Persian Incursion

Adapting Harpoon to Explore a Real-World Security Issue

Connections 2011

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Outline

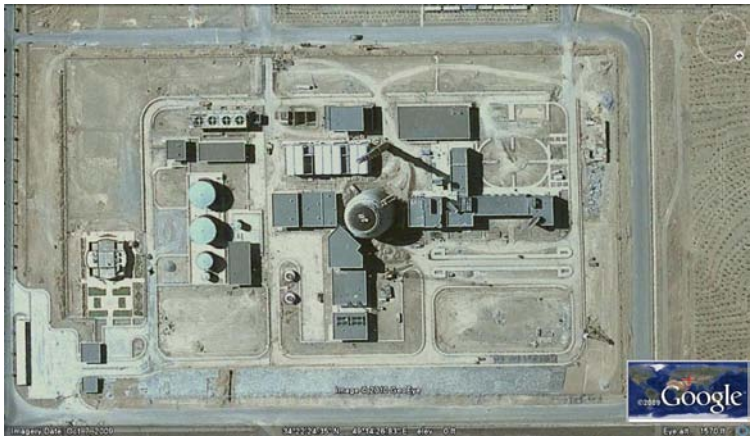
- What is *Persian Incursion*?
- What were the design requirements?
  - Entertaining as well as educational
- Initial concepts
  - Articulate the questions to be explored
  - Specify desired features
  - Establish structure and player roles
- Political aspect – card based
- Air combat – miniatures based (*Harpoon*^{4})
  - Extensive use of nodal engagement concept
- Abstract aspects that are difficult to quantify & time intensive
- Game development process

What is *Persian Incursion*?

- A stand alone board game that explores the issues and consequences of an extended Israeli campaign to eliminate Iran's nuclear infrastructure
- An investigative tool to look into a highly complex problem, from both sides, to gain a better understanding of the key points or drivers
- WARNING: Wargames don't "prove" anything, but they can enlighten

Design Requirements

- Describe Iran's nuclear infrastructure
  - Facility locations and functions
  - Identify the key nodes in the two paths
- Describe Israel's military capability
  - Focus on air strikes, SOF, and IO
  - Give players a taste of strike planning
- Describe Iran's defensive options
  - Allow force on force response
  - Preserve asymmetrical options
- Variable scenarios and political aspect
  - Card component enables high variability
  - Opinion tracks support resource allocation and victory conditions
- Extensive use of Google Earth imagery
- ***As an exploratory game, it had to be entertaining as well as educational***



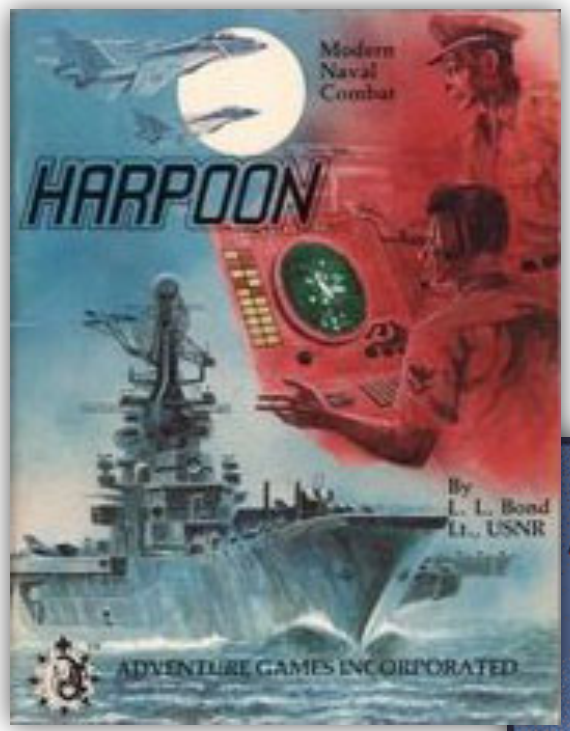
Initial Concept

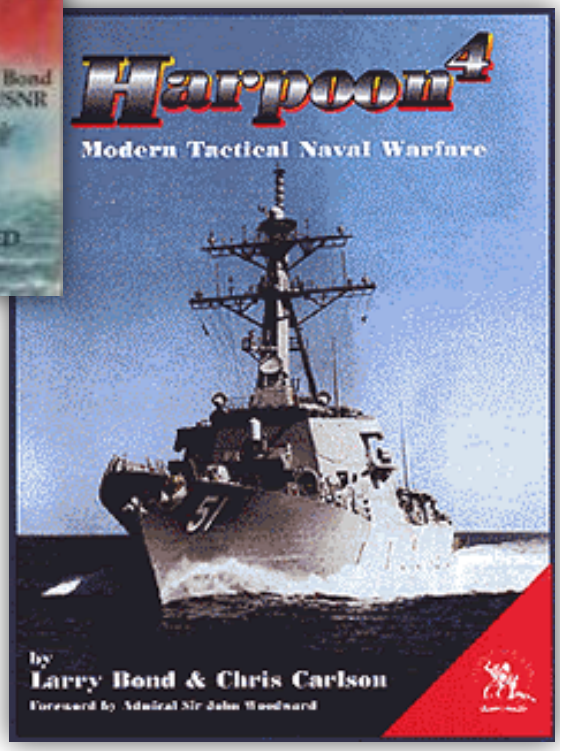
- Use *Harpoon* miniatures game to resolve military engagements between Israeli and Iranian forces
- Existing rules for tactical interactions:
  - Aircraft movement, attacks against land targets
  - Target characteristics
  - Air-to-air combat, SAMs and AAA
  - Sensors
- Develop rules for:
  - Political dimension
  - Resource allocation
  - Information Operations
  - Special Operations Forces
  - Ballistic missiles & ballistic missile defense

