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Policy Brief

Escalation Risk in Protracted Missile Exchanges:

Assessing Low-Probability, High-Impact Dynamics in the U.S.–Israel–Iran Conflict Based on IRGC Operation True Promise 4 (Waves 1–13)

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Key Findings

As artificial intelligence (AI) shifts from a research and innovation domain to a core Based on open-source reporting and cross-validated indicators concerning IRGC Operation True Promise 4 (Waves 1–13):

- Estimated interception rates appear to remain relatively high (approximately 75–90 percent), limiting aggregate confirmed damage.
- There is no independently verified evidence of systemic military degradation among principal actors as of Wave 13.
- Escalation risk appears to be driven less by average strike performance than by the probability of a single high-impact strike against a critical node.
- If launch tempo and defensive consumption rates persist at current levels over several weeks, cumulative probability dynamics may increase systemic escalation risk.
- The conflict remains operationally contained within observed escalation boundaries. No confirmed strategic escalation threshold has yet been crossed.

All estimates remain subject to reporting uncertainty, partial battlefield visibility, and ongoing verification.

1. The Analytical Problem

Public assessments of missile exchanges often emphasize aggregate launch numbers or daily damage totals. While informative, such metrics may understate escalation risk in protracted engagements such as Operation True Promise 4 (Waves 1–13).

Certain categories of targets: strategic air bases, command-and-control nodes, leadership compounds, naval platforms, and dense urban centers, carry asymmetric strategic weight. These “high-value nodes” exhibit nonlinear escalation potential.

Under this structure:

- Multiple failed strikes may produce limited cumulative strategic effect.
- A single successful strike against a critical node may generate disproportionate political, military, or alliance consequences.

This dynamic introduces probabilistic instability into what otherwise appears to be a contained exchange.

2. Current Operational Assessment (Waves 1–13)

A. Tactical Level

Estimated interception success rate:75–90 percent (range derived from open-source reporting and observed outcomes). These estimates reflect blended defensive performance across missile and UAV categories and are not system-specific.

Estimated breakthrough (non-intercept) rate: 10–20 percent. Confirmed effective-strike rate remains lower due to accuracy variance and target dispersion.

Observed outcomes to date:

- Limited independently confirmed military infrastructure degradation;
- Continued operational capability among principal actors;
- No verified destruction of major strategic assets.

These indicators suggest sustained defensive effectiveness under current conditions, although reporting gaps and verification constraints remain.

B. Operational Level

Indicators suggest:

- Elevated interceptor consumption rates;
- Sustained high operational tempo;
- Increased stress on defensive systems.

However:

- Defensive redundancy appears intact;
- No confirmed evidence of defensive system collapse;
- No observed sustained operational paralysis.

Operational stress is evident, but systemic breakdown has not been observed as of Wave 13.

C. Strategic Level

No confirmed indicators of:

- Full-scale mobilization by major powers;
- Formal declaration of expanded war objectives;
- Irreversible alliance rupture;
- Large-scale civilian mass-casualty event;
- Loss of strategic-level military assets.

The conflict remains limited in scope but high in operational pressure.

D. Daily Cost Escalation Pattern (Day 1–Day 3)

The daily incremental cost data (Figure 1) indicate a stepwise escalation pattern rather than smooth linear growth.

Key observations:

- Day 1 reflects initial strike exchange and immediate defensive mobilization.
- Day 2 demonstrates increased operational tempo and interceptor consumption.
- Day 3 shows broadened geographic engagement and elevated systemic stress.

