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# **Modeling and Simulation Support for the Standing Joint Force Headquarters Concept**

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# Standing Joint Force Headquarters Background

- Provides a standing element that focuses on a Commander in Chief's (CINC) operational trouble spots
  - Knowledge-centric, cross-functional organization takes advantage of knowledge and information flow
  - Functions at the operational level of national defense as the joint C2 element to support a rapid decisive operation
  - Provides information and collaboration support for Regional Combatant Commanders and/ or Joint Task Forces
- Provide each regional CINC an informed and in-place C2 capability
  - 65 people integrate directly w/ any regional command structure
  - SMEs for Effects-Based Planning and Operations processes
  - Reduce the *ad hoc* nature of standing up today's JTF Hqtrs
  - Provide increased stability as a result of the deep situational understanding developed prior to SJFHQ employment
  - SJFHQ will give the CINCs an advantage of time, perhaps the most critical resource

Groups and Teams

Boards, Centers, Cells, Working Groups

T=Team Member  
 X=Assigned  
 A=Augment/Support  
 C=Coordinates  
 L=Assigned Lead  
 S=Secondary Lead

Position	Command Group	Info Superiority Grp	Info Superiority Tm	ONA Section	Intel Section	IO Section	Eff Assessment Cell	Operations Group	Logistics Group	Operations Team	Logistics Group	Planning Team	Effects Working Grp	KM Group	KM Team	JISC	JCMC	JCB (Virtual)	JCB Working Group	JFE Working Group	TSCT	LCB (virtual)	Blue/Red Cell	JTF-JPG (virtual)	Effects Working Grp	JKM Board	ONA Working Grp
1 Director SJFHQ	X																										
2 Chief of Staff	X																										
3 Deputy Chief of Staff	X																										
4 Admini/Supt Coord #1	X																						A				
5 Admin/Suprt Coord #2	X																						A				
6 Plans Chief										L	L											X	L				
7 Deployment Plans Off										X	T											X	X				
8 Ops Law Planner										X	T								X			X					
9 Planner (Aerospace)				X						X	T												X			X	
10 Planner (Army)				X						X	T												X			X	
11 Planner (USMC)				X						X	T												X			X	
12 Planner (Maritime)				X		X				X	T												X			X	
13 Planner (Space-STO)				X						X	T															X	
14 SOF Planner				X						X	T												X			X	
15 Pol/Mil Planner				X						X	T	X								X		X	X	A		X	
16 Blue/Red Planner #1				X						X	T	X				A						X	A			X	
17 Blue/Red Planner #2				X						X	T	X				A						X	A			X	
18 FP Plnr (TBE/WME)				X						X	T										X	X	X			X	
19 Operations Chief		A					XL	TL													L		X			X	
20 Aerosp Ops Off #1				X			X	T												X	X		X			X	
21 Aerosp Ops Off #2				X			X	T												X			X			X	
22 Land Ops Officer #1				X			X	T												X	X		X			X	
23 Land Ops Officer #2				X			X	T												X			X			X	
24 SOF Ops Officer #1				X			X	T												X	X		X			X	
25 SOF Ops Officer #2				X			X	T												X			X			X	
26 Maritime Ops Off #1				X			X	T												X	X		X			X	
27 Maritime Ops Off #2				X			X	T												X			X			X	
28 Fires/Targeting Off				X			X	T												L	X		A			X	
29 Logistics Ops Chief				A					T	S												L				A	
30 Transport Ops Off				A					T	X												X	A			A	



# Goal for Modeling and Simulation

- **Gain insight into personnel issues**
  - Number and types of people needed to perform specific functions
  - Where bottlenecks occur in conducting the EBP processes
  - Impact of workload on time to complete overall EBP process
  - Use results to
    - Improve assignment of tasks to personnel
    - Identify critical nodes where delay in processes will cause disruptions in SJFHQ performance
- **SJFHQ responsibilities identified and tracked**
  - Scheduled meetings
  - Information production
  - Command and team decisions
  - Information assessment
- **Many involve sub-processes, e.g., producing specific information**
  - Broken down – individual tasks
  - Identify groups of people that perform tasks
- **Tracked personnel activities, work on desktop, how performing tasks is affected by multi-tasking**



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## **Simulation Development Tasks**