- Confrontation is asymmetric – less about game mechanics, more about player decisions. Victory based on political outcome

Harpoon

- First published in 1980, current version is *Harpoon*[4]
- General-purpose tactical level miniatures wargame
- Covers surface, submarine, air, and strike warfare
  - Mine warfare in *Harpoon V*
- Training tool to provide a basic introduction to naval platforms, sensors, and weapons





Initial Game Scope

- Design to give the two sides freedom to act and interact as they would in the real world
- Air attacks by Israel on Iranian nuclear sites, airfields, ballistic missile sites, SAM, AAA, radar sites
- Ballistic missile warfare
- Naval warfare
  - Israeli subs and Iranian attempts to close the Strait of Hormuz
- Special warfare & terrorist attacks
- Information operations
- Political interactions
  - This was the major design challenge
  - Key to victory conditions
- Simple, but meaningful resource allocation system

The Questions

- Can the Israelis take out the entire nuclear infrastructure?
  - Or is most of it enough?
- What can the Iranians do to stop them?
  - How effective is their national air defense organization?
  - Is an asymmetric response their only effective option?
- Will a military campaign affect the Iranians' political will?
- What are the political and economic repercussions for the rest of the world?
  - How do regional powers fit into the picture?
  - Russia and China?
- What political price will the Israelis have to pay?
  - Can they achieve their goal before the ROW demands that they stop?

Desired Features

- High game variability – supports numerous "what if" scenarios
  - Seven political environments – variable starting conditions
  - Variable orders of battle – real-world uncertainty
- Players make strategy and system upgrade decisions
- Card based system for political interactions
  - Random card selection, luck of the draw
  - River concept simulates fleeting opportunities
  - Opinion or "Happy" Tracks to display sentiments within a country
- Accurate descriptions of Iranian nuclear infrastructure facilities
  - The "so what" of the entire game
  - Involves Israeli player in strike planning, Iranian in air defense
- Detailed modeling of combat where appropriate, everything else is abstracted for ease of play and speed
- More than one way to win or lose
  - One driven by military outcomes, a second driven by the Opinion Tracks
  - ***If the Israelis don't win big, then they lose***

Structure

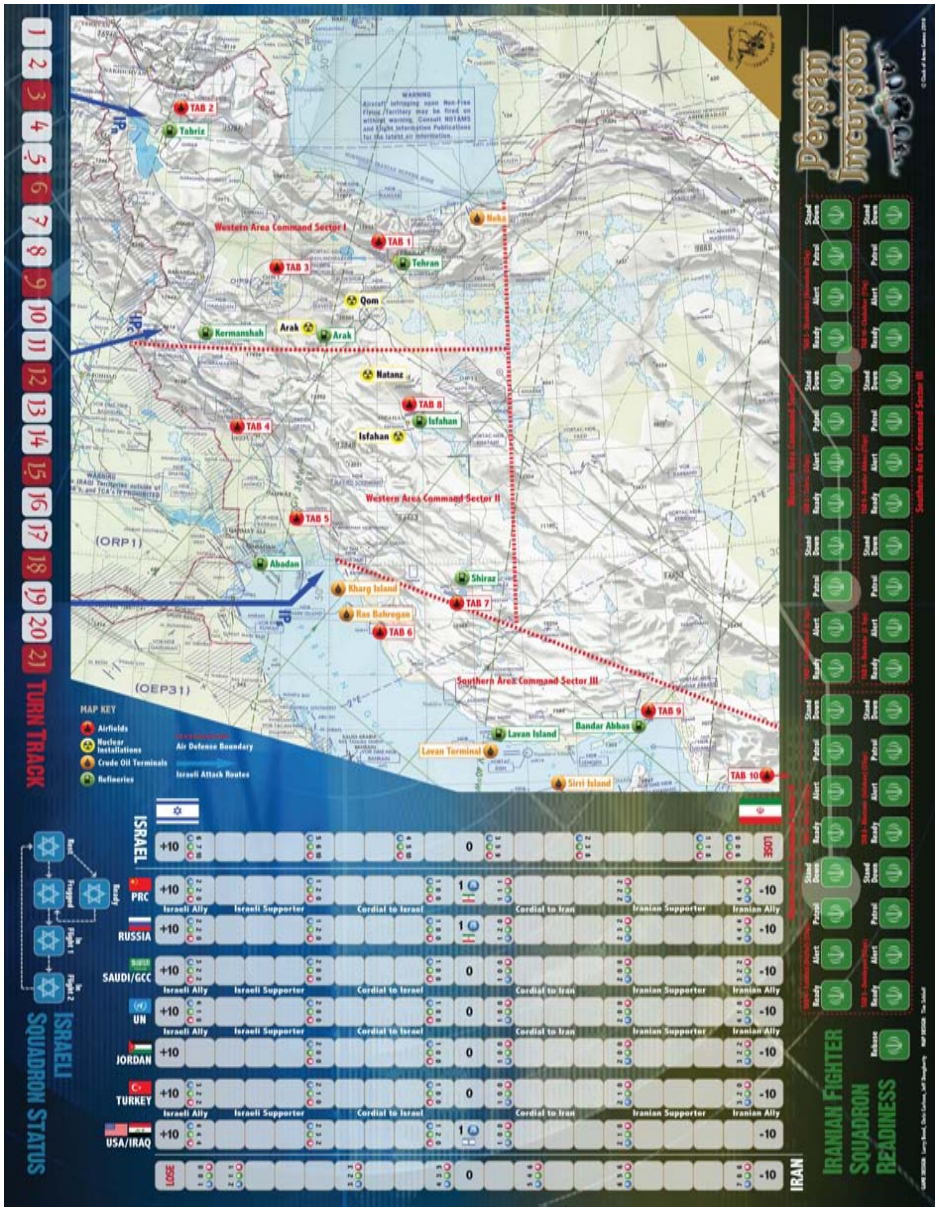
- Players are national decision makers
  - Decide strategy and purchase upgrades accordingly
  - Plan and execute strikes
  - Allocate resources for military and political actions
- Eight-hour Map Turn. Keyed to:
  - Aircraft sortie rates
  - Political decision making cycle
- Fixed game duration of 7 days, 21 turns
  - “Real World” scenario is 14 days, 42 turns
- Miniatures-based game with a supplementary card-based system added for the political dimension
  - One BIG book with rules, target descriptions, and relevant background
  - Map, counters, playing cards, player support cards