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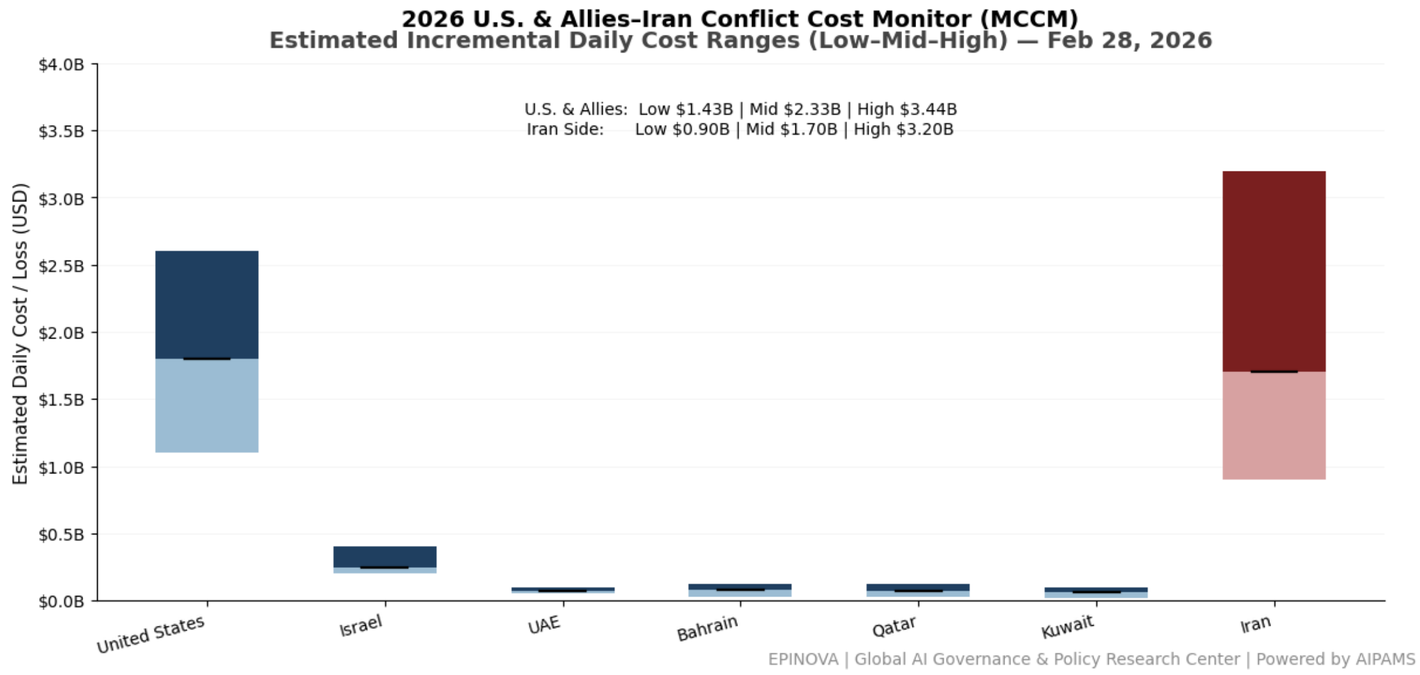
This pattern suggests that fiscal exposure is event-driven and responsive to operational intensity rather than preplanned cost baselines.

The slope between Day 2 and Day 3 may indicate expanding engagement scope, consistent with increased regional involvement and multi-domain operational activity.



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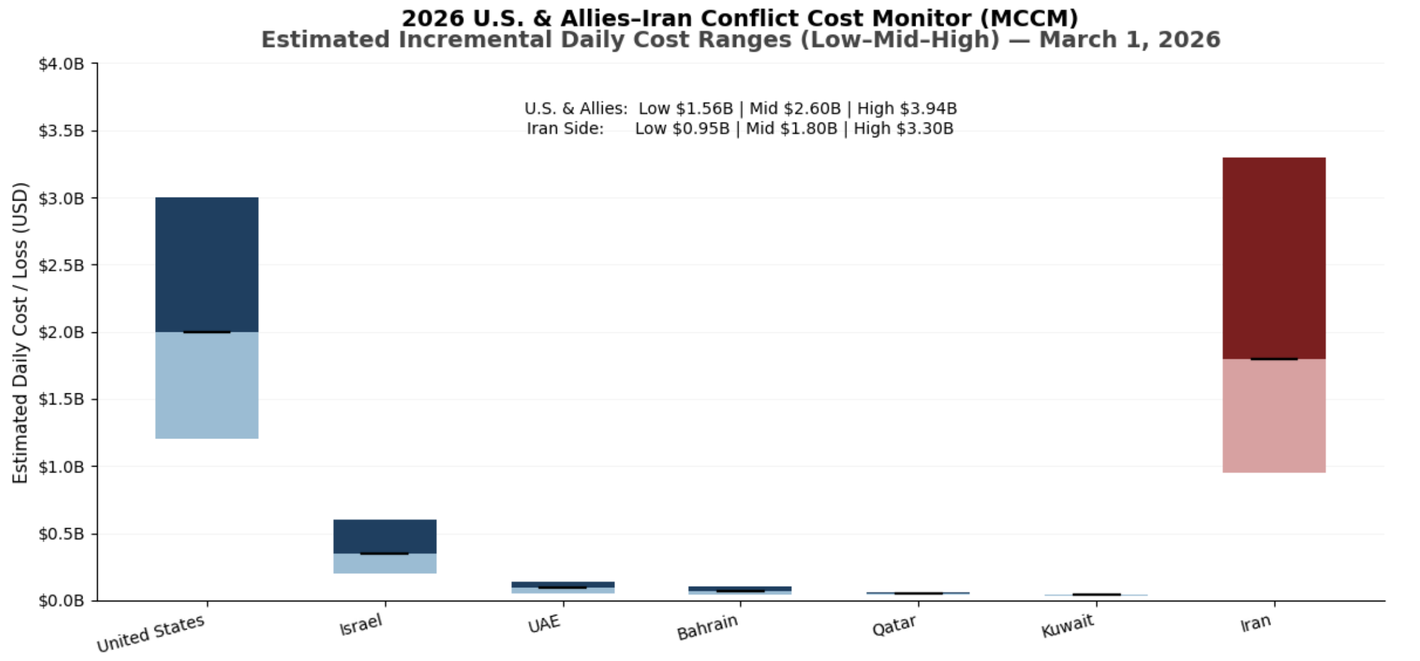