- 1. Determine all SJFHQ processes**
- 2. Decompose processes into three levels of sub-processes, down to the individual task level**
- 3. Develop an SJFHQ operational architecture**
- 4. Vet the architecture with J89**
- 5. Identify tasks that are performed to accomplish these processes**
- 6. Determine task sequencing, interdependences, and information flow**
- 7. Identify the individuals, by title, who work on these tasks**
- 8. Define task workgroups (all processes decomposed to the task level)**
- 9. Develop methodology and accompanying tables that map people, task workgroups, and processes to provide the database foundation for the simulation**
- 10. Develop a multi-tasking module that represents human work performance**
- 11. Create the baseline SJFHQ simulation**
- 12. Perform rigorous tests of the simulation to insure proper operation (verification)**
- 13. Report the results of simulation runs to illustrate use of the methodology**



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## Determine SJFHQ Processes



### ➤ SJFHQ sub-organizations:

- Command Group
- Information Superiority Group
- Operations Group
- Logistics Group
- Planning Group
- Knowledge Management Team

### ➤ Boards, Centers, Cells, and Working Groups:

- Joint Information Superiority Cell
- Joint Collection Management Cell
- Joint Coordination Board (JCB)
- JCB Working Group
- Joint Fires Working Group
- Time-Sensitive Targets Cell
- Logistics Coordination Board
- Blue/Red Cell
- Joint Planning Group (at JTF level)
- Joint Knowledge Management Brd



## Decompose processes into three levels of sub-processes

### SJFHQ Top-Level Processes and Number of Sub-Processes for each Sub-Level within the Model

<u>Process</u>	<u>Sub-Processes</u>		
	<u>Level-1</u>	<u>Level-2</u>	<u>Level-3</u>
Command Directives	6	4	19
Effects-Based Planning	4	15	76
Operational Net Assessment	7	35	235
Collaborative Info Environment	3	3	10
Training Exercises	3	3	15
Deployment/Logs/Transport	3	3	22
Total # task-level sub-processes			<hr/> 377



# Develop a SJFHQ Operational Architecture

- **Architecture required for process simulation uses components from the Department of Defense Architecture Framework**
  - **Decomposition EBP process captured in process maps**
    - **Provide way to visualize information flow and process interrelationships**
  - **Process blocks laid out on a visual template and connections made between them, when maps are used**
  - **Database method reported here, tables were used**
    - **Developing the maps was a necessary step to ensure that information flow is correct, logical, and contains neither sinks (processes that have no output) nor infinite loops**

