Weather Data**
- **Weaknesses Of Model**
  - **No Water Damage Or Surge Module**
- **Challenges Of Employment/Operations**
  - **Exploit Model's Potential (Getting Ahead Of Disaster Onset Prevent vs Rehabilitate, Push vs Pull Of Relief Supplies)**
  - **Unavailability Of Infrastructure Databases**

# Joint Conflict And Tactical Simulation Model (JCATS)



- **Joint (Air/Land/Sea), Multisided, Entity level, High Resolution Model**
- **Effective Tool For Training, Analysis, and Mission Planning and Rehearsal**
- **Decision Maker Can “See” The Scenario and Run Possible Alternatives (Courses Of Action)**
- **Developed by Lawrence Livermore National Laboratory**

# JCATS



- **Real World And Training Support Analysis**
  - **Blue Advance 99**
  - **PKO South 99**
  - **Real World NEO And CT Operations**

# JCATS



- **Advantages**
  - **Allows Detailed Modeling Of Small Group Tactics In Rural And Urban Terrain**
  - **Dynamic Aggregation/De-Aggregation Of Units During The Exercise**
  - **Multi-sided, Including “Grey” (Civilian Factions)**
  - **Detailed Line Of Site Calculations At Entity level**
- **Disadvantages**
  - **Data Bases Built By Hand**
  - **Requires Addition Of Civil Affairs Module**
- **Challenges of Employment/Operations**
  - **Unavailability Of Data Bases**
  - **Lack Of Infrastructure Data Bases**
  - **Asset Intensive**
  - **Linkage Of JCATS To Civil Affairs Module**

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# Deployable Exercise System (DEXES)



- **Models The Impact Of MOOTW On:**
  - **Political Variables**
  - **Economic Variables**
  - **Socio-cultural Variables**
  - **Public Health Variables**
- **Adaptable For**
  - **Country**
  - **Group Of Countries**
  - **Region**
  - **Political Faction**
- **Developed For USSOUTHCOM By Corrales Software Inc.**

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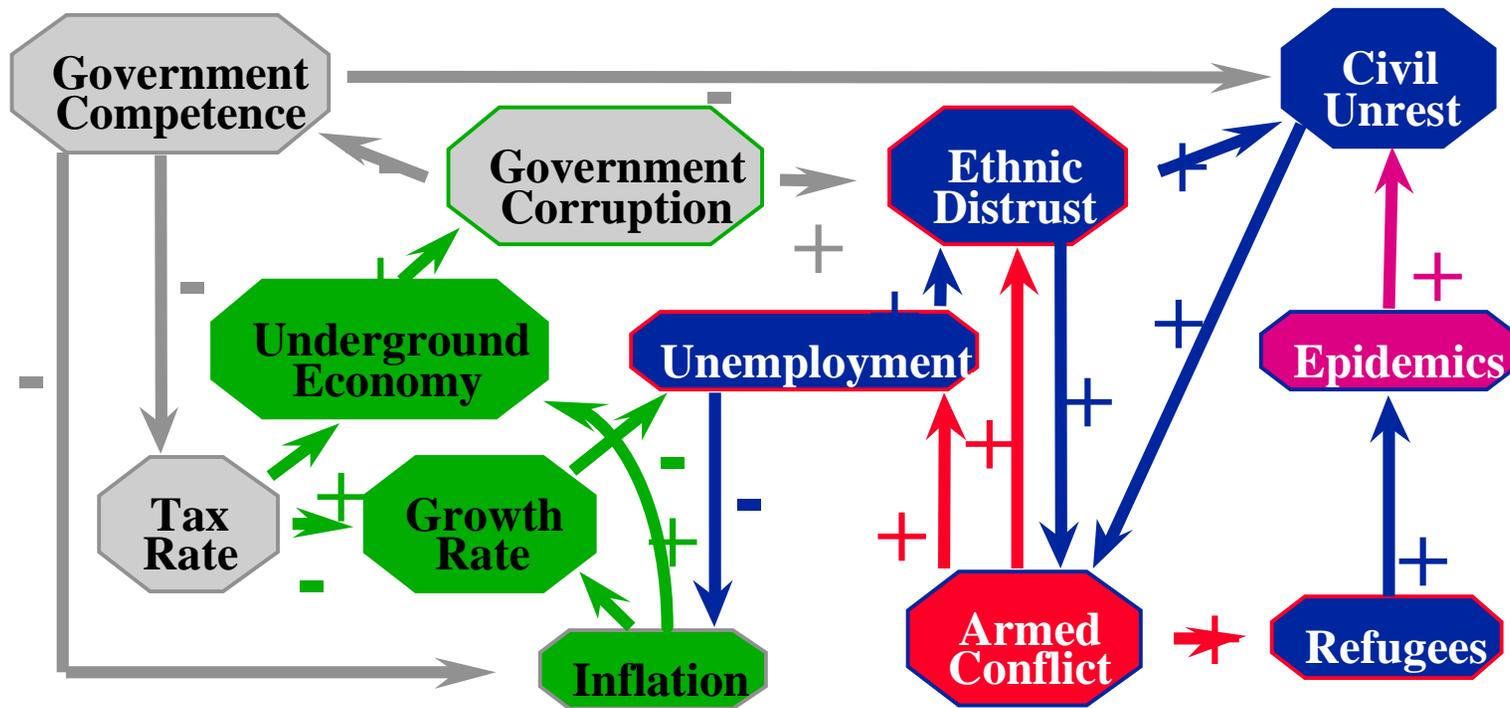
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# DEXES