Political Aspect

- Players draw seven cards, each describing different actions, different costs, and different outcomes
  - Some require pre-existing actions or conditions
  - Some cards can "Backfire" on the player
  - Defines who can be influenced by the card and by how much
- Not held in player controlled hand, but a "River" that changes each Map Turn
  - Simulates opportunity
  - Can generate a "use or lose" stress
- Players get points from other countries as well as their own, depending on the status of their relationship
  - Opinion Tracks display the level of support

Game Map

- General visual playing aid used for strike and air defense planning
- Displays locations of nuclear and oil targets, as well as Iranian TABs and air defense boundaries
- Iranian TAB status and Israeli strike cycle included to ease aircraft availability bookkeeping
- Displays Israeli attack routes
- Nine “Opinion Tracks” provides easy reference of relationship status and the number and type of resource points assigned to that status



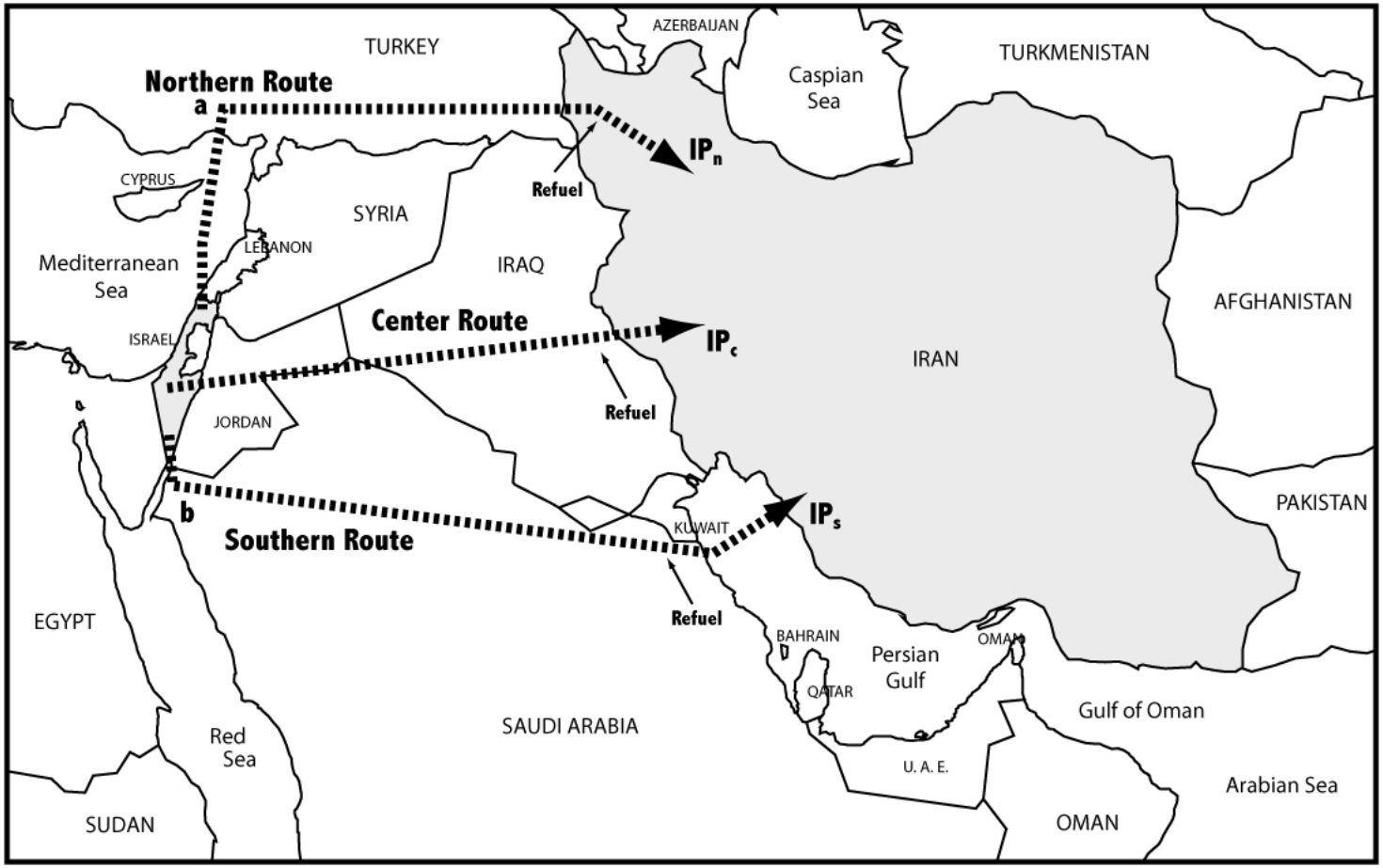
Political Aspect Questions

- Who are the main players besides Israel and Iran?
  - Opinion Tracks for major players: US, PRC, Russia, Turkey, Jordan, Saudi Arabia and GCC countries, ROW (UN)
  - Omitted: Syria, PLO
- What are the effects of the Opinion Tracks?
  - Israel needs either Turkey, Saudi Arabia or US as a "Supporter" for overflight privileges
  - US, Russia, or China can become directly involved with "Ally" status
  - Resource points are provided - Political, Military, Intelligence
- Interactions?
  - Levels define relationship: Cordial, Supporter, or Ally
- Player actions?
  - Card play directly impacts a country's relationship
  - Resource points are necessary to execute political (cards) or military actions: the more you have, the more you can do