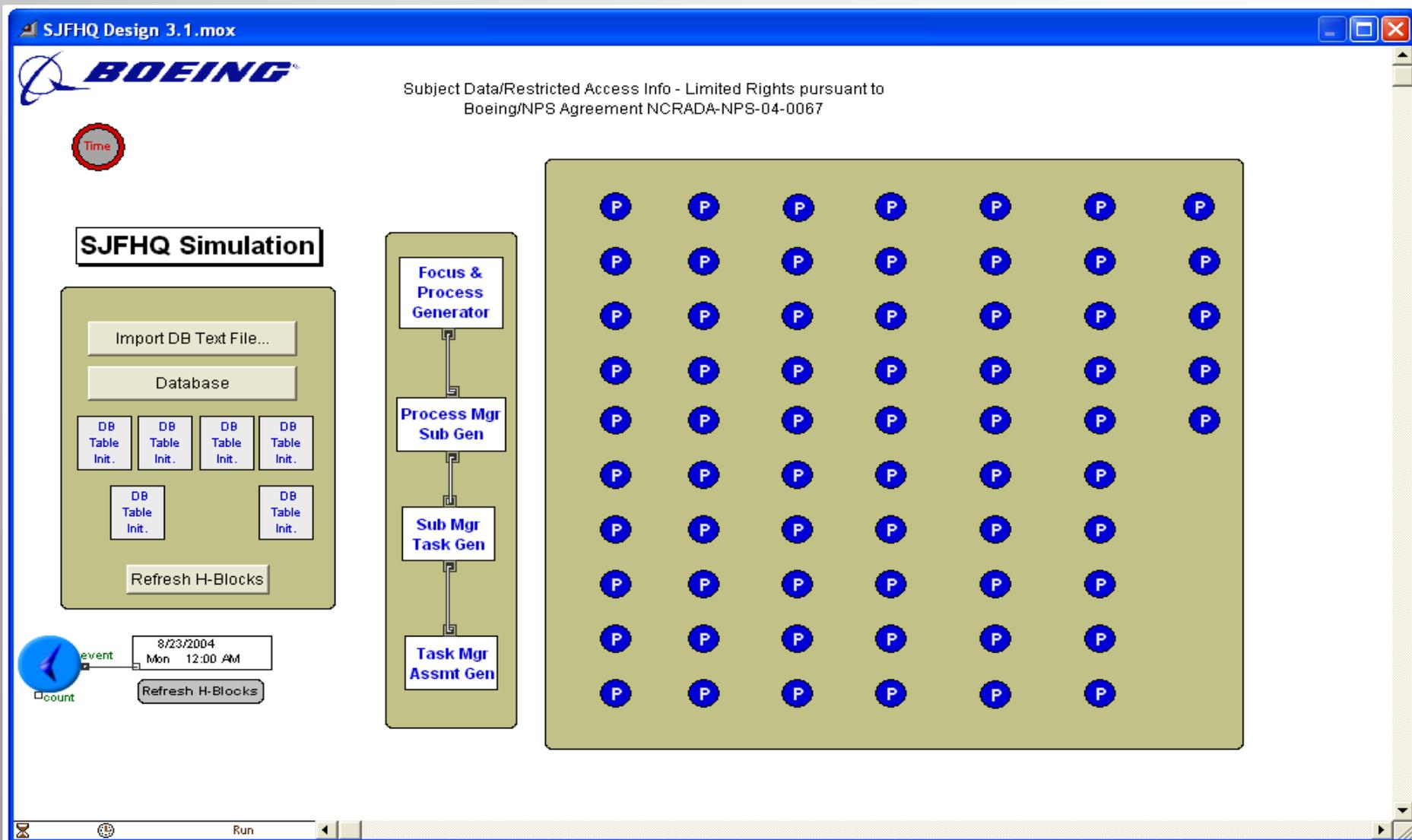


# Simulation Methodology

- **EXTEND simulation software, discrete event application**
  - **Rapidly develop wide range of process models**
  - **Boeing's Phantom Works group expertise using EXTEND**
    - **Developed simulation analysis tools for wide variety military/commercial system architectures**
- **Models structured by connecting library block components**
  - **Logically describe process/system being modeled**
- **Library of validated base blocks**
  - **>95% SJFHQ model developed with standard EXTEND components**
  - **Augmented with custom Boeing/SJFHQ block components**
    - **Model unique characteristics of SJFHQ scenario**
    - **Stored and delivered in EXTEND library file – installed before launching model file**
- **Leverages EXTEND's strong hierarchical capabilities**
  - **Powerful ability to structure scenario input data within its own internal relational database**