- **Training Support And Analysis**
  - **PKO South 99**
  - **FAHum 99**

# DEXES



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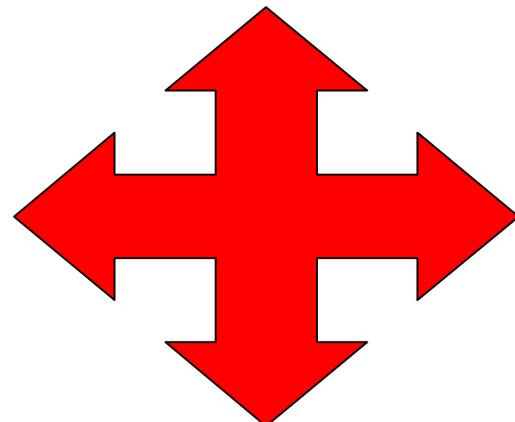


**DEXES**

**EVENTS FLOW**

**CONTROL GROUP**  
**DIRECTOR & SNR ROLE PLAYER**      **OPERATIONS CELL**

**DEXES**  
**TIME JUMP**



**TRAINING AUDIENCE**  
**UN FORCE, BRIGADE & BATTALION HQTRS**  
**EXECUTE ASSIGNED TASKS**

**CONTROLLERS**  
**ROLE PLAYERS**

**JCATS**

**EVENTS** (black arrow)  
**INTERACTION** (red arrow)

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# DEXES



- **Strengths of Model:**
  - **Developed For USSOUTHCOM (Meets Our Needs)**
  - **Quick Turn Around**
  
- **Weaknesses Of Model:**
  - **Macintosh Based**
  - **Requires Intensive Train-up**
  - **Model Adjustments Require Extensive Expertise**
  
- **Challenges Of Employment/Findings:**
  - **Obtaining Current Data On Trends/Status/Effects**
  - **Applicability To Other Analysis Requirements**

# NATIONLAB



- **Real World Engagement And Training Support/Analysis**
- **Customized Model Using COTS STELLA Software**
- **Modeling, Simulation & Analysis (MS&A) Of Poverty, Corruption, And Narcotrafficking In Bolivia**
- **A Collaborative US-Bolivian Project**
- **Stella Software Marketed By High Performance Systems Inc.**

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# NATIONLAB



- **Identify Actions That Government Of Bolivia (GOB) Could Pursue To Attack And Disrupt The Vicious Cycle Among Poverty, Corruption, And Narcotrafficking In Their Country, Based On The MS&A Results.**

