European Phased Adaptive Approach (EPAA) Ballistic Missile Defense

- A Technical Overview -

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## European Phased Adaptive Approach To Developing And Deploying Missile Defense

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10 Steps To Missile Intercept
– Aegis Missile Defense –

1. Detect threat missile launch
2. Cue tracking sensors
3. Determine end of threat missile powered flight (burnout) and begin Tracking threat missile
4. Identify warhead (Reentry Vehicle) in cluster of nearby objects
5. If possible, develop Fire Control Solution (guidance instructions) for interceptor from Aegis At Sea or Aegis Ashore Missile Defense System; threat must be in ballistic trajectory and impact in a defended area
6. Launch Interceptor and expend booster stages
7. Communicate with interceptor in flight (provide threat missile Track Updates)
8. Kill Vehicle Separates, and performs final Maneuvers before intercept (endgame)
9. Kill Vehicle Intercepts threat Reentry Vehicle
10. Determine if threat Reentry Vehicle was Destroyed

Space

Atmosphere

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EPAA U.S. Aegis Missile Defense
- SM-3 Interceptors Cannot Intercept Russian ICBMs -

If Possible, Develop Track and Fire Control Solution of Ballistic Trajectory after Burnout

- ICBM must achieve burnout before ballistic trajectory can be projected and confirmed
- Predicted ICBM trajectory must impact in defended area
- SM-3 launch does not occur until after track developed and weapon system processes completed (assuming perfect sensor knowledge, approximately one minute after ICBM burnout, can be up to 2-3 minutes)
- ICBM achieves burnout approximately 130 to 180 seconds after launch
- Earliest SM-3 launch approximately 190 to 240 seconds after ICBM launch
- ICBM too fast for an SM-3 to catch up to and intercept
- ICBM speed and range well beyond SM-3 capability before launch possible from Aegis EPAA Missile Defense assets

- Interceptor in a Tail Chase
- Not Enough Interceptor Divert Capability
- Distance Too Far between Interceptor and ICBM (Closest Approach: ~300-400 km)

Standard Missile-3 (SM-3)

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EPAA Ballistic Missile Defense System
– Incapable of Intercepting Russian ICBMs –

Russian ICBMs launched towards U.S. travel on Polar trajectories and are too fast for deployed SM-3 to intercept either ICBM itself or reentry vehicle
Perceptions and Facts About EPAA Missile Defense System

• Perception: Russian ICBM and SLBM trajectories to U.S. pass through EPAA defense design
  - Fact: Few Russian strategic missile trajectories pass near EPAA assets
  - Fact: Majority of trajectories to U.S. take a Polar route, north and east of EPAA assets

• Perception: Launch of missile defense interceptors occurs well before burnout of the targeted ICBM
  - Fact: Fire control solution only generated for coasting/non-powered object on ballistic trajectory
  - Fact: Interceptor launch will not occur until approximately 60 seconds (at earliest) after threat missile’s powered flight (boost) ends, and after initial ballistic trajectory track is established

• Perception: Boost phase intercept of ICBMs and SLBMs possible by EPAA assets
  - Fact: During powered flight (boost) threat missile trajectory is not ballistic
  - Fact: Intercept is not possible during boost phase due to unobtainable fire control solution
  - Fact: Inadequate interceptor thrust and divert

• Perception: Aegis Ashore in Poland, close to Russia, makes it easier to intercept Russian ICBMs
  - Fact: Intercept is impossible due to delays inherent in missile defense engagement:
    – Threat burnout must occur before fire control solution development
    – Interceptor launch and fly-out must occur before kill vehicle deployment and activation
  - Fact: Error basket (threat missile location uncertainty) too large
  - Fact: Sufficient interceptor divert capability not attainable for uncertain threat missile position
  - Fact: Fire control solutions result in tail chase; interceptor closest approach 100s of kilometers

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European Phased Adaptive Approach (EPAA) Summary

• Addresses the growing ballistic missile threat to NATO countries in Europe and U.S. homeland

• Not oriented towards Russian Federation

• Not capable of intercepting Russian ICBMs or SLBMs

• Cannot engage boosting ICBMs or SLBMs

EPAA Capabilities Do Not Undermine Strategic Stability
– Supported By Technical Analysis –