

Countering The Disruption Of Theater Missile Defense

Presentation to the 19th RUSI Missile Defense Conference, February 2019

Uzi Rubin

- **The growing effectiveness of theater missile defense.**
- **The hostile's response: disruptive technologies and tactics.**
- **What needs to be done.**

All information herein is from open sources. Copyright Rubincon Ltd

Technological Requirments for Theater Missile Defense

The Growing Effectiveness of Theater Missile Defense



Iron Dome intercepts an Iranian missile, 1/20/2019



Patriot intercepts an Iranian missile, 6/24/2018

Technological Requirments for Theater Missile Defense

The Growing Effectiveness of Theater Missile Defense



Nazeat 6, guided version ?



Patriot intercepts an Iranian missile, 6/24/2018

Technological Requirements for Theater Missile Defense

Early Threats of Disruption



“Iran will launch a blitz of missiles on the Gulf States, targeted not only on US bases in the region but also strategic targets such as refineries and power stations... the objective will be to overwhelm the US missile defense systems by tens if not hundreds of missiles that will be fired simultaneously against selected targets”.

Ali Shamkhani, former Iran MOD, June 10 2007 (Defense News)

Disruptive Measures

- **Emerging technologies and tactics:**
 - **Precision guidance**
 - **Atmospheric skipping (Hypersonic gliding)**
 - **Suppression**
 - **Saturation**

Technological Requirements for Theater Missile Defense

Precision Guidance

- **The first generation of theater missile threats consisted of “classical” ballistic missile and rockets**
- **The second generation of theater missiles is now being deployed, equipped with terminal navigation, guidance and control to achieve pinpoint precision**
- **This vastly multiplies the destructive effects of non WMD warheads.**



Iran Shahab 2 (SCUD C)



Hizbullah 122 mm rockets (GRAD)