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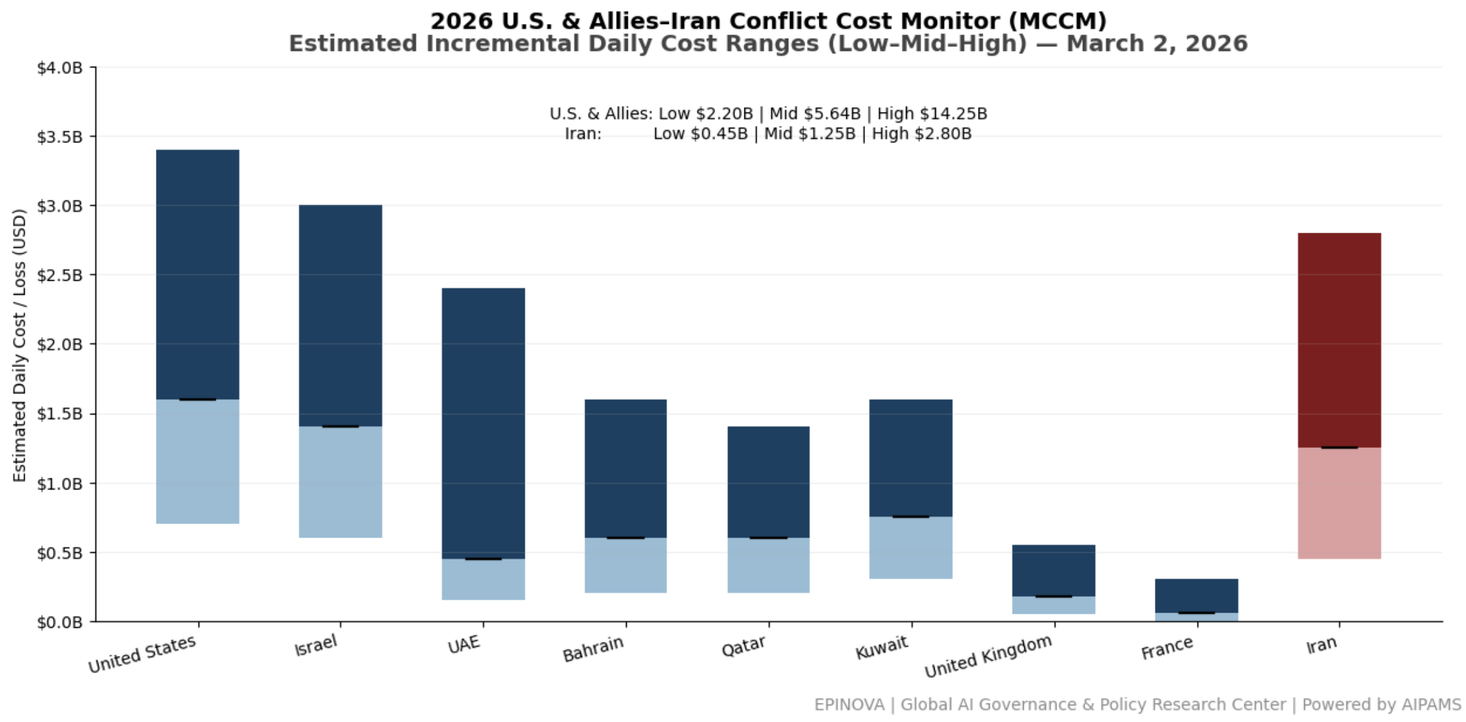

(c)

Figure 1. Daily Incremental Cost (Day 1–Day 3)

E. Cumulative Cost Dynamics

As shown in Figure 2, cumulative fiscal exposure diverges significantly across scenario bounds.

