

## *Teaching IR through Simulation & Gaming*

*Global Agenda!  
January 19, 2006*



### *Outline*

- Revisit yesterday's course discussion
- Use of Simulations and Games
- *Global Agenda!* Simulation Game



## Simulation and Gaming in IR

- New global realities call for new ways of teaching
- Not a new phenomenon
  - War simulations and games to give players a new perspective
  - Games give us a sense of how the world works
- Internet now allows us to reach more, teach more
- Political science theory can be embedded into underlying game model
  - New conception of International Relations
    - Includes more than state-to-state interaction
    - Individuals and other actors involved
  - Theories can be adjusted to create different games

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## *Some IR Simulations*

- International Futures – Denver University
  - Theory-based
  - <http://www.du.edu/~bhughes/ifswelcome.html>
- Seven Futures – CSIS thinktank
  - Political goals
  - <http://216.12.139.57/discover/index.cfm>
- SimCountry – Game
  - Imaginary countries
  - Automated
  - <http://www.simcountry.com/>
- QPawn - Web-based
  - Real countries
  - Run by moderators, forum-based
  - <http://www.angelfire.com/oh/qpawn/>

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## *Our Project: Global Agenda!*

- ✦ Single-player interactive strategic game
- ✦ Real-World politics simulation with plausible scenarios
- ✦ Based on social science & political science theory, and empirical data
- ✦ 3 levels of play/analysis:
  - global system
  - nation-state
  - “your office” (cabinet, advisors, barometers)
- ✦ Feedback systems & agent based strategies
- ✦ Balance sheets updated with each move

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## *Philosophy:*

- ✦ The purpose of this game is to educate people about International Relations and the Global System
  - By making people look at the world through different perspectives
  - By introducing important IR concepts
  - By interacting with different events and issues in the world
  - By playing the role of the leader of a country.

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## Game Play

- ✦ Choose a role
  - As a leader of a country or non-state actor
- ✦ Click one of the **Hot Spots** across the planet
- ✦ Proceed through different stages of political moves:
  - You advance by **making decisions** and managing **internal/external pressures or crises**
- ✦ Every move you make has **costs & benefits**
- ✦ Monitor the changing dynamics of the world through **barometers**
- ✦ You will play through one term of office, and at the end, you will receive a “**Report from History**”□

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## Imagine and Realize

- Imagine:
  - you are the President of the USA
  - working for permanent global sustainability
  - in turbulent times of uncertainty, technological development, terrorism, and financial and environmental crises.
- Imagine
  - you are the leader of a former superpower such as Russia,
  - seeking to determine your new role in the world
- Imagine
  - You are a dictator
  - Challenged by the international community.
- Imagine
  - You are a democratic president in a small country
  - Surrounded by drug-business, illegal weapons trade, lawlessness and massive corruption

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## *Global Agenda! Outline*

- Hotspot Introduction
- Barometers
- Simulation Model
- IR Core Concepts included
- Defining a Hotspot Scenario

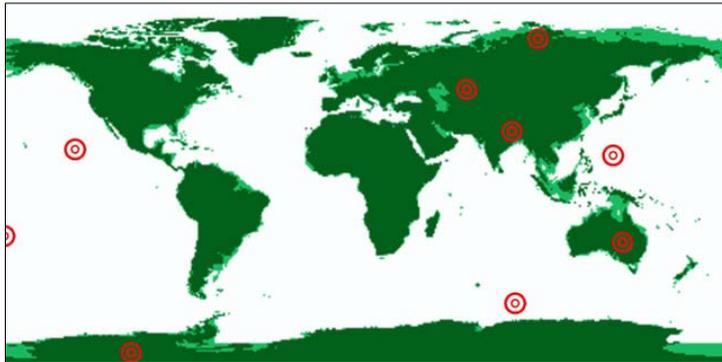
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## *A Hot Spot-based Game*



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## *Introduction to Hotspots*

- “Hotspots” are our name for specific Scenarios that illustrate an issue that the player will have to deal with
  - A Hotspot is a series of events and actions that could occur in one region about the same issue, or interrelated issues.
  - They will begin, or be “set off”, by some initial levels of barometers (parameters).
  - The actions taken will determine the flow of the Hotspot, as the barometer levels change with the actions taken
  - The player can decide whether to continue working on the same Hotspot until “finished”, or whether to move on and work on different Hotspots