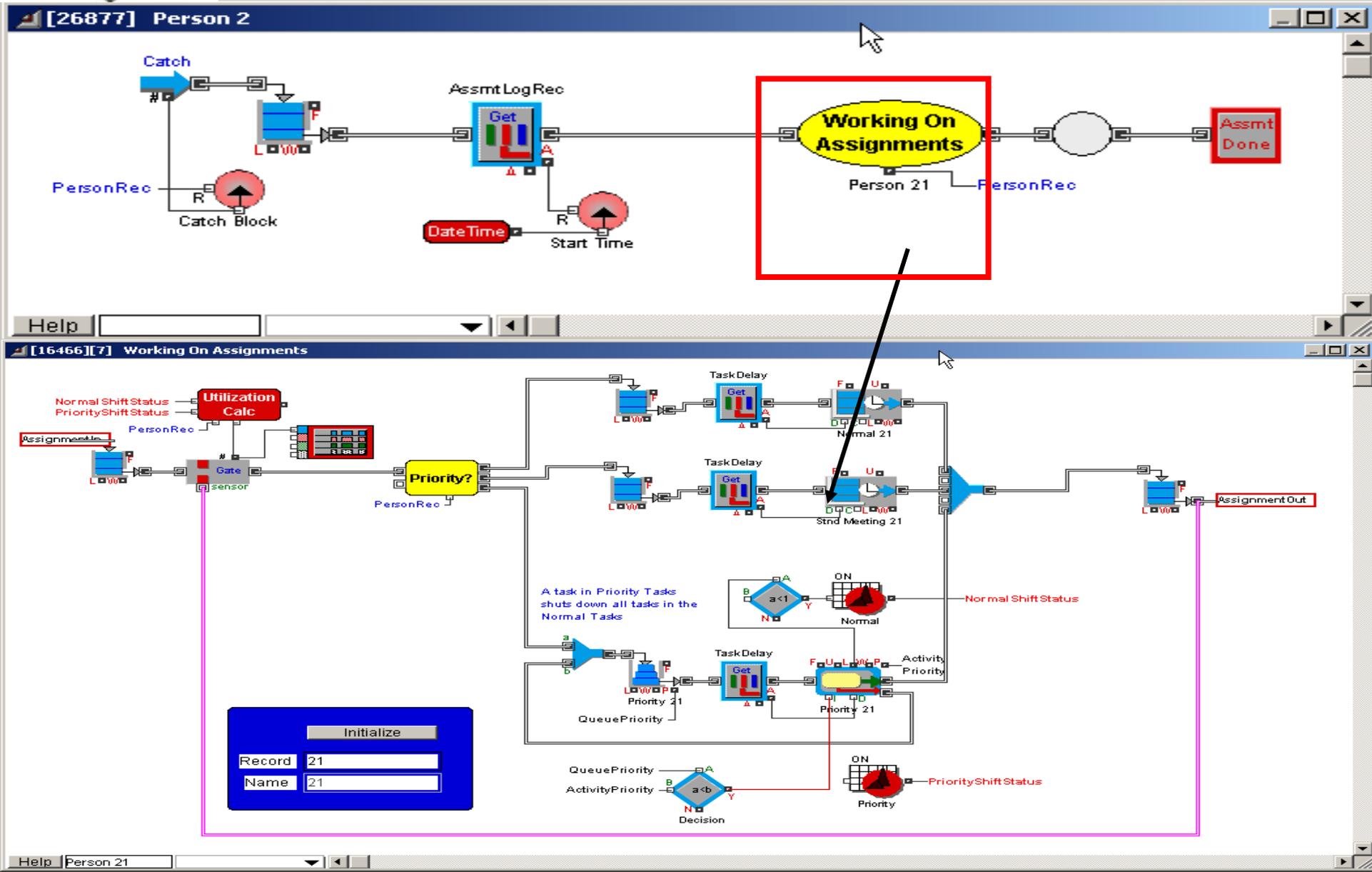


# Top-level view of the EXTEND Standing Joint Force Headquarters Model



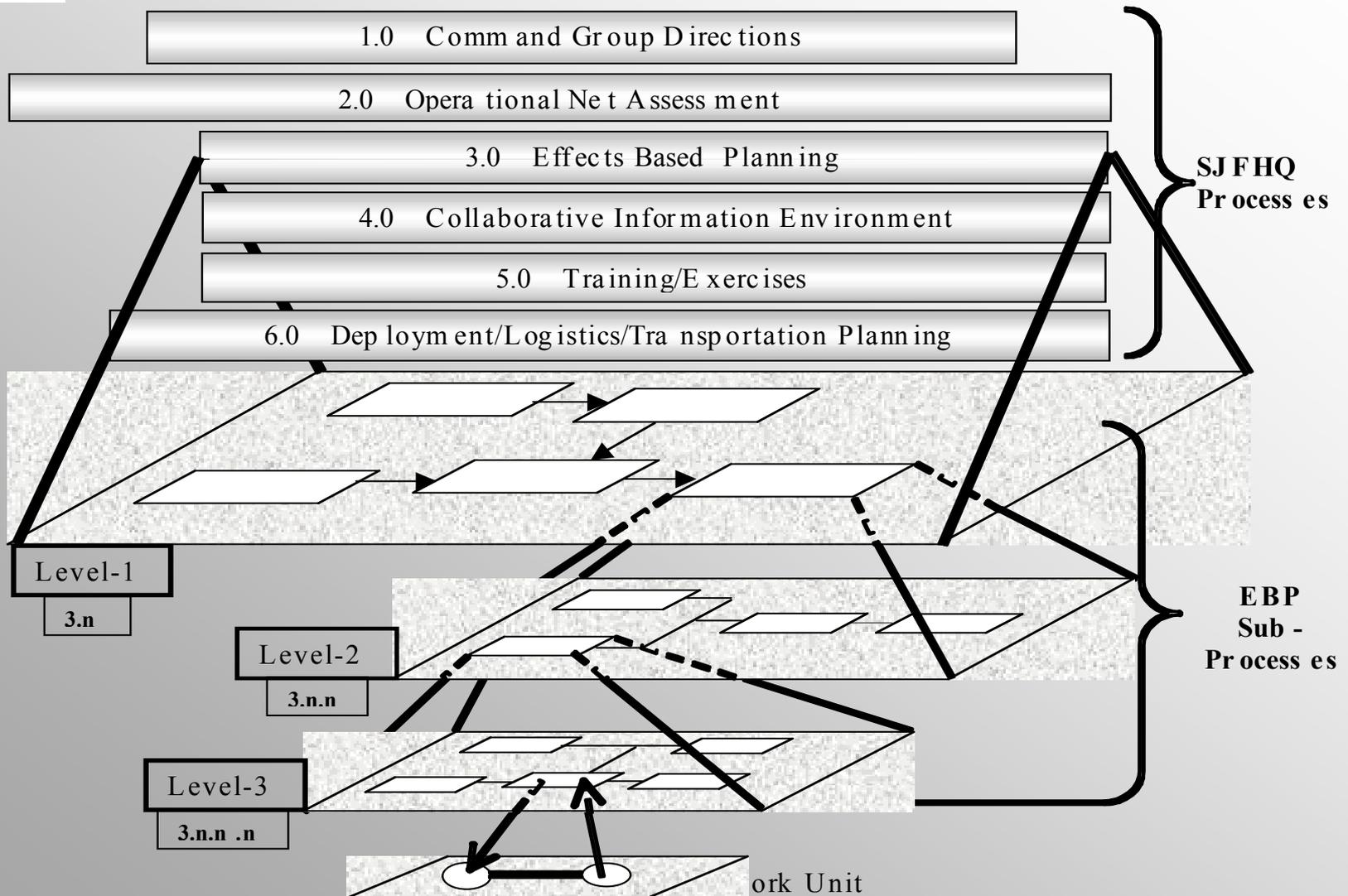


# Model Constructs, Person H-Block





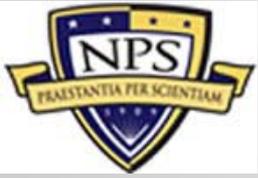
# Core, Top-Level Processes and three levels of Sub-Processes





# SJFHQ Sub-Process Definitions

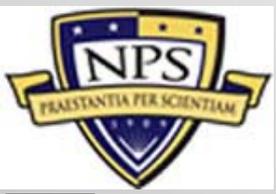
<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>	<b>3<sup>rd</sup></b>	<b>Level</b>	<b>Processes and Sub-Processes</b>
<b>1.0</b>				<b>Command Group Directives</b>
<b>1.1</b>				<b>Assess National Guidance</b>
		<b>1.1.1.1</b>		<b>Dummy</b>
<b>1.2</b>				<b>Assess AOR Plans</b>
		<b>1.2.1.1</b>		<b>Dummy</b>
<b>1.3</b>				<b>Develop Initial Guidance</b>
		<b>1.3.1</b>		<b>Assess Transition and Provide Guidance</b>
		<b>1.3.1.1</b>		<b>Dummy</b>
		<b>1.3.2</b>		<b>Commander's Intent Development</b>
		<b>1.3.2.1</b>		<b>Develop Commander's Intent</b>
		<b>1.3.2.2</b>		<b>Transmit Cdr's Intent for Mission Analysis</b>