Technological Requirements for Theater Missile Defense

Iran's 2nd Generation Missiles



2004: Kader



2017: Emad

Technological Requirments for Theater Missile Defense

Iran's 2nd Generation Missiles



1990's: Fajer 5



2017: Fajer 5C

Technological Requirments for Theater Missile Defense

Iran's 2nd Generation Missiles



2010: Qiam 1



2018: Qiam 2

Technological Requirements for Theater Missile Defense

Iran's 2nd Generation Missiles



2000: Fatah 110, 200 Km



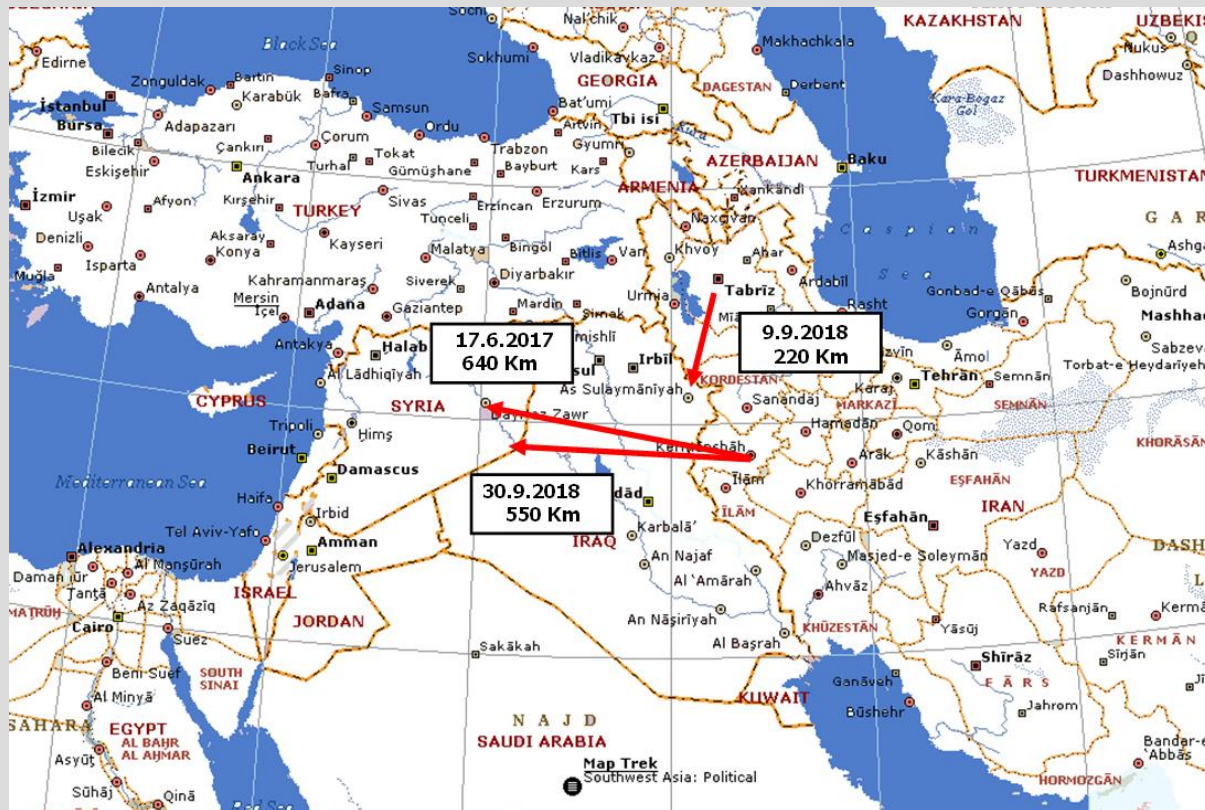
2015: Fatah 313, 500 Km



2017: Zulfikar, 700Km

Technological Requirements for Theater Missile Defense

Iran Missile Programs More Accuracy, More Range



Technological Requirements for Theater Missile Defense

Iran's Precision Missile Attack on KDPI Headquarters, Koya Kurdistan September 9 2018



Technological Requirements for Theater Missile Defense

Iran's Precision Missile Attack on KDPI Headquarters, Koya Kurdistan September 9 2018



Technological Requirements for Theater Missile Defense

Iran's Precision Missile Attack on KDPI Headquarters, Koya Kurdistan September 9 2018



Technological Requirements for Theater Missile Defense

Iran's Precision Missile Attack on KDPI Headquarters, Koya Kurdistan September 9 2018



Technological Requirements for Theater Missile Defense

Iran's Precision Missile Attack on KDPI Headquarters, Koya Kurdistan September 9 2018



Technological Requirments for Theater Missile Defense

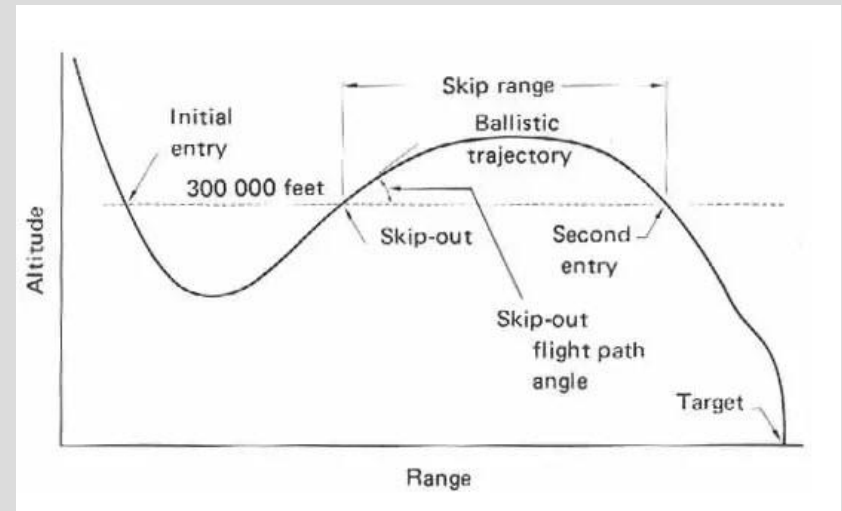
Iran's Precision Missile Attack on KDPI Headquarters, Koya Kurdistan September 9 2018



Technological Requirements for Theater Missile Defense

Atmospheric Skipping/Hypersonic gliding

- Range extension.
- Degrading trajectory predictability.



Technological Requirements for Theater Missile Defense

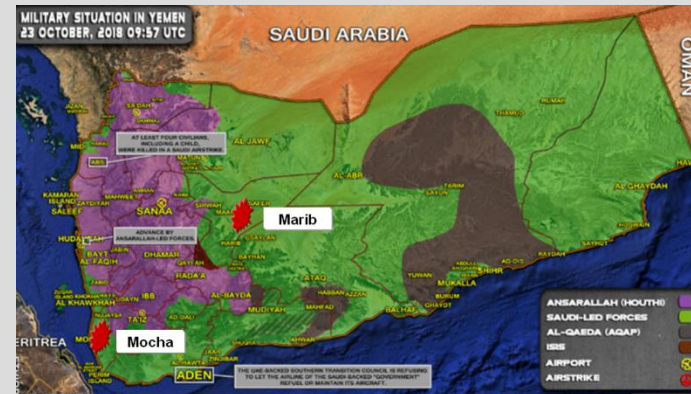
Suppression

Checkpoint

Houthi forces appear to be using Iranian-made drones to ram Saudi air defenses in Yemen, report says