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## *Game Play Logic: Inputs and Outputs*

### ✦ Inputs

- Real-World Data, Cases and Historical facts into scenarios/storylines,
- Barometers as data for Hot-Spot Analysis
- User Actions

### ✦ Outputs

- Barometer values
- Game feedback in the form of Press, Performance, Competitiveness, Time, ...
- Final outcome of player’s term in office

✦ Examples in: UNDP, games (Superpowers, Making History, Civilization, Rise of Nations)

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## *Barometers (Parameters)*

- ✦ Allow the player to measure his/her performance, *Global Agenda!*
- ✦ Some will be visible through the GUI and will be known as Barometers
  - Register and respond to fluctuations in the global and local systems that the player is affecting through his/her actions
  - Each country or region represented in the game will have its own set of parameters to describe the current state, and to serve as starting conditions of various Hot Spots.
- ✦ Parameters will be used to set off Hotspots around the globe

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## *Technical Needs of Parameters:*

- Parameters are variables/equations/algorithms that describe current state of nations or regions and the actions taken by the player
  - *Visible* parameters (the barometers) will be set up to indicate whether performance was optimal/acceptable/sufficient/unacceptable.
  - *Invisible* parameters include things that the player, as a leader of a country, would not have access too, such as other countries' parameters on military, economy, etc.
- Real data will be used to initialize values of the barometers to provide a realistic state of the world.
- Includes some amount of random perturbation to represent the unpredictability of the world
- All parameters used to compute changing conditions of Hot Spot scenarios and feedback conditions
  - Done by algorithms and equations that relate to Political Science theories, such as the Lateral Pressure Theory.

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## *Barometers to Monitor: Visible*

### ⊕ Visible:

- Nation-level:
  - Population
  - Economy
  - Health of country
  - State of environment (maybe an optional variable you can spend "time" to view)
  - Security/defense level
  - Domestic approval rating
- International:
  - Global leader support
  - Global status/rank in various categories (?) In
- Other player involved in a hotspot (country/group)
  - Tension/threat
  - Strength of political/ organizational system

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## *Barometers to Monitor: Invisible*

### ⊕ Invisible:

- Nation-level:
  - Immigration levels
  - How important economy, security, etc., are in determining visible approval rating (changes in each game)
- International:
  - Well being (economic, health, environment)
  - U.S. approval
- Other player involved in a hotspot (country/group)
  - Responsiveness to U.S. actions (positive vs. negative)
  - Economy
  - Health
  - Environment
  - Security/defense level

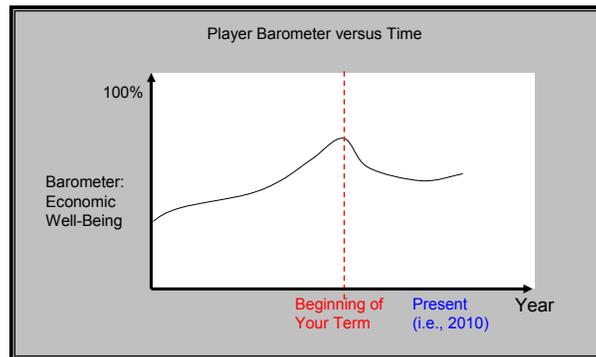
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## Visualizing Barometers over Time