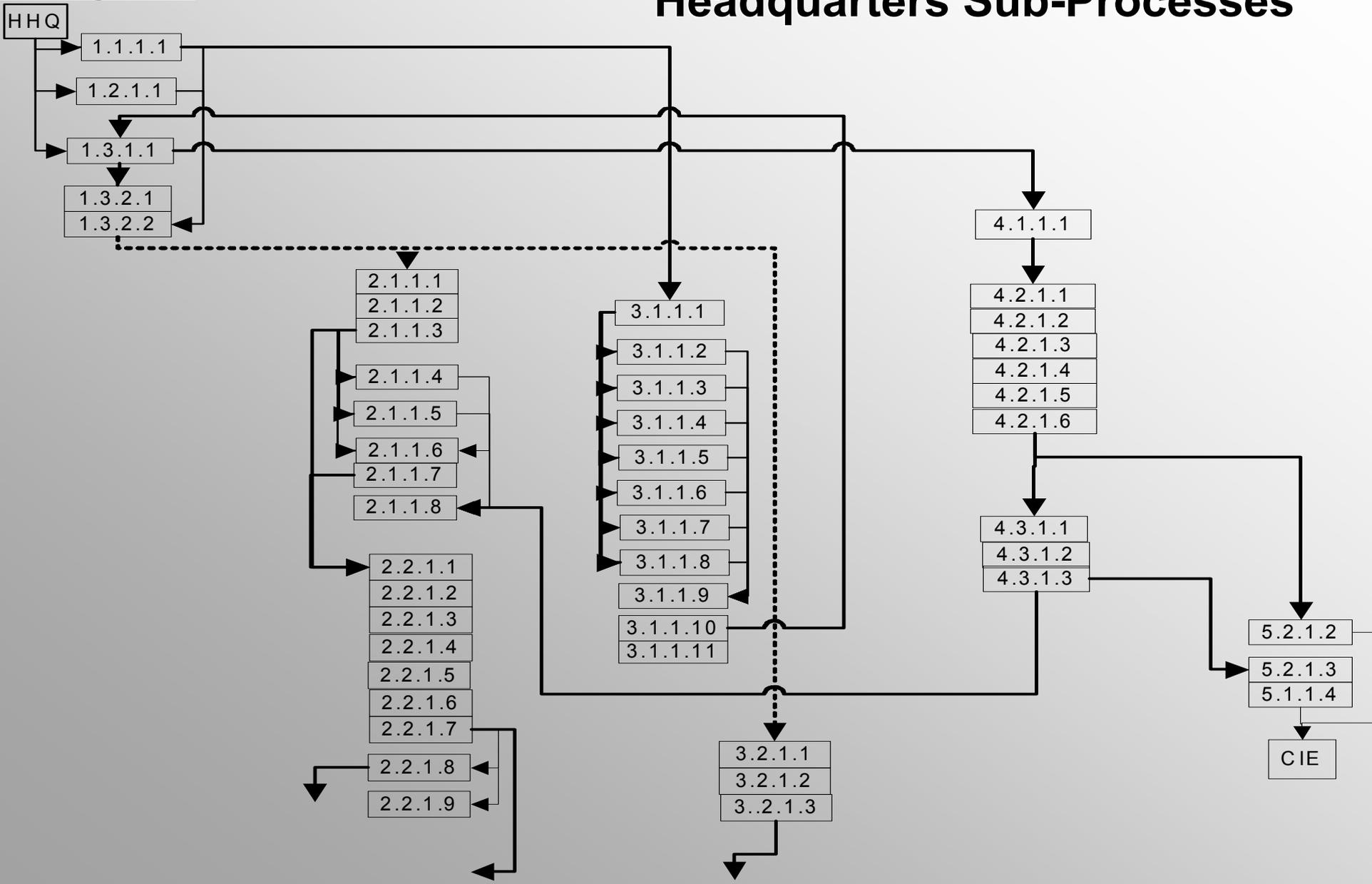
## Example of Required Input Sources, Task Duration, External Delay, and Task Priority

Inputs From	Duration	Delay	Priority
SECDEF	1		10
RCC	0.5		10
SECDEF, 3.1.1.10 1.3.1.1,	0.2		1
1.1.1.1, 1.2.1.1	0.4		5
1.3.2.1	0.2		1