# NATIONLAB

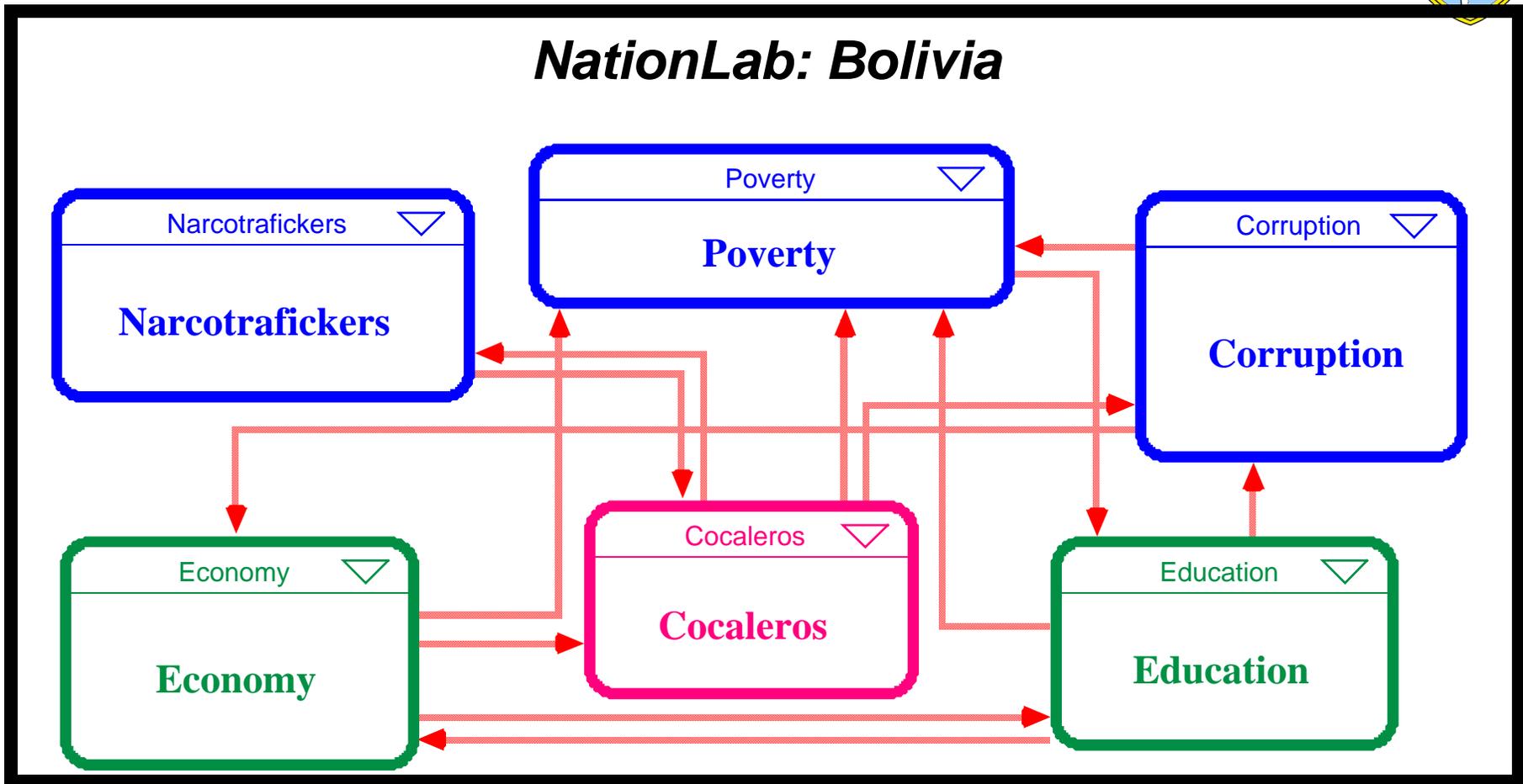


- **Three Phases:**
  - **Initial Model Development And Refinement**
  - **Model Refinement And Database Preparation**
  - **Analysis Of Actions**