Air Attacks

- Iranian target set
  - Oil and nuclear facilities are broken down into “Primary” and “Secondary” categories, distinction drives air strike victory levels
  - Repeated “Decisive” victories needed to get Iran to fold militarily
- Israeli order of battle, available ordnance
  - Attack profile, route dependent
  - Range calculations a major concern
- Drove first political consequence:
  - Choice of attack route
- Iranian air defenses
  - Main defenses: SAMs
  - EW defenses: GPS jamming
- Abstracted support:
  - Air defense suppression missions
  - Suter attacks
  - Aerial tankers

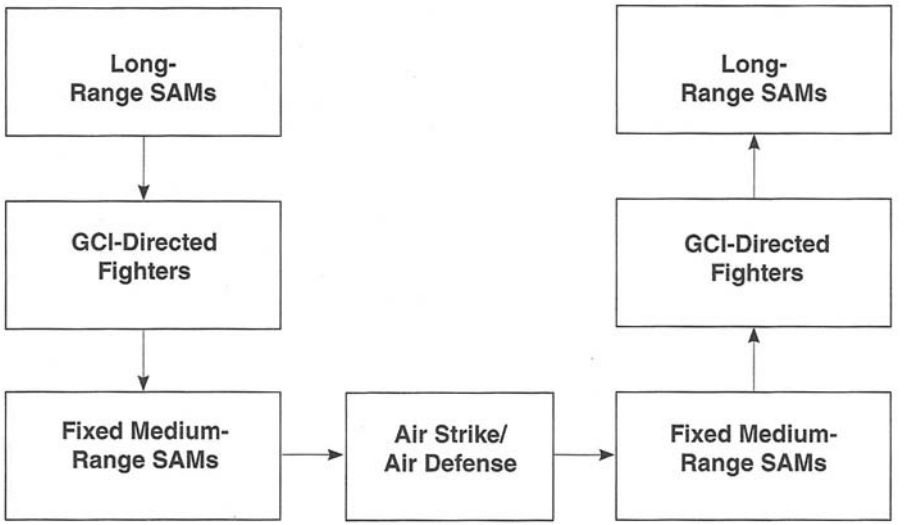
Israeli Attack Routes



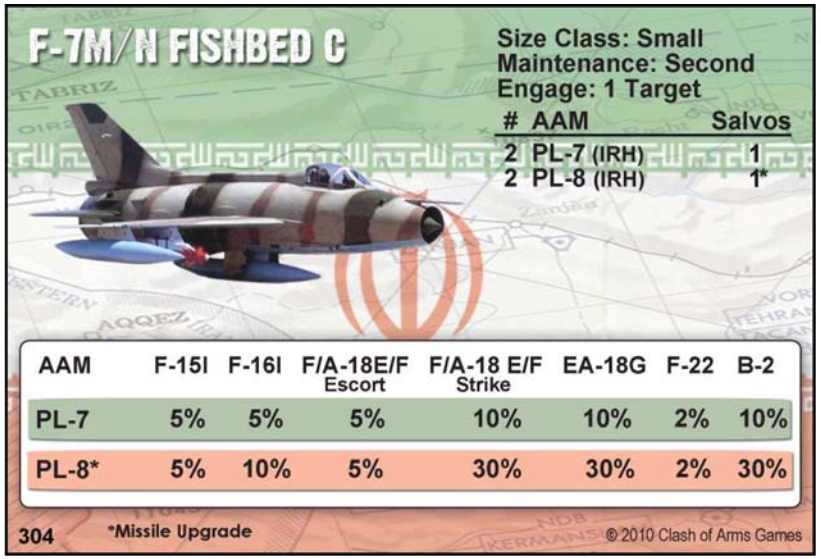
Highlights the close relationship between tactical and political issues