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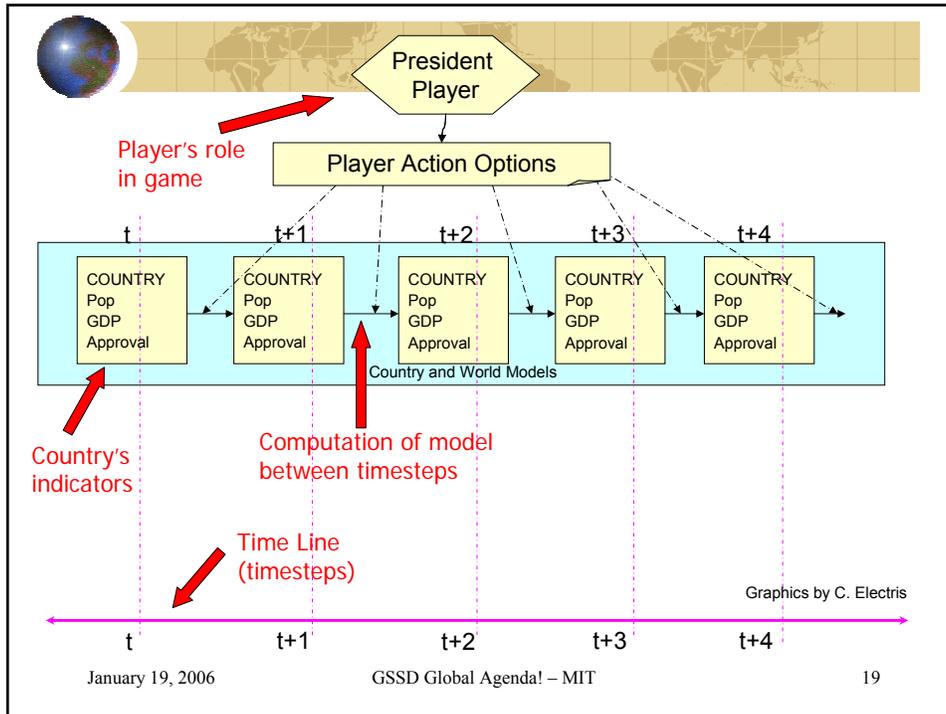
## Game Logic

- The game is broken into individual timesteps. For explanatory purposes, we will call these  $t$ ,  $t+1$ ,  $t+2$ , and so on.
- Each Country in the game is described by some indicators (i.e., barometers)
- These indicators change over time according to some model (i.e., equations)
- The Player's actions affect certain indicators, which will show up at the next timestep's computation of the model
- Hotspots (see Hotspot Types on later slide)
  - Can be caused by certain indicators reaching certain levels
  - Can be spontaneous
  - Can also affect the indicators' values
  - Can cause the Player to react differently and change the actions taken

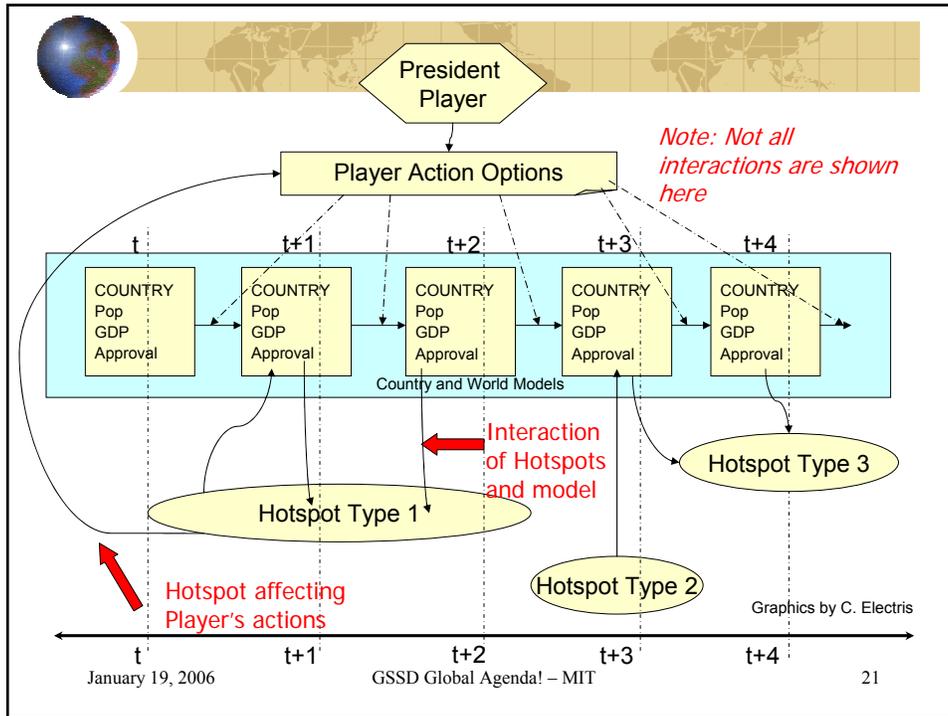
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- ## Hotspot types
- ⊕ Type 1: Background (Existing issues)
    - Hotspots exist before player begins
    - Ex: User decides to take action in Somalia's problems
  - ⊕ Type 2: Randomly Generated
    - Hotspots occur with little/no warning
    - Ex: Flood
  - ⊕ Type 3: Parameter Generated
    - Hotspots are put into action by the conditions of the parameters
    - Ex: Drop in economy causes riots
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## Game Components

