

THE BASIC ORDINANCE OBSERVATIONAL MANAGEMENT SYSTEM

GEOVISUAL ANALYTICS OF IMPROVISED EXPLOSIVE DEVICE INCIDENTS

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INTRODUCTION

- **Research Objective**

- to support *sensemaking & decision making* of **Improvised Explosive Device (IED)** attacks



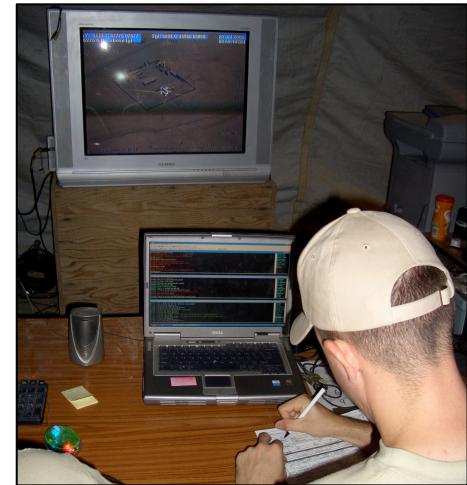
- **BOOMsys**

- prototype *geovisual analytics* application designed to facilitate spatiotemporal visual analysis of IED incidents

PROBLEM CONTEXT

- **Intelligence Analysis**

- *the process by which collected information is evaluated and integrated with existing information (FM 2-0)*



- **Intelligence Preparation of the Battlefield**

- 1) Define the Operational Environment
- 2) Describe the Effects of the Operational Environment
- 3) Evaluate the threat
- 4) Determine threat courses of action

PROBLEM CONTEXT: IEDs

■ The IED

- Terrorist/Insurgent weapon of choice
- Cost effective
- Concealable/ Covert
- 23,000 military & civilian casualties worldwide in 2009



■ IED Emplacement

- increase in geographic extent, frequency, and sophistication
- gaps in IED data dissemination, spatial analysis, and threat analysis (GAO 2009)

PROBLEM CONTEXT: IEDs

Worldwide Incidents Tracking System

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Search go within results [» Advanced Search](#)

Reports Event Type Incident Filters Location Victim [+]/ Perpetrator [+]/ Facility [+]

GENERATE REPORT

Begin Date: 01/01/2009 End Date: 12/31/2009
- Select a Report -
 Generate Report

Attack **Victim** **Perpetrator** **Facility**

Records Concept Cloud Map Charts Reports

Matching Attack Records: 10,325 [edit]

ICN	Incident Date	Subject	Country	City	D	W	H	T	View
1. 200566043	27 Jan 2005	3 civilians killed, 7 injured in IED attack in Mahmudiyah, Ninawa, Iraq	Iraq	Mahmudiyah	3	7	0	10	<input type="button"/>
2. 200907658	17 Aug 2009	Several shops damaged in IED attack in Al Fallujah, Al Anbar, Iraq	Iraq	Al Fallujah	0	0	0	0	<input type="button"/>
3. 200458891	8 Jun 2004	1 oil pipeline damaged in IED attack in Bayji, Salah ad Din, Iraq	Iraq	Bayji	0	0	0	0	<input type="button"/>
4. 200565660	19 Jan 2005	1 civilian, 1 child killed, 2 civilians wounded in suicide VBIED attack by AQI in Baghdad, Iraq	Iraq	Baghdad	2	2	0	4	<input type="button"/>
5. 200809868	23 Sep 2008	1 civilian killed, 8 others wounded in IED attack by suspected ISI in Ba'qubah, Diyala, Iraq	Iraq	Ba'qubah	1	8	0	9	<input type="button"/>
6. 200691203	29 Jul 2006	3 civilians, 3 police officers wounded in IED attack in Baghdad, Iraq	Iraq	Baghdad	0	6	0	6	<input type="button"/>
7. 200703104	13 Mar 2007	2 government employees killed, 6 others wounded in IED attack in Baghdad, Iraq	Iraq	Baghdad	2	6	0	8	<input type="button"/>
8. 200905542	23 Jun 2009	Government building targeted in IED attack in Mosul, Ninawa, Iraq	Iraq	Mosul	0	0	0	0	<input type="button"/>
9. 200705932	16 May 2007	Civilians targeted in IED attack in Baghdad, Iraq	Iraq	Baghdad	0	0	0	0	<input type="button"/>
10. 200696083	12 Oct 2006	4 civilians, 1 police officer killed, 22 civilians, 3 police officers wounded in IED and VBIED attacks in Baghdad, Iraq	Iraq	Baghdad	5	25	0	30	<input type="button"/>
11. 200685787	31 Mar 2006	1 oil pipeline damaged in IED attack in Kirkuk, At Ta'mim, Iraq	Iraq	Kirkuk	0	0	0	0	<input type="button"/>