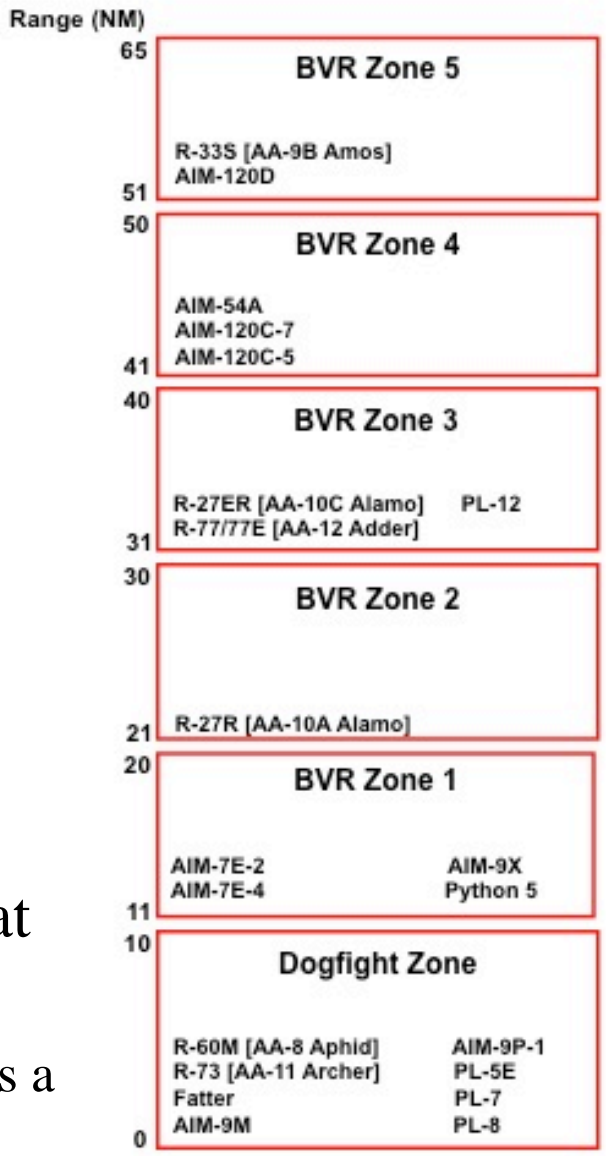
Nodal Air Defense Concept

- Separate air defense service, "Khatam-ol-Anbia Air Defence Headquarters," formed in 2009
- NOT an IADS - data is transmitted from sensors via voice or commercial data link
- Israeli air strikes move through the various nodes and are engaged by Iranian assets when applicable
  - Israeli IO attacks, suppression missions, or flight profile can degrade or negate a node
  - Israeli PGMs largely negate short range defenses
    - AAA is a "Pasdaran jobs program"



Nodal Air-to-Air Combat





- Originally considered gaming out air engagements with *Harpoon*[4]
  - Sanity prevailed and an abstracted nodal AAM engagement flow chart was developed
- Necessary information for air-to-air combat was summarized on Air Data Cards
  - Based on *Harpoon*[4], but becoming less and less a dedicated supplement

Strike Warfare

- Israel has a wide variety of precision guided munitions
  - Mostly US weaponry
  - Some indigenous: SPICE 2000, Guillotine
  - Majority are GPS-aided, some dual guidance
- Wanted players to get a sense of what goes into a planning a large strike package
  - Target selection
  - Ordnance selection – "Weaponeering"
  - Logistical support
  - Air defense suppression
  - Need for accurate battle damage assessment
- Use Google Earth imagery for added realism, improve player immersion

Target Set Development

- Initial concept only considered the nuclear infrastructure. Oil strategy was added to allow Israel to attack Iran economically
- Facility buildings originally had “criticality points” for victory conditions, replaced by simpler primary and secondary Target Facility Lists
- *Harpoon* damage points replaced by hit boxes to reduce book-keeping
  - 1 hit box requires equivalent damage of a 500 lb GP bomb

Facility Target Lists

Natanz Facility Target List

	Description	Dimensions (m)	Area (m2)	Size Class	Construction Type	Armor Class	Damage Boxes Damaged	Destroyed
Primary Targets								
Original Centrifuge Plant - Centrifuge Assembly complex								
A	Quality Control, pilot centrifuge plant	60 x 45	2700	C	Medium	0	□□□□	□□
B	Pilot Plant 2	60 x 40	2400	C	Medium	0	□□□	□□
C	Pilot Plant 3	60 x 45	2700	C	Medium	0	□□□□	□□
D	Pilot Plant 4 (center building)	40 x 30	1200	C	Medium	0	□□□	□□
E	Pilot Plant 5	55 x 22	1210	C	Medium	0	□□□	□□
F	Pilot Plant 6	55 x 22	1210	C	Medium	0	□□□	□□
Underground Facility								
G1 - 4[1]	Centrifuge hall	150 x 150	22500	*[2]	Hvy Reinforced	48[2]	□□□□□	□□□□
H1 - 4[1]	Centrifuge hall	150 x 150	22500	*[2]	Hvy Reinforced	48[2]	□□□□□	□□□□
I	UF_6 Storage	70 x 90	6300	*	Hvy Reinforced	48[2]	□□	□
J	Building covering tunnel entrance to the underground facilities	72 x 19	1368	C	Medium	7	□□□	□□
Secondary Targets								
L	Steam Plant 1	62 x 85	5270	B	Medium	0	□□□□	□□
M	Steam Plant 2	17 x 40	680	D	Medium	0	□□□	□
N1	Air Handling Building	70 x 26	1820	C	Medium	0	□□□	□□
N2	Air Handling Building	70 x 26	1820	C	Medium	0	□□□	□□
P1	Transformer Station	47 x 17	800	C	Light	0	□□	□
P2	Transformer Station	47 x 17	800	C	Light	0	□□	□
P3	Transformer Station	47 x 17	800	C	Light	0	□□	□
P4	Transformer Station	47 x 17	800	C	Light	0	□□	□
Q1	Backup Gas Turbine Generator	45 x 8	360	E	Light	0	□	□
Q2	Backup Gas Turbine Generator	45 x 8	360	E	Light	0	□	□
R	Transformer Substation	68 x 34	2312	C	Light	0	□□	□

Notes:

1) G1 - G4 and H1 - H4 are four aim points distributed over each hall. The hit damage from the weapons that penetrate all four aim points should be combined for each hall. The two centrifuge halls require a total of five hit boxes to be damaged, and four more (nine total) to be destroyed. Damage is limited to five hit boxes if only one aim point is penetrated. They can only inflict full damage (nine boxes) with two or more aim points penetrated.

2) Based on NITI and imagery reports by ISIS, the centrifuge halls and UF_6 storage area heavily protected by an 8-meter layer of earth and rock over a 2.5m concrete "burster slab" over another 8 meters of earth and rock on top of the 2.5 meter-thick ceiling of the structures. Barring mechanical failure or targeting error (included in the hit chance), a guided weapon will strike the relatively large area occupied by the underground facility, but to reach the hall's vitals, a second weapon must pass through a hole in the burster slab created by the first weapon's impact. This requires two successive hits on the same spot. The first aim point is a B-sized area. The second is an F-sized target (the hole in the slab made by the first weapon). Only if the second EGBU-28B also hits will it actually inflict any damage inside the hall.