- Modular Components
- Progress and Future actions needed

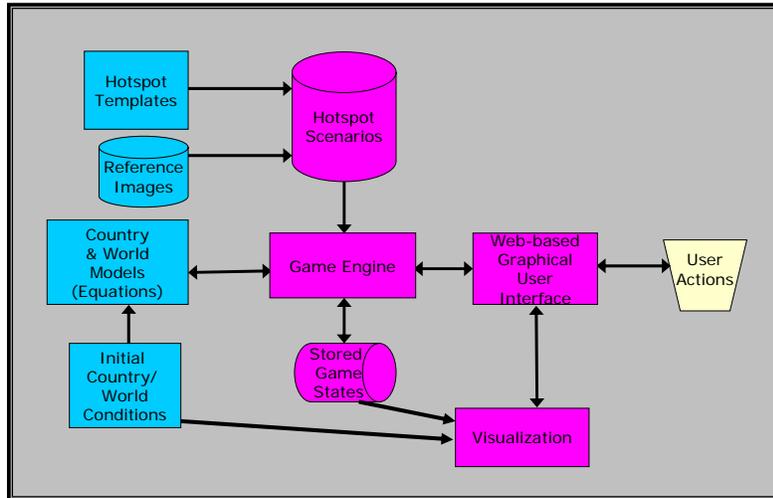
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## Game Components: Content (blue) & Programming (purple)



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## Applying Theory to the Game

- Simulation model embeds theory
  - Through equations relating the various parameters, we are able to model how we think the world works
  - This model is used to react to actions taken, time passing, and random events occurring

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## Model/Equations:

- Sketch of model (see next slide)
  - ▣ approximates relationships between variables – this is a sample of what could be implemented
- Equations and initial conditions make model relevant to real-world reality
- Country vs. World Model
  - ▣ Sample Model describes how a Country might function
  - ▣ Model must also be adapted to global level

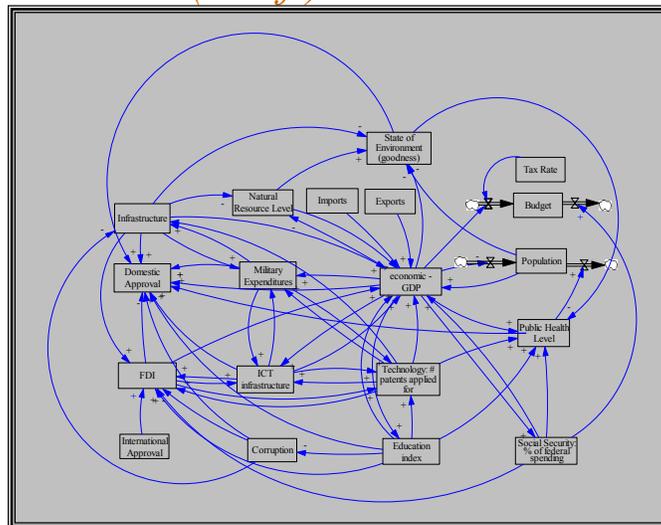
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## Sample Model (Draft)



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## *Game Fundamentals: Core IR Concepts*

1. Action-reaction
2. Tradeoffs among Options
3. Intended vs. unintended consequences
4. The Role of "Time"
5. Levels of Analysis
6. Feedback Dynamics
7. Retaining domestic & other support
8. What is "Winning"? (national vs. global contexts)
9. Understanding Complex Data: making decisions
10. Specific IR Issues & Problems
11. Managing multiple and connected '**Hot Spots**'
12. Anticipating emergent '**Hot Spots**'