Under mid-range assumptions:

- U.S. & Allies cumulative cost: approximately $11–12B by Day 3.
- Iran cumulative cost: approximately $5B by Day 3.

Although the fiscal exposure remains manageable within current defense budget baselines under short-duration assumptions, the widening gap between low and high scenarios reflects reporting uncertainty and variable strike intensity assumptions.

At present, the cumulative curve does not exhibit exponential acceleration. However, if daily marginal costs continue to increase, the slope could steepen beyond current bounds.

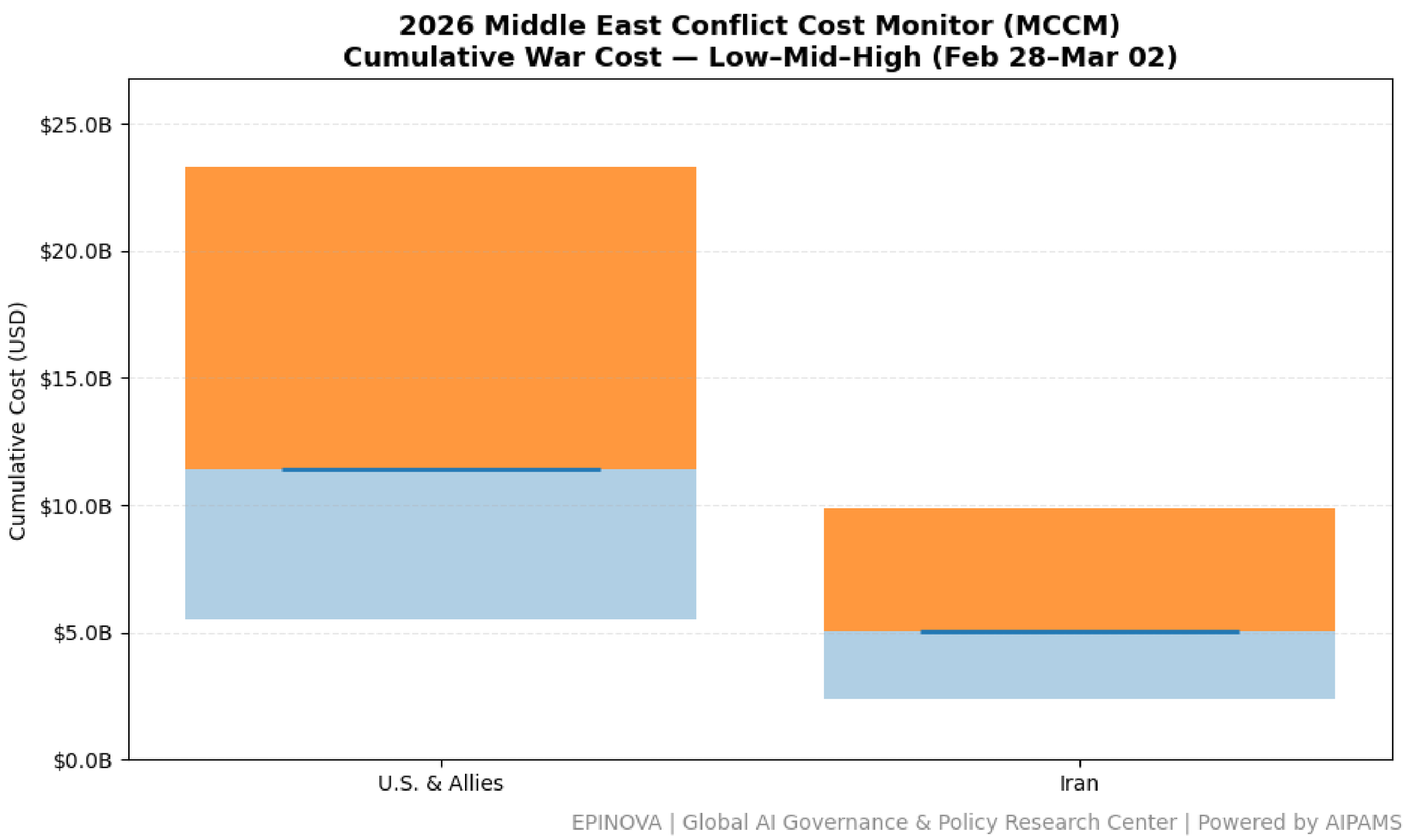

Figure 2. Cumulative Cost Trajectory (Low–Mid–High Scenario)