If the US is an Israeli supporter at the start of the game, the Israeli player can purchase the EGBU-28C upgrade, which is an improved munition. A single EGBU-28C can penetrate the entire overhead protection of the centrifuge halls and support building and inflict full damage. In this case, each aim point only requires one hit against a B-sized target. As a US ally, the Israeli player may also be given a B-2 mission (see page 11 of the Rules Booklet). The GBU-57 Massive Ordnance Penetrator will go through both layers of earth and concrete (like they aren't even there!), inflicting full damage if it hits. It also rolls to hit an A-sized target.

Natanz UEF

Main
Transformer
Station
Underground hall
Transformer
Sub-station
Backup
Gas Turbine
Generators
Personnel entrance
to underground halls
Pilot Plant
Underground halls
Vehicle entrance
to underground
halls
Possible Steam Plant
or ventilation exhaust
Admin Bldg
Probable Air Handling/
Air Conditioning Bldg
Worker Dormitories
N
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Ballistic Missiles

- A *VERY* big deal in both Israel and the US
- Iranian order of battle, employment
  - Only care about 5th Ra'ad Brigade
  - Armed with Shahab-3 & Sejil-2 MRBMs (upgrade)
  - Lengthy preparations for liquid-fueled missiles
- Israeli Defenses
  - Arrow-2 & Patriot PAC-3
  - Third Arrow-2 battery (upgrade)
  - Aegis/SM-3 coverage (card)
  - "Shahab hunt" rules
- BMD effectiveness unknown
  - Took publicized test results and reduced Ph
- Ballistic missile attacks have, so far, had little military effect, mostly political

Naval Warfare

- Cruise-missile armed Israeli subs
  - Harpoon missile have limited range and warhead
  - Nuclear strikes a non-starter
  - Dropped Israeli Navy participation
- Attacks on Western naval units
  - Trigger direct Western involvement
  - Not central to the primary design goal
- Closing the Strait of Hormuz
  - Iranian navies attempted this during Iran-Iraq War, did not go well for them
- "This time, we'll do better"
  - Small craft with C701missiles & torpedoes
  - Numerous coastal C802 ASCM batteries
  - F-7s and Su-25s attack aircraft
- Reluctantly had to admit that detailed naval interaction was superfluous
  - Abstract Iranian attempts to close strait

Special Warfare

- Iranian-sponsored terrorist attacks
  - Hezbollah and Hamas
  - No military results, but political effects
    - Impacts Opinion Tracks
- Israeli attacks with Special Operating Forces
  - *Shaldag* or Special Air-Ground Designating Team
  - Improves targeting
  - Identify high fidelity decoys
  - Direct attacks against facilities or air defenses

Information Operations

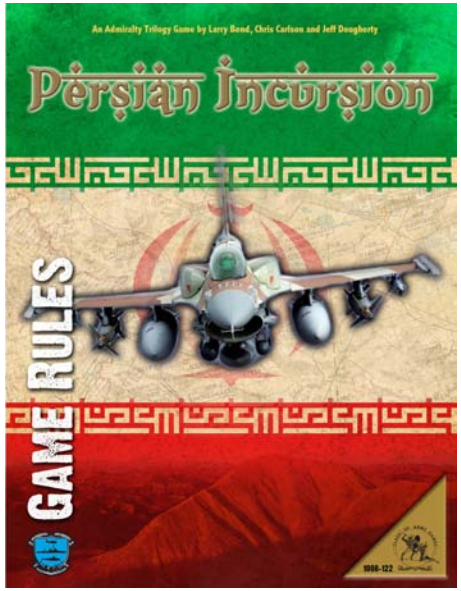
- Importance of IO emphasized
  - Electronic warfare
  - Cyber attacks
  - Media exploitation
- Iran has the option to purchase upgrades
  - High fidelity decoys
  - GPS jammers, laser guided bomb decoys
- Israelis are masters of IO
  - Modern self-protection and standoff jammers
  - Miniature Air Launched Decoys (MALD)
- SUTER attacks
  - Hack into an air defense network
    - Shavit ELINT aircraft and Eitan UAVs
    - Manipulate data
    - Disrupt communications
  - Shut down entire Syrian IADS in Sept 2007