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## *Action – Reaction*

- Every action inevitably brings a reaction
- This will be demonstrated through the changing of the visible and invisible variables/barometers
  - State centric attitudes, behaviors, actions, etc
  - Other country specific attitudes, behaviors, actions, etc
  - World attitudes, behaviors, actions, etc

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## Tradeoffs

- As the leader of a country, a player must learn that they cannot do everything, and thus must decide between tradeoffs.
- Some important tradeoffs:
  - Time intertwined with everything
  - Who to please– self, advisors, political party, country's public, world leaders, world public? Which Barometer?
  - What issues are most important to deal with?
  - Whether to further pursue solving an issue /hotspot or move on to a new issue
  - Money element – if we have limited monetary resources, how to allocate them to appropriate causes.
  - Issue tradeoffs – i.e., growth vs. sustainability

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## Time

- Logic: Time as both a resource and a constraint
- Concept: Time as a tradeoff
  - The game allows limited time, so player must decide what issues are most important to deal with
- ⊕ Reactions to actions taken often have the time delay, whether expressed in changes in barometers/variables or messages to the player about the current state of the hotspot new
  - Time as an Opportunity Cost → Costs as a part of the barometer or the burden on you
  - Relativity of Time: different 'time sense' depending on the hot spot and situation

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## *Time (continued)*

- ✦ One way to deal with Time :
  - If we assume each player turn is one month, we can break up the time in two days or weeks
  - Every new screen take some amount of days in a month:
    - i.e., One or more days to review a hot spot on and the president's agenda, consult an expert/adviser, to carry out an option in dealing with the hotspot, ...
  - Can only do few Hot Spots in depth or many at a shallow level
  - If a player spends time always asking "experts" for advice, he/she will delay solving the issue, allowing for more pressure to build up in the hot spot

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## *Levels of Analysis*

- In International Relations:
  - Sub-national
  - Nation level
  - International level
- It is important to convey the concept to the player that the president of a country cannot only think domestically with respect to policies on topics such as
  - National Security
  - Economics
  - Resources
  - Technology
  - Legitimacy
  - Others...

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## *Levels of Analysis – continued*

- ⊕ Different levels of thinking about how to solve a problem:
  - ▣ internal/external
  - ▣ local/international
  - ▣ ...
- ⊕ Different impacts of thinking & of Actions
- ⊕ Sometimes no action is itself a specific reaction

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## *Feedback*

- ⊕ Player should have a chance to change how they react based on the results of their actions
  - ▣ These results are part of the feedback dynamics created by earlier moves
- ⊕ Every move has a consequence
  - ▣ positive and/or negative
- ⊕ Consequences are not always immediate

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## *Feedback - Continued*

- ⊕ Tracking Feedback, for example:
  - After player is done working on a hot spot, present summary of player's actions and visible reactions
  - If hotspot is "solved", present summary of what led to the result
  - At end of game, present a "history" of the player's time in office
    - Highlight key changes that occurred in the world
    - Expose domestic/world variables hidden during game

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## *Understanding Complex Data*

- ⊕ Visualization Displays are an ideal way to
  - give *feedback* of before/after states of the world and the country.
  - Give player information about "current" states of the nation/world in the game while the players making decisions
  - Provide real world information about trends in history to base future decisions in the game
  - Illustrate geo-strategic realities (as that of 'moving borders' with the end of the Soviet Union)

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## Winning & Losing

- ⊕ What does this mean in the Global reality?
- ⊕ Who is winning or losing?
  - The player? The country? Other nations? The globe? ...
- ⊕ Feedback must convey the message that winning the re-election does not mean the state of the nation, or of the world, is good
- ⊕ Win or lose outcomes are constrained by
  - number of moves possible in game
  - the range of moves allowed

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## Win States

- **Winning the Game**
  - Completing many hot spots successfully
  - Satisfying both National and International Barometers
  - Being re-elected
  - Receiving a favorable “Verdict of History”
- **Winning Stages**
  - Transcending obstacles – a particular hotspot
    - financial crises, public opinion pressure, energy crises, war and terrorist jeopardy, ...
  - “Just-in-time” decision-making, diplomatic negotiation, prioritization, good luck, ...
  - Endurance & sustainability, military & economic power, intelligent operation, ...