National Counterterrorism Center (NCTC) World Wide Incident Tracking System (WITS)

METHOD

■ Visual Analytics:

- the science of analytical reasoning facilitated by interactive visual interfaces
- Thomas et al. (2005) agenda developed in response to pitfalls in information sharing/analysis from 9-11



■ Geovisual Analytics

- applications to analytical problems with an inherent geographic component

METHOD

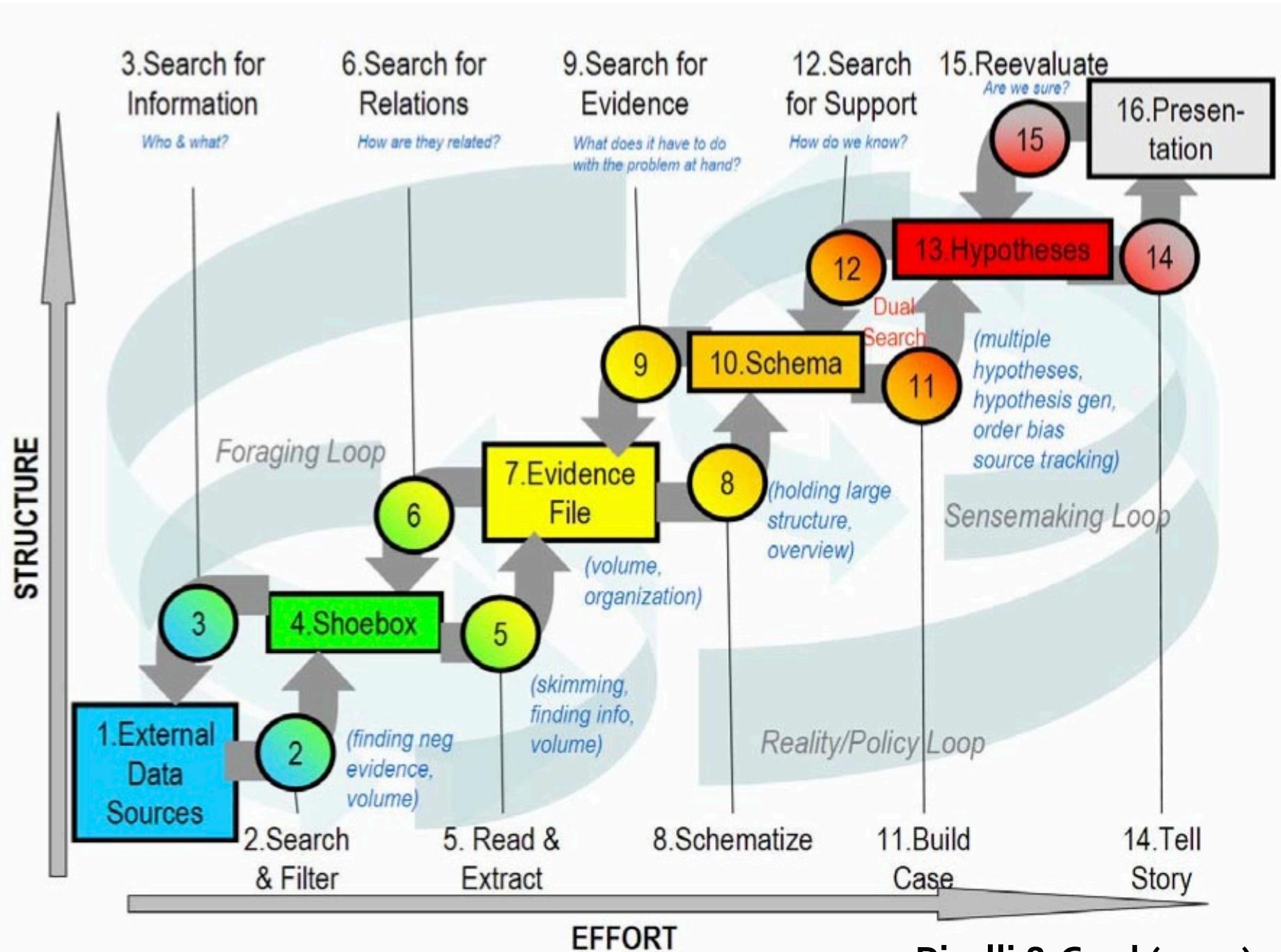
■ Sensemaking:

- the process of iteratively acquiring, analyzing, and restructuring relevant bits of information to generate actionable insight

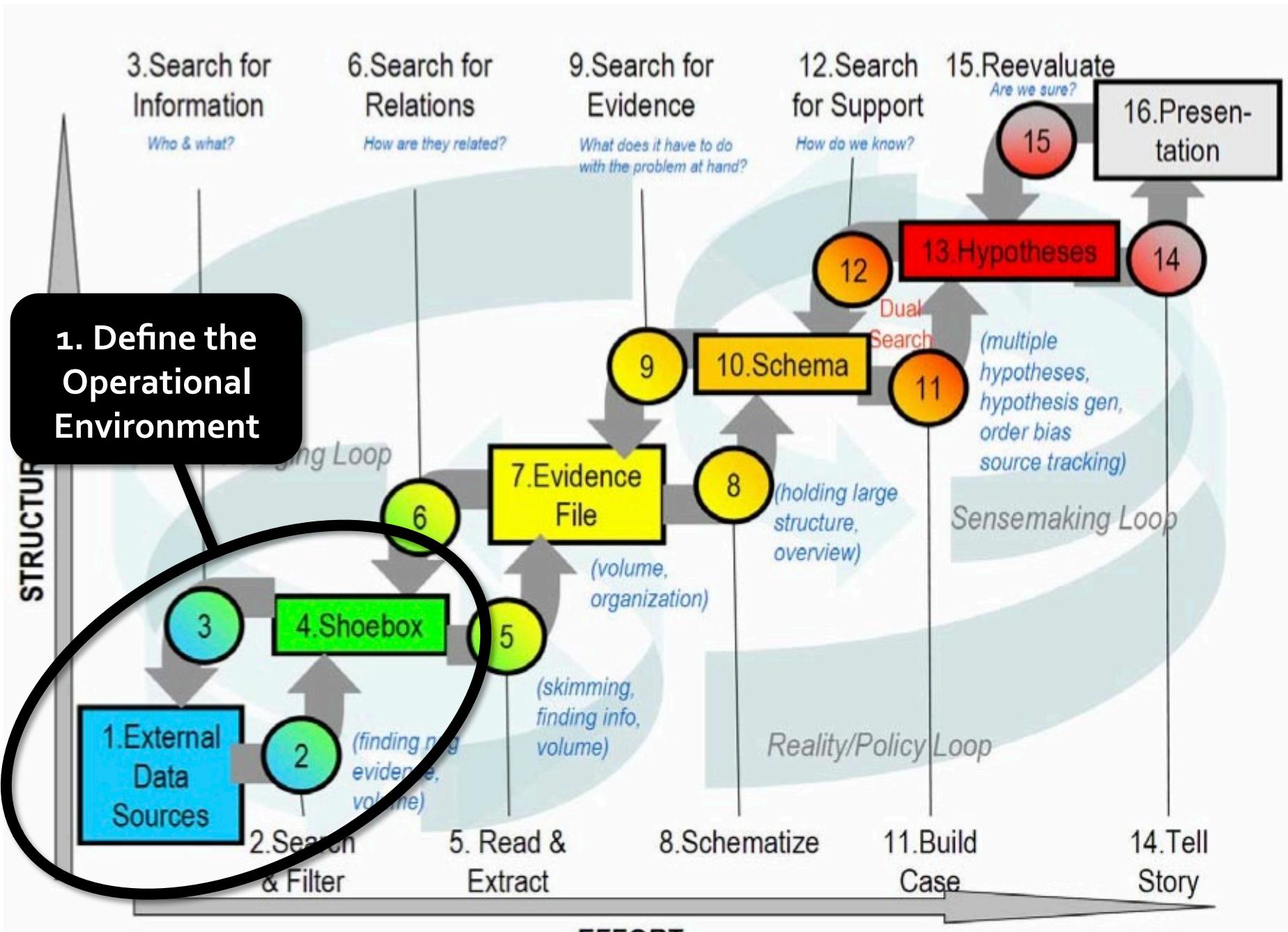


■ Decision Making:

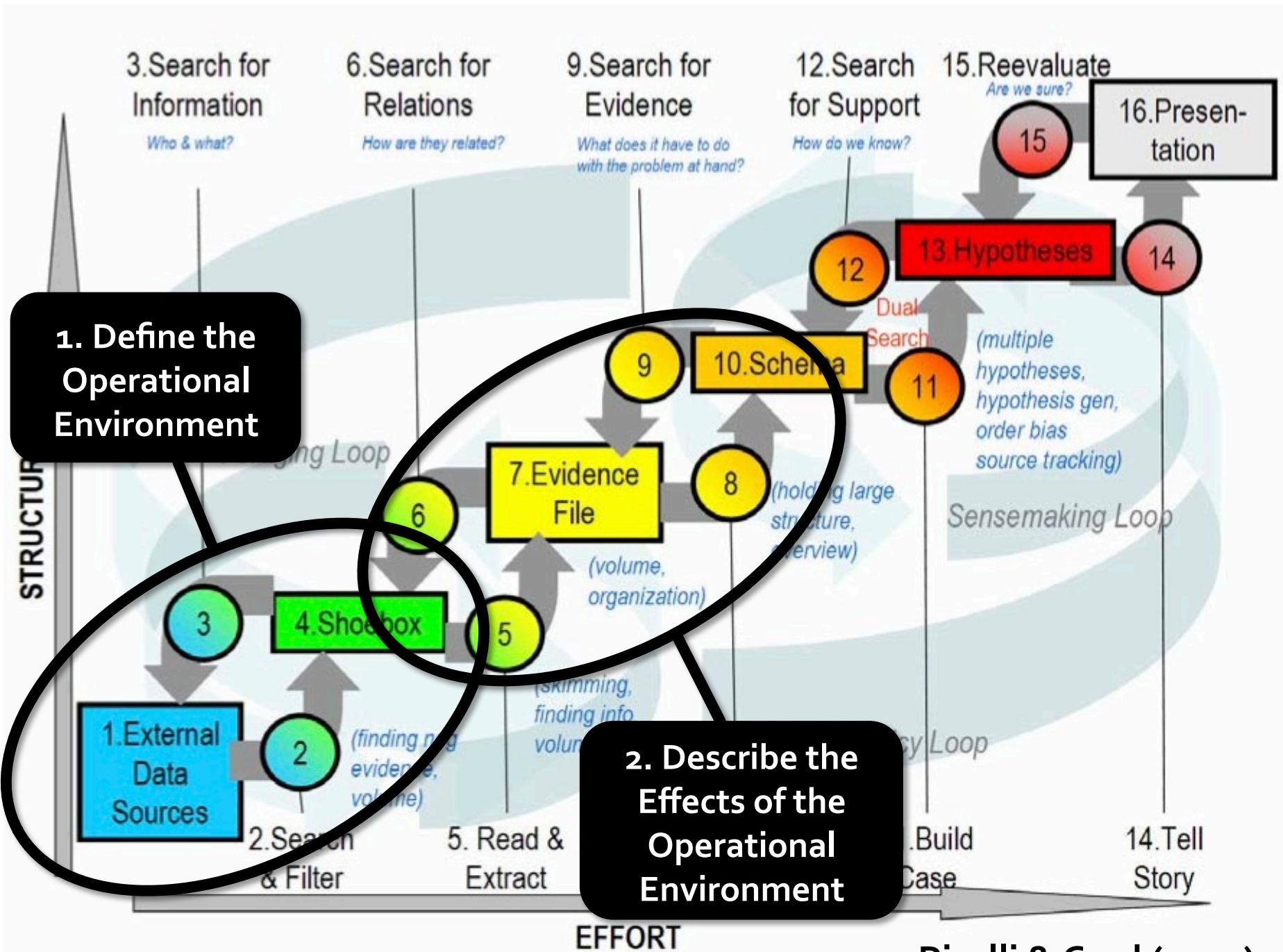
- operationalizing this insight to inform tactical and strategic courses of action