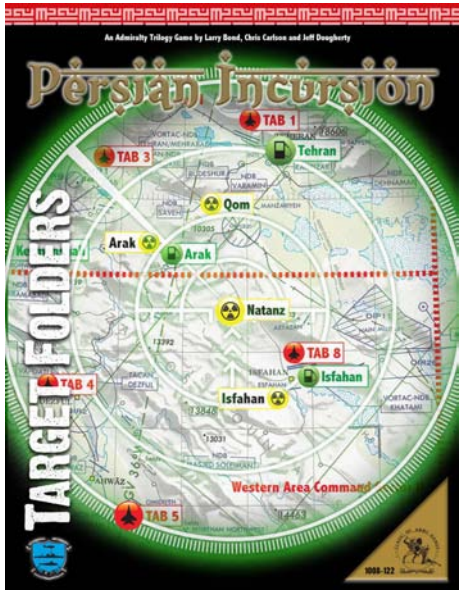
Development Process

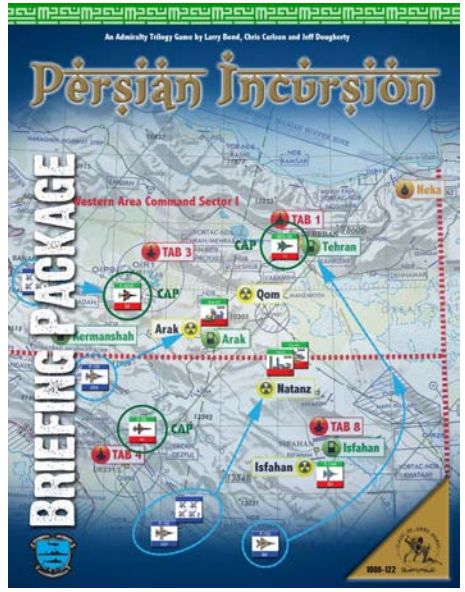
- Initial draft had a radically pared-down *Harpoon* rules set, ballistic missiles, special warfare and IO roughed out, draft card set
- Simplifications:
  - Naval warfare – largely irrelevant
    - Abstract closing Strait of Hormuz
  - Eliminated Shahab hunt rules – ineffective tactic
  - Air defense interactions – totally based on nodal engagements
  - Range calculations become a yes/no matrix
    - Tanker support requirements distilled to a single table
  - Detailed annexes replaced by scenario-specific data
    - Air data cards contain all necessary information for air-to-air
    - PGM, SAM, and suppression tables covered everything else
  - Facility damage points replaced by "Hit Boxes"
- Additions:
  - Primary and secondary facility target lists
    - Allowed more detail in the target folders
  - Addition of the oil strategy to allow Israel to strangle Iran economically
- **After all was said and done, *Persian Incursion* had effectively become a stand alone game, and not a dedicated *Harpoon*^{4} supplement**
  - Remaining development shifted to ensure that a proper board game was completed

Major Format Changes

- An operational level board game freed up considerable space in rules book
  - But it was still a bit big
- Decision was made to produce three booklets, enabled us to focus on providing more data
  - That educational thing
  - Easier for players to read and use
- Added functionality to draft map to make it more useful for the players
- Lots of Google Earth imagery
- Excellent artwork in the map and other components

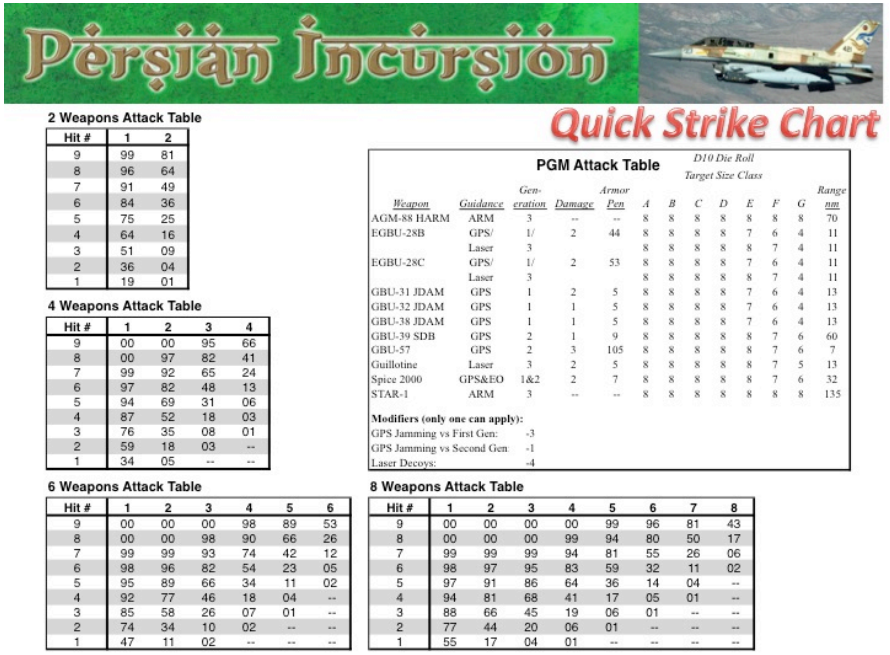






Post-Publishing Support

- Feedback from players was predominantly positive, however there were some issues…..
- "A lot of wristage in the strike resolution"
  - Quickstrike rules aggregates attacks
- More information on Iranian SAM sites was requested
  - SAM site roster produced
- More example airstrikes
- Rules errata/clarifications
- All errata and support products posted on Clash of Arms website



Persian Incursion

Quick Strike Chart

2 Weapons Attack Table

Hit #	1	2
9	99	81
8	96	64
7	91	49
6	84	36
5	75	25
4	64	16
3	51	09
2	36	04
1	19	01

4 Weapons Attack Table

Hit #	1	2	3	4
9	00	00	95	66
8	00	97	82	41
7	99	92	65	24
6	97	82	48	13
5	94	69	31	06
4	87	52	18	03
3	76	35	08	01
2	59	18	03	--
1	34	05	--	--

PGM Attack Table

D10 Die Roll Target Size Class

Weapon	Guidance	Gen-eration	Damage	Armor Pen	A	B	C	D	E	F	G	Range nm
AGM-88 HARM	ARM	3	--	--	8	8	8	8	8	8	8	70
EGBU-28B	GPS/	1/	2	44	8	8	8	8	7	6	4	11
	Laser	3			8	8	8	8	8	7	4	11
EGBU-28C	GPS/	1/	2	53	8	8	8	8	7	6	4	11
	Laser	3			8	8	8	8	8	7	4	11
GBU-31 JDAM	GPS	1	2	5	8	8	8	8	7	6	4	13
GBU-32 JDAM	GPS	1	1	5	8	8	8	8	7	6	4	13
GBU-38 JDAM	GPS	1	1	5	8	8	8	8	7	6	4	13
GBU-39 SDB	GPS	2	1	9	8	8	8	8	8	7	6	60
GBU-57	GPS	2	3	105	8	8	8	8	8	7	6	7
Guillotine	Laser	3	2	5	8	8	8	8	8	7	5	13
Spice 2000	GPS&EO	1&2	2	7	8	8	8	8	8	7	6	32
STAR-1	ARM	3	--	--	8	8	8	8	8	8	8	135

Modifiers (only one can apply):