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## *Loss States*

- ⊕ Loss conditions
  - Running out of budget (financial crises)
  - Running out of time (in key hot spot)
  - Loss of Domestic support (\*failure in next election)
  - Depleting international support (military intervention).
  - Stalemate or loss in **Hot Spot** strategy
  - Emergency Crises –civil, environmental, security-
  - Negative 'Verdict of History'

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## *Learning through playing to win*

- ⊕ Some good questions to leave in the players' minds is:
  - "Is there really a way to win when you lead the country? The United States?"
  - "Is it important to please the whole world, or should I only look out for my own country's interests?"
  - "If people are happy, but the environment has been threatened or endangered, do the people really win?"
  - Can a sub-system and the whole system be sustainable at the same time?

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## *Other Concepts Through Game*

- Specific IR Issues & Problems
  - Hot Spots focus on these specific issues
- Managing multiple & connected '**Hot Spots**' simultaneously
- Anticipating emergent '**Hot Spots**' & preventing them

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## *Defining a Hotspot Scenario*

- Necessary information per Hot Spot:
  - **Title** and **players** involved
  - **Explanation** and **background** identifying dangers/issues known to the administration
  - **Options**: listed and described to the player
  - **Advice**: two or more different (partial) views of how to deal with the overall situation given the options at hand and why relevant
  - Unbiased **Displays/Information** that can be used to make decisions (such as maps, etc)

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## Hot Spot Info (Continued)

- Results, visible and invisible to player, includes:
- how each **barometer** is affected (with some randomness)
  - List of **possible outcomes** related to state of the barometers and actions taken
  - **Scripts** that can be used for feedback
  - **Displays** that can be used at end of hotspot or end of term feedback

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**Hotspot Template**  
 Hotspot Name: \_\_\_\_\_

Hotspot Theme: _____  Hotspot Description:  Hotspot Regional Location: <input type="checkbox"/> Asia <input type="checkbox"/> Middle East <input type="checkbox"/> Europe <input type="checkbox"/> North America <input type="checkbox"/> Africa <input type="checkbox"/> South America  Country/State actors involved : A) _____ B) _____ C) _____  <div style="background-color: yellow; padding: 2px;"> <b>Initial conditions for overall hotspot :</b>          What triggers the hotspot in terms of the level of barometers?       </div> <div style="background-color: green; padding: 2px;"> <b>Advice for overall hotspot:</b>          A) _____          B) _____          C) _____          D) _____       </div>	<table style="margin: auto;"> <tr> <td colspan="4" style="text-align: center;">Event N</td> </tr> <tr> <td style="background-color: yellow; text-align: center;">Initial conditions</td> <td style="text-align: center;">Choice</td> <td style="text-align: center;">Effects</td> <td style="text-align: center;">Time</td> </tr> <tr> <td style="background-color: yellow; text-align: center;">Initial conditions</td> <td style="text-align: center;">Choice</td> <td style="text-align: center;">Effects</td> <td style="text-align: center;">Time</td> </tr> <tr> <td style="text-align: center;">Event 2</td> <td style="text-align: center;">Choice</td> <td style="text-align: center;">Effects</td> <td style="text-align: center;">Time</td> </tr> <tr> <td style="background-color: yellow; text-align: center;">Initial conditions</td> <td style="text-align: center;">Choice</td> <td style="text-align: center;">Effects</td> <td style="text-align: center;">Time</td> </tr> <tr> <td style="text-align: center;">Event 1: Description...</td> <td style="text-align: center;">Choice</td> <td style="text-align: center;">Effects</td> <td style="text-align: center;">Time</td> </tr> <tr> <td style="background-color: yellow; text-align: center;">Initial conditions</td> <td style="text-align: center;">Choice</td> <td style="text-align: center;">Effects</td> <td style="text-align: center;">Time</td> </tr> <tr> <td style="text-align: center;">These from Action List</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">Don't define</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">new actions each time</td> <td></td> <td></td> <td></td> </tr> </table>	Event N				Initial conditions	Choice	Effects	Time	Initial conditions	Choice	Effects	Time	Event 2	Choice	Effects	Time	Initial conditions	Choice	Effects	Time	Event 1: Description...	Choice	Effects	Time	Initial conditions	Choice	Effects	Time	These from Action List				Don't define				new actions each time				IR Concepts:  Political Science Theory:  Comments on Time:  Linkages to other Hotspots (Conceptual)  References for all materials used in HS (Bibliography format)  Library of Hotspot maps and Images  <div style="border: 1px solid black; padding: 2px;"> <b>ACTION LIST (additions, etc)</b>          Definitions of all "actions" used specifically for playing this Hotspot, including equations linking them to country and world models       </div> <div style="background-color: green; padding: 2px;">         Formulas needed for Hotspot History and Hotspot Verdict       </div>
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## *Example of Falklands*