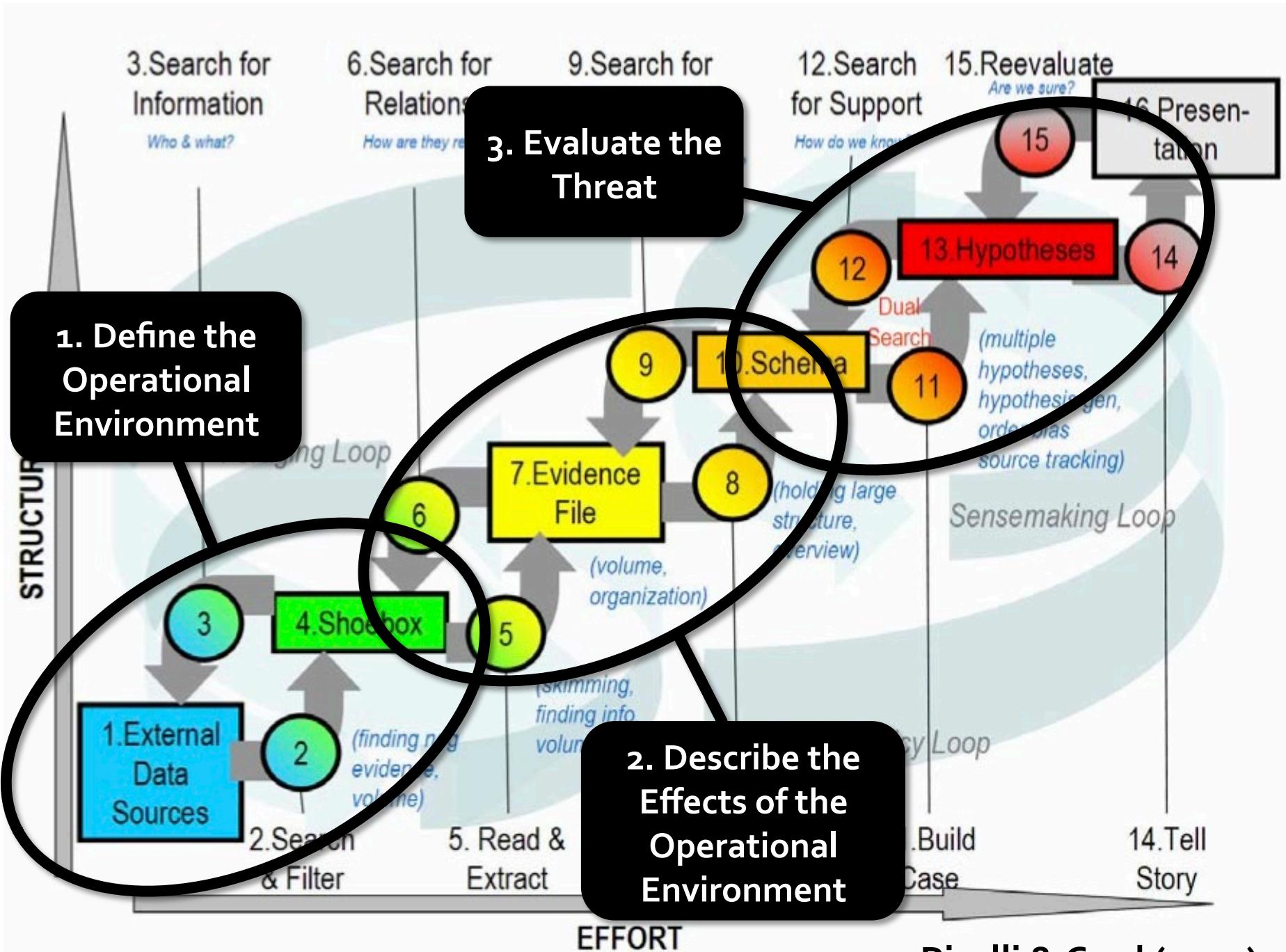