# NATIONLAB



## *NationLab: Bolivia*



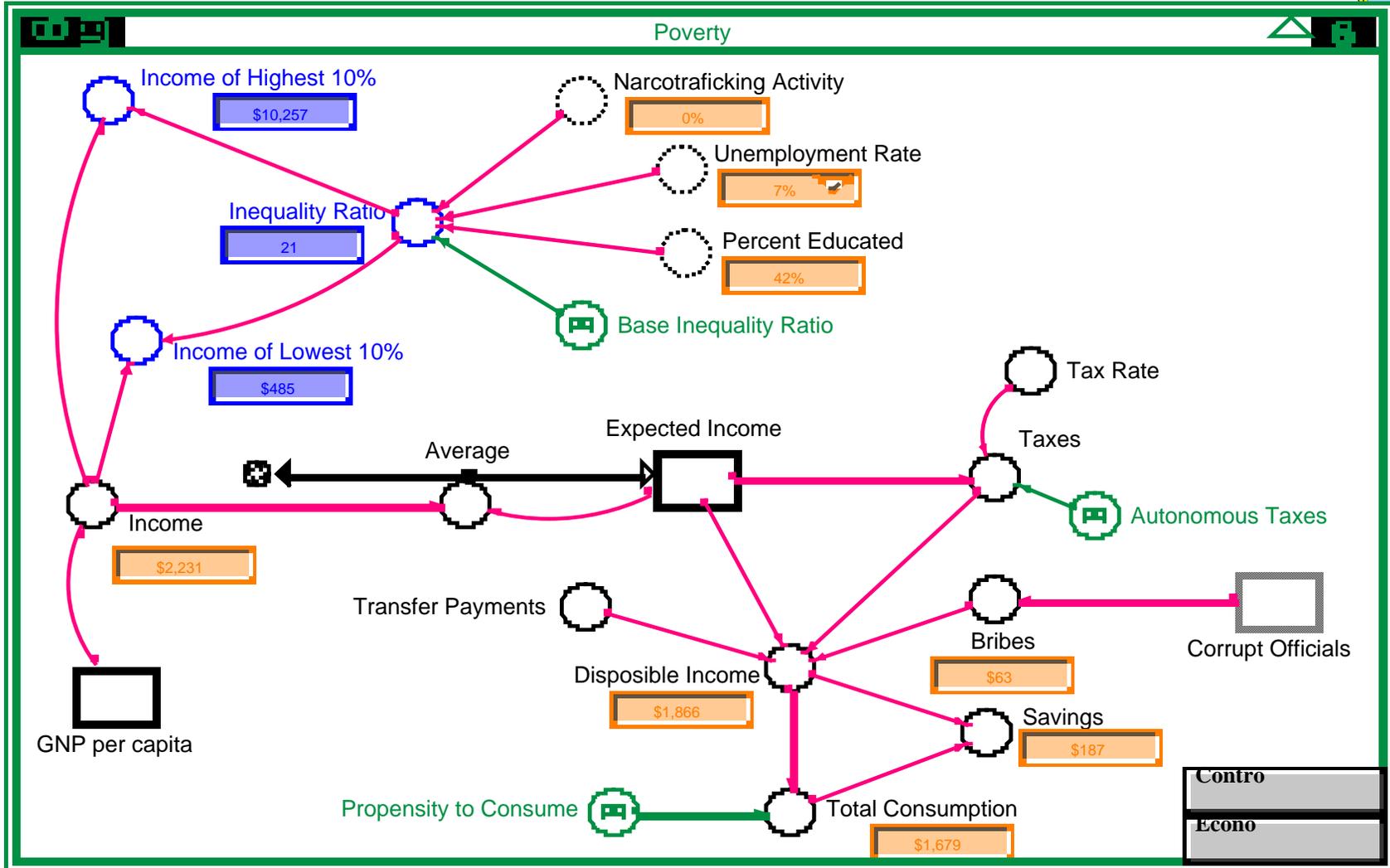
Loren Cobb, 1998

NationLab

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# NATIONLAB

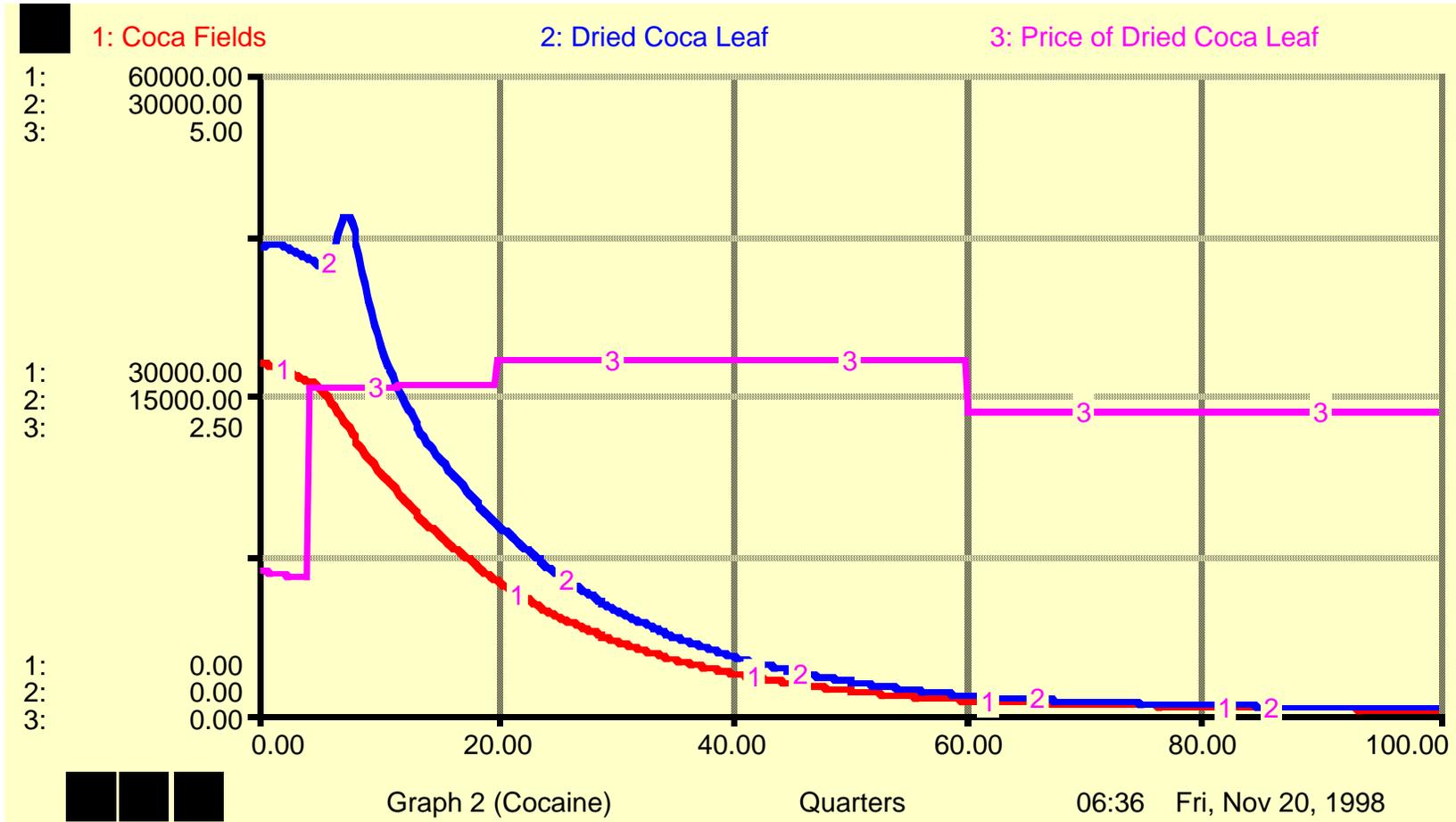


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# NATIONLAB



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# NATIONLAB



- **Strengths Of Model:**
  - **Graphically Displays Cause And Effect Over Time**
  - **Quick Turn Around (Rapid Prototyping Of Conceptual Models)**
  - **COTS Software - Stella**
- **Weaknesses Of Model:**
  - **Requires Intensive Train-up**
  - **Requires Extensive Mathematical Background**
- **Challenges Of Employment/Findings:**
  - **Obtaining Current Data On Trends/Status/Effects**
  - **Applicability To Other Analysis Requirements**

# The Way Ahead



- **Possess A “Tool Box” Of Automated Analytical And Decision Support Applications, And A Staff Of Trained Experienced Analysts Capable Of Providing CINC And Senior Staff With Timely, Credible, User-friendly Information To Support Decision-making And Situation Awareness**
- **Continue Engagements With NATIONLAB**
- **Remain A Key And Essential Element Of The SOUTHCOM Planning Process**

# ISSUES



- **JWARS -- No Utility To USSOUTHCOM**
  - Not Entity Level
  - Low Resolution
  - Conventional “Cold War”-Fighting Vs Contemporary SSC/MOOTW
- **JSIMS -- No Utility To USSOUTHCOM**
  - Minimal MOOTW, SOF, Or MOUT Capabilities
  - “Cold War” Fighting Vs Contemporary Mil Ops
  - Limited Support To Operational Analysis
  - No Rehearsal Capability
  - USSOUTHCOM AOR Last In Data Base And Scenario Build Priority
- **Unavailability Of Infrastructure Data Bases Will Persist**

# USSOUTHCOM



Miami, Florida

## SCJ5-PAS Modeling, Simulation, and Analysis Support To USSOUTHCOM

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