- Hotspot Info
  - Your country has an island territory/colony (the Falklands) near Argentina. The islands' economy has been crumbling, with output falling by a quarter in the past 5 years. The population has been sapped by emigration, and has dwindled from 2,400 to 1,800.
  - The prospect of continuing to subsidize this ailing colony so far away in the South Atlantic has led your country to try to give the Falklands to Argentina, which has been claiming sovereignty over them. They call the islands the Malvinas. However, the protests of the islanders who are overwhelmingly descendants of your country, has protested and stopped this attempt. Argentina's dictator has gotten fed up with waiting and is about to just snatch the islands

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## *Falklands Advice Examples*

- Advice 1
  - "Don't forget that the real motivation to have this island is for the natural resources it possesses. Both our country and Argentina want the islands so they can exploit the oil and fishing territory that comes with the island. It's not something we should give up on too easily."
- Advice 2
  - "Who needs those little islands. I hear all they have there is a bunch of sheep and some squid. Well, I suppose if you cared about being close to Antarctica you might like being there. But it's so far away from here – it's hard to maintain a territory from here."

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## *Falklands Options*

- Option A : Go to war to protect your colony
  - affect Barometers in specified manner
  - Feedback: You have avoided national and personal humiliation. However war has hurt the already ailing economy and infrastructure. Your forces were dispatched on April 3, the first troops landing at San Carlos Bay on May 21. By June 14, the Argentine invaders had been overcome after fierce sea, land and air battles. 12,000 troops surrendered. 258 Britons, including three Falkland Islands civilians, lost their lives.
  
- Option B : Let Argentina have the islands
  - affect Barometers in specified manner
  - Feedback: You have disappointed the people of the Falklands, and have shown the world that your territories are not very important to you. Argentina is happy with your decision, as you have justified their claim to the islands.

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## *More Options...*

- Option C: Negotiate a bargain.
  - affect Barometers in specified manner
  - Feedback: The agreement you want is to keep the islands as your colony, and allow Argentina to share in more of its resources through more oil partnerships and rights to fish in the surrounding waters. Argentina still claims that the islands are rightfully theirs, but may accept the deal to spare a war over it.
  
- Option D: Do nothing:
  - Affect Barometers in specified manner
  - Feedback: A massive invasion of the Islands by Argentine forces takes place. The 80 Royal Marines and local volunteer force were overpowered after courageous resistance and the Islands are placed under Argentinean rule. The islanders are resisting, but you may have to go to war after all to protect them... but it will take almost two months to get troops there to fight, because of the distance. (Another choice of actions here)

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## *Interactions Among Hot Spots*

- What happens when Hot Spots interact?
  - New Realities
  - New Uncertainties
  - Now 'un-controllable' factors?
  - What can be 'manipulated'?

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## *Hotspot Issues*

- Possible issues to work on:
  - environment
  - migration
  - terrorism
  - energy
  - war
  - drugs-narcotraffic
  - natural disaster
  - epidemics-health
  - human rights-international law
  - trade disputes
  - be creative and come up with your own

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## *Where to find data/cases*

- Resources from Syllabus/readings/discussions
- Press
  - The Economist
  - New York Times
  - Lexis-Nexis collections
- Databases
  - ICE, ICB
  - CIA World fact book
  - Department of Energy
  - University databases: MIT, Tufts, Uppsala University ([www.pcr.uu.se](http://www.pcr.uu.se))
- MIT libraries – books, articles, databases, etc.