# Third-Level Map of Standing Joint Force Headquarters Sub-Processes





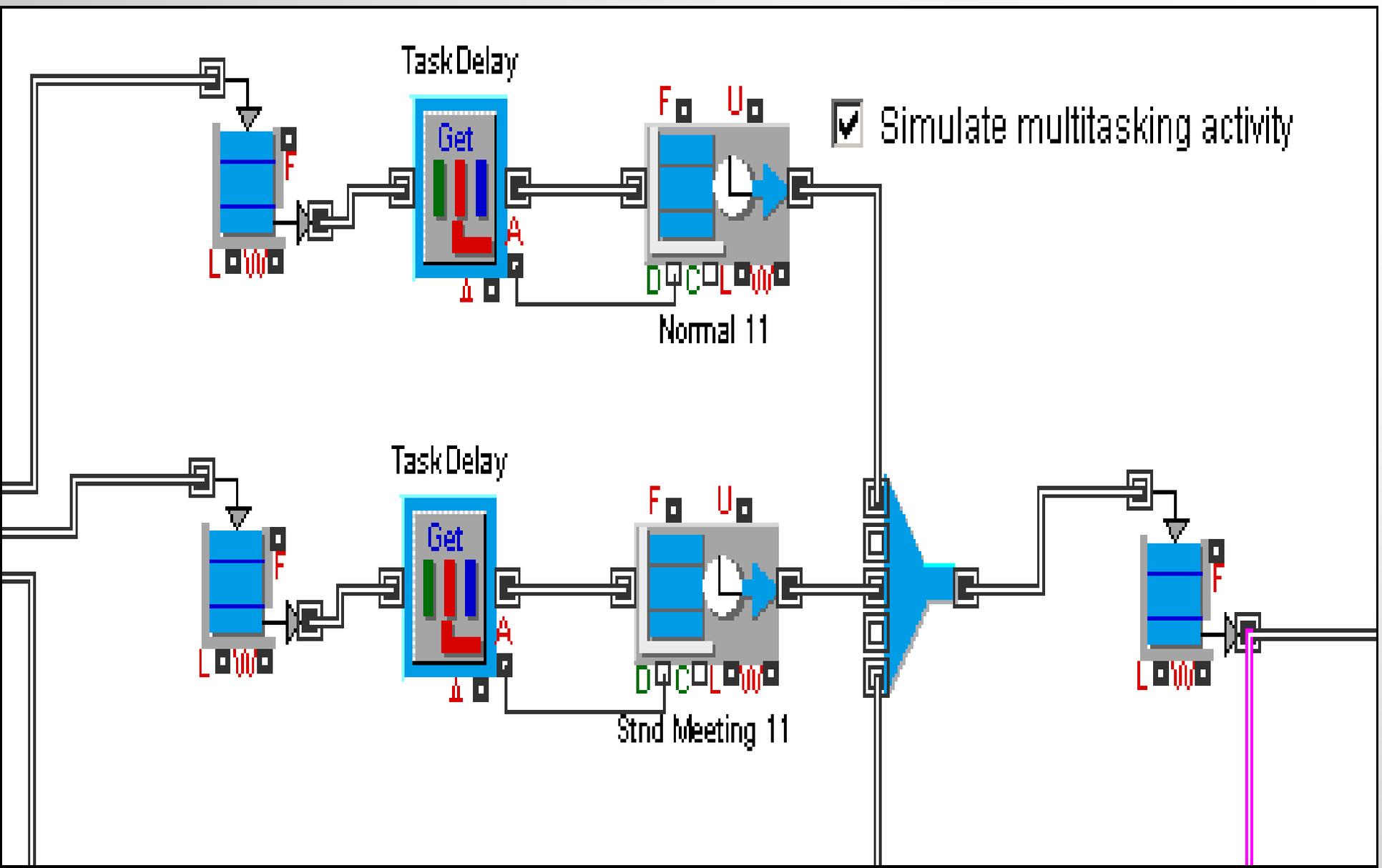
# PERSONNEL TASKING

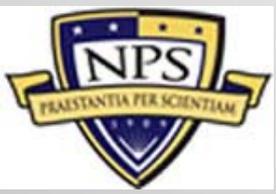
## Sample of Work Assignments

<b>2.1.1.1</b>	<b>Assess Intel, Cdr's Guidance, Geospatial Info</b>	<b>35, 36, 37, 42, 43, 46, 47, 48, 49,...55, 56, 57, 58, 64</b>
<b>2.1.1.2</b>	<b>Compare Situation &amp; Intel with ONA Baseline</b>	<b>50, 51, 52, 53, 54, 55, 56, 57</b>
<b>2.1.1.3</b>	<b>Identify Changes in Environment</b>	<b>50, 51, 52, 53,54, 55, 56, 57</b>



# Normal Assignments (top path) and Standard Meeting (bottom path)





# Results and Conclusions

- **M&S provides an efficient and cost effective means to obtain data to provide inputs to answer key questions of interest to concept developers**
- **Information can be used to examine details regarding SJFHQ processes and task performance and make decisions so that initial use of these units can be as efficient as possible**
- **Total Simulation run time – ~3 seconds**
  - **260 Total work hours**
- **Large variations in personnel use**
  - **Pol/Mil Planner                      246 tasks    worked 94% of time**
  - **Aerospace Ops Off'r #1            66                      29%**
  - **Aerospace Ops Off'r #2            14                      5%**
- **Possible solutions to workload inequities**
  - **Modify number of personnel types assigned**
  - **Cross train so people can perform a wider range of tasks**