F. Methodological Note

Daily cost estimates reflect bounded scenario modeling based on:

- Open-source reporting of strike volume,
- Estimated interceptor expenditure,
- Known unit cost approximations,
- Observed deployment milestones.

Figures exclude macroeconomic spillover effects (“Global Shock”) and focus on direct operational and material costs. All values remain subject to revision as additional verification becomes available.

3. Escalation Pathways Under a Critical Node Strike

Escalation dynamics vary significantly depending on the type of target successfully struck.

A. Scenario A: Major Military Facility Hit

Potential consequences:

- Temporary operational degradation;
- Expanded retaliatory strike scope;
- Increased launch volume.

Escalation risk: Moderate and potentially containable, depending on damage scale and political response.

B. Scenario B: Leadership or Symbolic Target Hit

Potential consequences:

- Immediate domestic political pressure;
- Credibility concerns;
- Expanded retaliatory intensity beyond current levels.

Escalation risk: High. Risk of rapid vertical escalation increases substantially.

C. Scenario C: Strategic Asset Loss (e.g., carrier-level or equivalent asset)

Potential consequences:

- Formal war authorization;
- Accelerated force mobilization;
- Regional conflict expansion;
- Potential alliance activation.

Escalation risk: Severe, with potential for rapid strategic escalation beyond current containment parameters.

As of Wave 13, no such confirmed loss has occurred.

4. The Time Variable

Even when per-strike success probability remains low, prolonged exchanges introduce cumulative escalation risk.

If:

- Launch volume remains steady,
- Defensive inventories continue to decline,
- Operational tempo remains elevated,
- Conflict duration extends beyond several weeks.

Then:

The probability of a high-impact strike increases over time, even if average breakthrough rates remain constant. This represents a probabilistic accumulation dynamic rather than a linear attrition process. Time may function as a destabilizing variable under sustained high-tempo conditions.

5. Escalation Threshold Indicators

The following developments would suggest rising systemic escalation risk:

- Sustained drop in interception effectiveness below approximately 70 percent.
- Confirmed destruction of strategic military assets.
- High-casualty civilian strike.
- Major U.S. or Israeli combat fatalities in a single high-profile incident.
- Explicit declaration of expanded war aims by principal actors.

A nonlinear escalation shift could occur if interception effectiveness declines sharply over a short temporal window, particularly under sustained launch tempo and high critical-node exposure.

None of these indicators has been independently confirmed as of Wave 13.

6. Policy Considerations

A. For the United States and Israel

- Reinforce redundancy in high-value military and political nodes.
- Sustain interceptor production and resupply capacity.
- Avoid symbolic concentration of leadership exposure.
- Preserve diplomatic signaling channels to manage escalation pathways.
- Prioritize distributed command-and-control resilience.

B. For Iran

- Continued saturation strategies may increase cumulative escalation probability.
- A single high-impact success could trigger disproportionate retaliation.
- Escalation control may become increasingly difficult as conflict duration extends.

C. For Regional States

- Harden energy and civilian infrastructure nodes.
- Maintain crisis communication channels to prevent misinterpretation.
- Enhance civil defense preparedness.
- Avoid reactive escalation driven by incomplete or unverified information.

Conclusion

Operation True Promise 4 (Waves 1–13) represents a sustained, high-intensity missile exchange characterized by elevated operational stress but no confirmed systemic military collapse. Average strike performance does not currently indicate strategic breakdown. However, the underlying structure contains escalation risk driven by low-probability, high-impact outcomes. If the exchange persists without effective de-escalatory mechanisms, cumulative probability dynamics could elevate systemic instability. At present, the conflict remains below the strategic escalation threshold. However, the margin of stability may narrow over time if operational tempo and defensive inventory consumption remain elevated.