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## *Visualizing the game-play through User Interfaces*

- The Three Levels of Global Agenda:
  - The Global System (the world)
  - The Country
  - The Office
- From paper to digital media
- From drawing sketches to 3D renderings

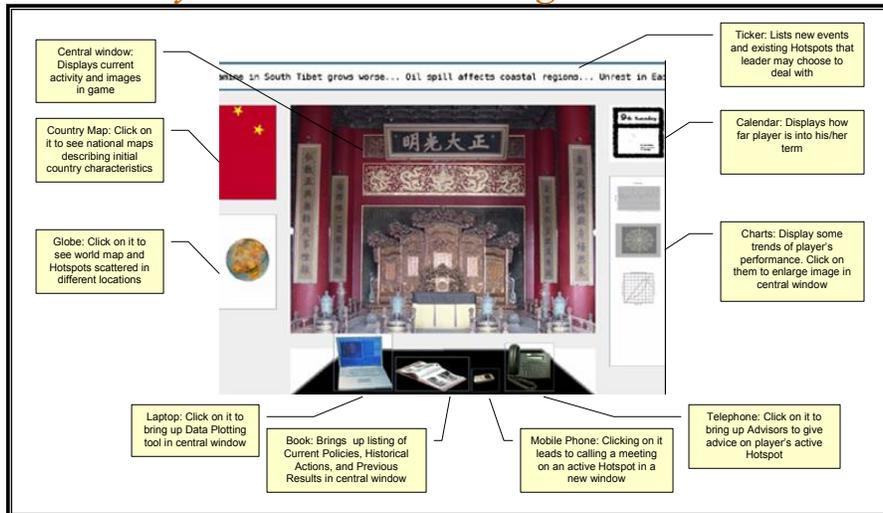
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## Player's Desk & Working Environment



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## Stepping through Scenarios

- Rough step-through to get a better sense of the game

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*You are sitting at your office, consulting the reports*



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### *Meanwhile...*

*a "green agenda" has is consolidating in the International Community*

- The US wants to protect the environment and limit deforestation, but at the same time they do not want to be caught up with leftist extremists. On the other hand, they need to help support their ally, Brazil, in its quest to bolster its rural population and the overall economy. This debate has recently been pulled to the forefront once again as a World Corporation tries to buy and deforest a large portion of land.
- In her first move to help obtain stability in this region, Jennie holds a conference with the Brazilian government, the World Corporation, Greenpeace, and some grassroots organizations. She's hoping to find a compromise that will satisfy all the parties involved.

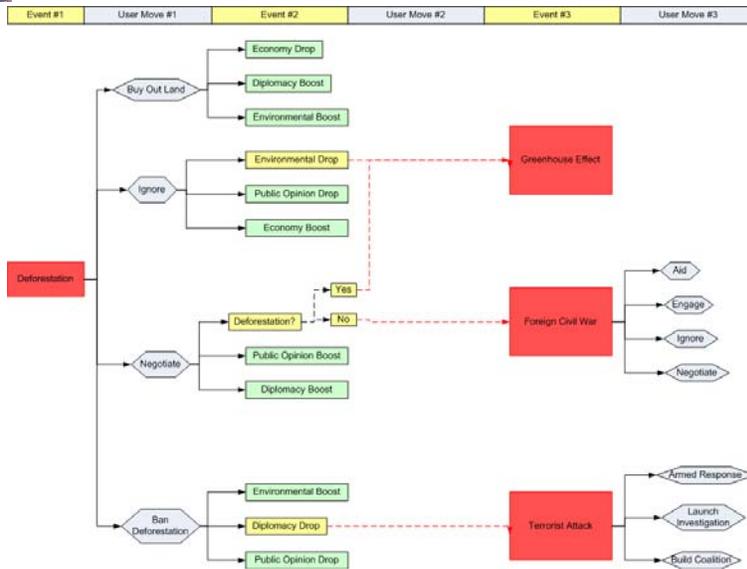
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## Possible flow of events



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## Get advice: What to do?

### ● Possible Actions

- Subsidize Forestation (without raising taxes)
- Move on or communicate to Public Opinion
- Talk to the Press
  - After the conference you gave about the new spending on domestic and global environment (forest) the barometer went up
- You can review your performance

### ● Political Realities:

- You are busy with the terrorism and environmental agendas, and you have to take care of your public (media) domestic support

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