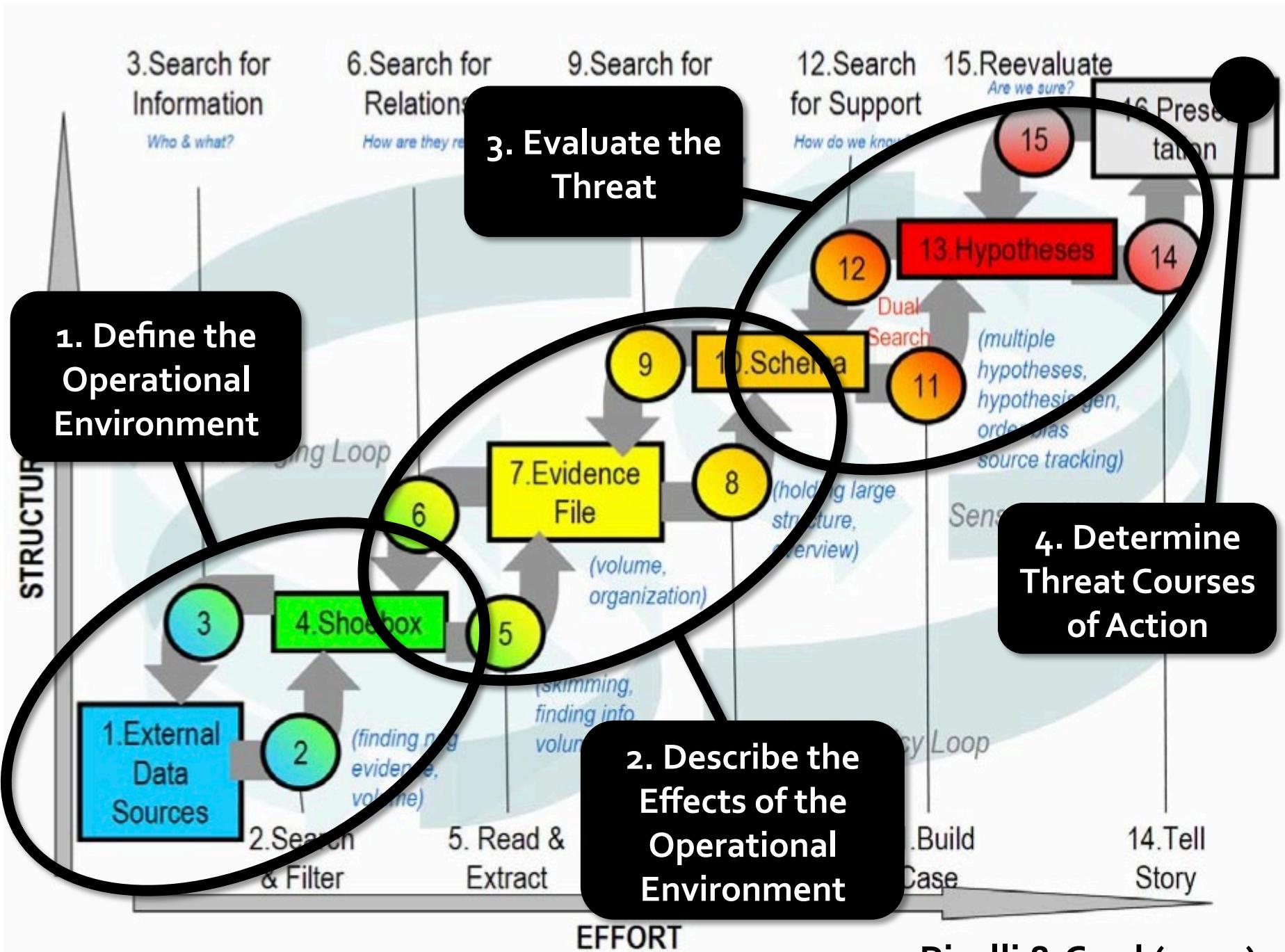
Pirolli & Card (2005)