By **Thomas Gibbons-Neff**
March 22, 2017

WEAPONS COMPLEX/MONITOR



Technological Requirements for Theater Missile Defense

Suppression



Technological Requirements for Theater Missile Defense

Saturation/Mass Raids

Escalation in Gaza, November 11-13 2018



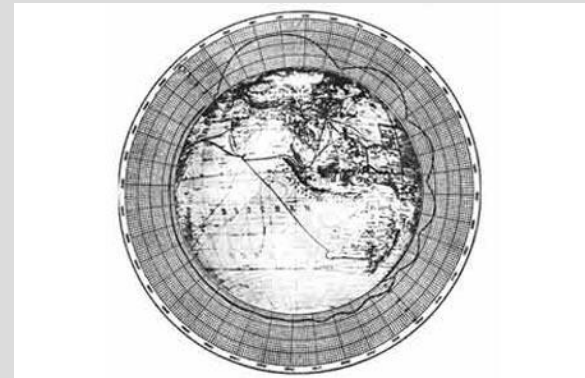
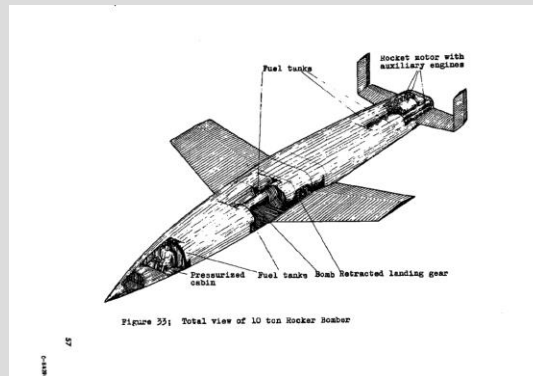
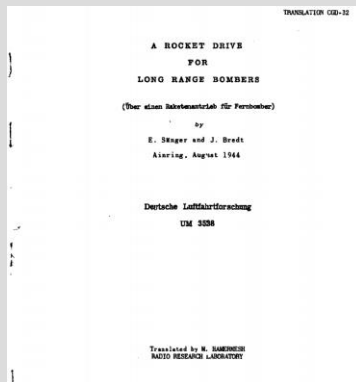
- The rate of fire was the highest recorded to date: 260 rockets in the first 30 minutes
- Total of 460 rockets in less than 48 hours.
- Concentration of fire from several launchers against single targets.

Technological Requirements for Theater Missile Defense

What Needs To Be Done – Atmospheric Skipping

- Atmospheric skipping was first theorized in 1944
- Predictability might be restored by more precise threat tracking: Optical tracking from long duration HALE UAVs.

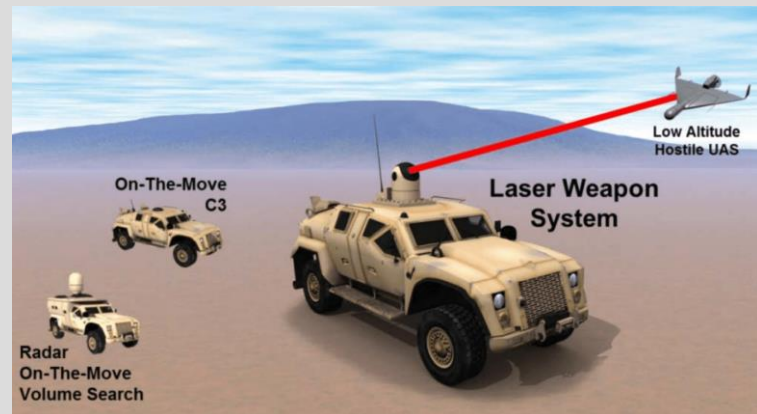
Eugene Sanger and Irene Brendt, 1944



Technological Requirements for Theater Missile Defense

What Needs To Be Done- UAV/Drone Access Denial

- **Hard and soft hostile UAV/Drones access denial systems.**



Technological Requirements for Theater Missile Defense

What Needs To Be Done – Saturation/Mass Raids

- The key is **Affordability**:
 - **Cheaper interceptors**
 - **Powerful, Low cost energy weapons**



Technological Requirements for Theater Missile Defense

Conclusion

- **The wizard war is on: Challenge begets responses, and responses beget more challenges.**
- **Emerging disruption technologies and tactics are complications but not show stoppers.**