GPS Jamming vs First Gen:	-3
GPS Jamming vs Second Gen:	-1
Laser Decoys:	-4

6 Weapons Attack Table

Hit #	1	2	3	4	5	6
9	00	00	00	98	89	53
8	00	00	98	90	66	26
7	99	99	93	74	42	12
6	98	96	82	54	23	05
5	95	89	66	34	11	02
4	92	77	46	18	04	--
3	85	58	26	07	01	--
2	74	34	10	02	--	--
1	47	11	02	--	--	--

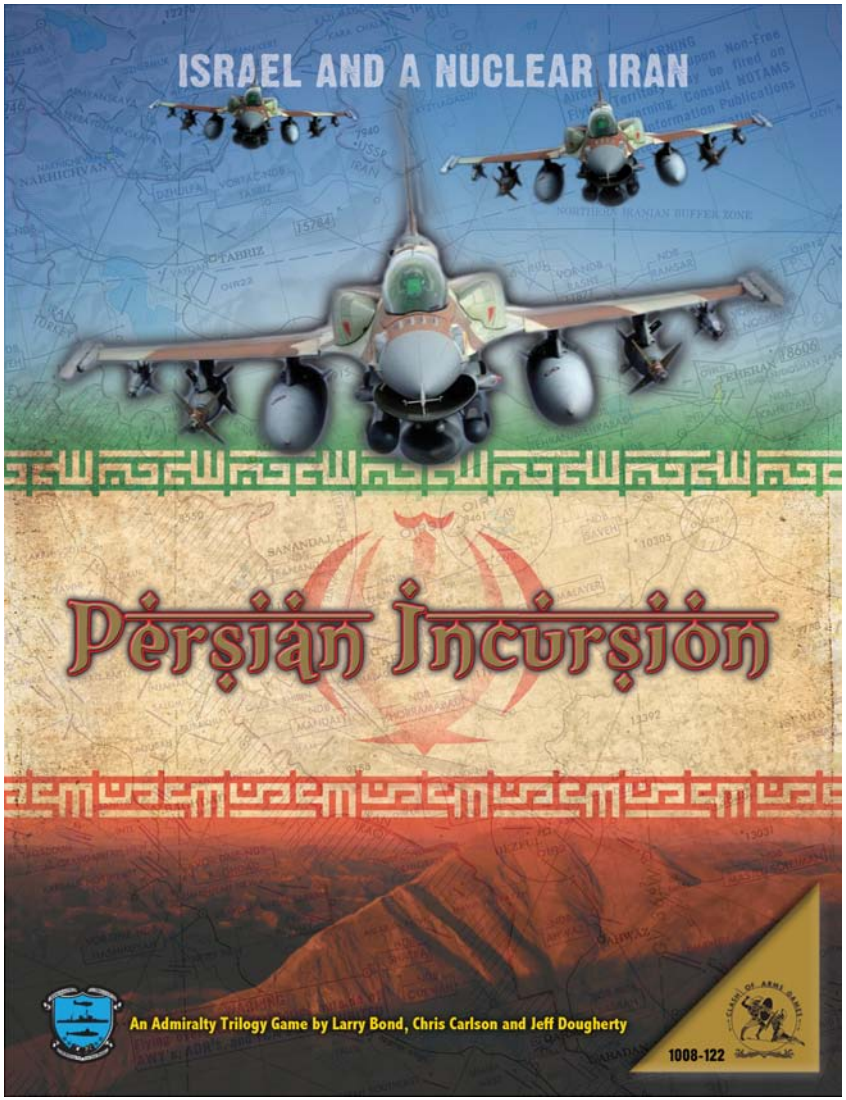
8 Weapons Attack Table

Hit #	1	2	3	4	5	6	7	8
9	00	00	00	00	99	96	81	43
8	00	00	00	99	94	80	50	17
7	99	99	99	94	81	55	26	06
6	98	97	95	83	59	32	11	02
5	97	91	86	64	36	14	04	--
4	94	81	68	41	17	05	01	--
3	88	66	45	19	06	01	--	--
2	77	44	20	06	01	--	--	--
1	55	17	04	01	--	--	--	--

Conclusions

- What started out as a tactical level *Harpoon*^{4} supplement with a supporting card-based political adjunct, eventually morphed into an operational stand alone board game
- Modular development of the rules and extensive play testing were crucial to seeing the significant changes that had to be made to the game's design and embracing them
- Ruthless simplification of *Harpoon*^{4} rules, along with abstracted rules for complex and time consuming issues enabled the design team to focus more on content
  - Briefing Booklet and Target Folders Booklet most popular features
- The final version met the original design requirement of producing an exploratory wargame that was entertaining as well as educational

Questions


ISRAEL AND A NUCLEAR IRAN
Persian Incursion
An Admiralty Trilogy Game by Larry Bond, Chris Carlson and Jeff Dougherty
1008-122

Persian Incursion
A COMPLETE GAME SYSTEM WITH ALL COMPONENTS NEEDED TO PLAY!
ISRAEL AND A NUCLEAR IRAN
"Is Iran building a nuclear weapon?" Little is known for certain. However, on June 6, 2008, Israeli Transport Minister, Shaul Mofaz said, "If Iran continues with its program for developing nuclear weapons, we will attack it."
Persian Incursion explores the political and military effects of an Israeli military campaign against Iran. It uses rules adapted from Harpoon4 to resolve the military action. But its goal is to look beyond the military action by modeling the political and intelligence actions and consequences of a potential political conflict by including a card-based diplomatic/political component to the game.
Players spend Political, Intelligence and Military Points to influence allies or enemies, purchase reinforcements, execute military strikes or shape their own domestic opinion. Players choose variable starting conditions that shape scenarios, while random strategic events influence play in unexpected ways.
Persian Incursion Components Include:
• Rulebook (42 pages)
• Briefing Package (41 pages)
• Target Folders (34 pages)
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