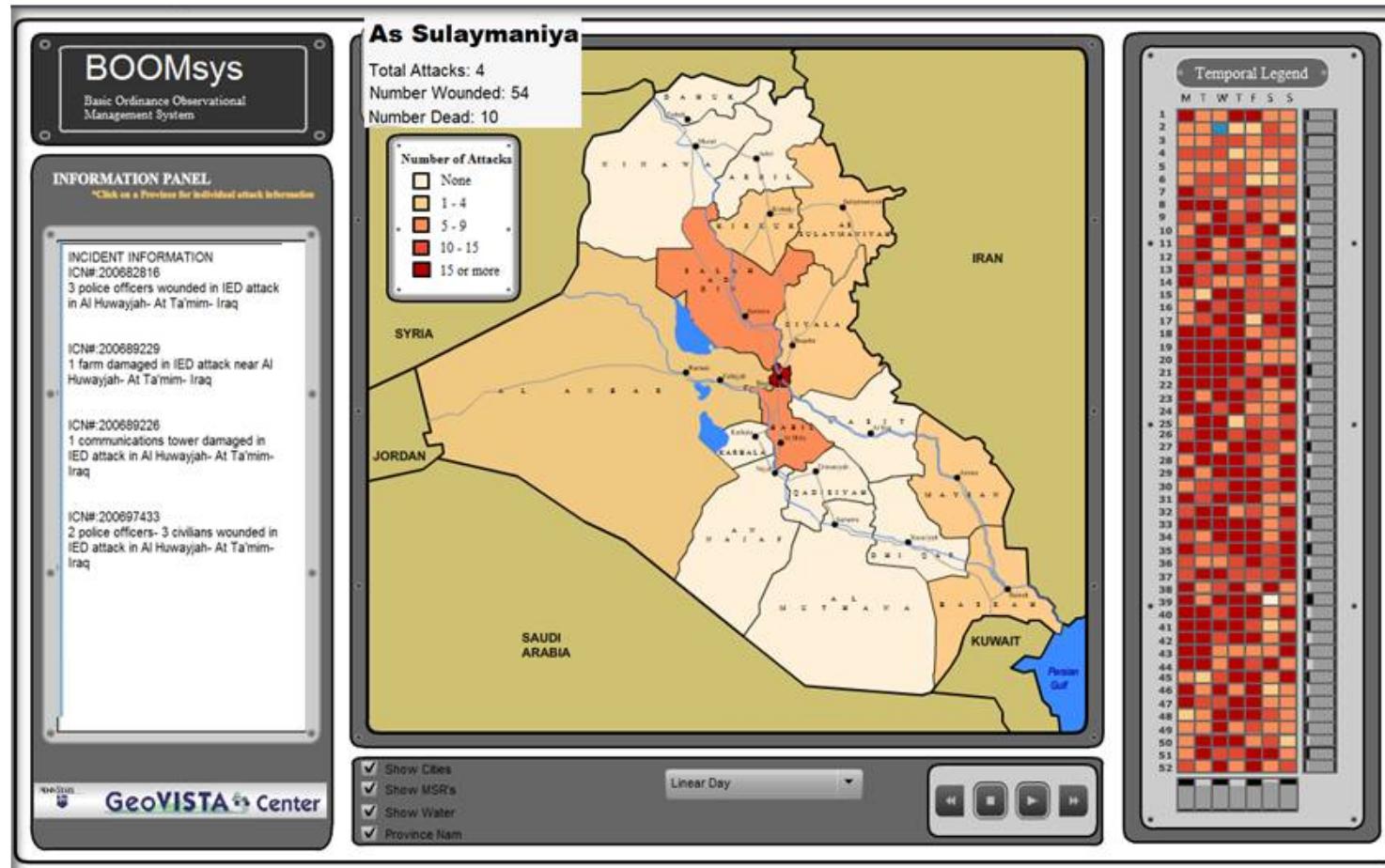
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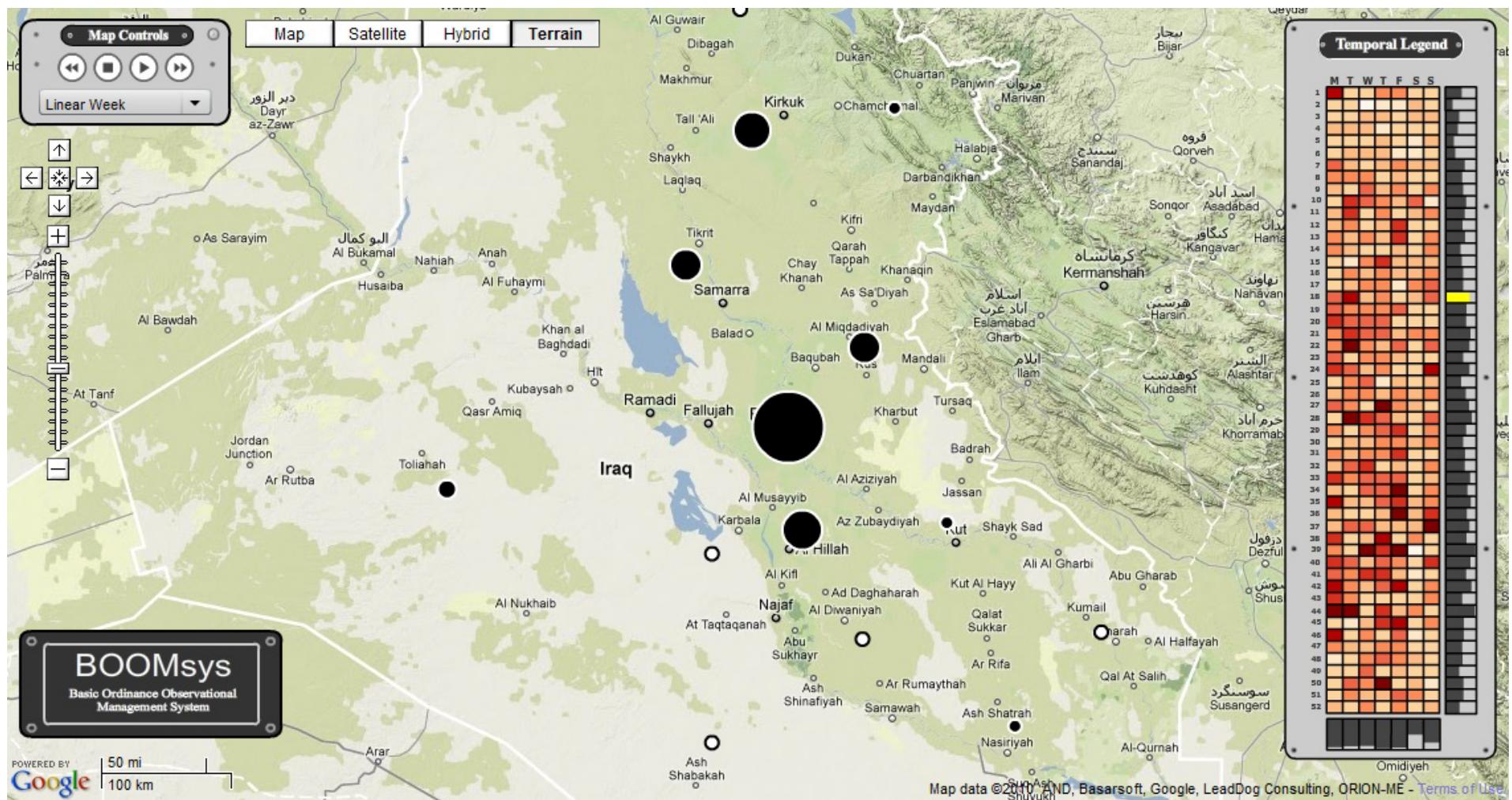




BOOMsys 1.0



BOOMsys 2.0



CONCLUSION

- **BOOMsys**
 - geovisual analytics (prototype)
 - spatiotemporal visual analysis
 - IED incidents & the IPB cycle
- **Synthesize**
 - information / extract temporal & spatial patterns in past IED activity
- **Increase understanding of the operational environment & IED affects on geographic space**

FUTURE DEVELOPMENT

- **Increase**

- analytical capabilities of prototype application.

- **Scale**

- larger geographic and temporal extent (i.e. GWOT)

- **User Studies**

- MOS 35 series (MI) in order to refine and extend the system to better support the needs of the targeted end users

QUESTIONS & COMMENTS

- QUESTIONS?
- COMMENTS
- GeoVISTA Contact Information

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