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Ballistic Missile Defense Deployment to Poland and the Czech Republic

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The United States has proposed to expand its Ballistic Missile Defense System by the deployment of up to ten interceptors at a site in Poland and a European midcourse radar in the Czech Republic. The stated purpose is to

defend much of Europe against missiles launched from Iran, and also to enhance the defense of the United States against Iranian missiles.

The best official information is obtained from a presentation by the U.S. Missile Defense Agency (MDA) of 06/28/2007 by Dr. Patricia Sanders to the European Union. I shall make extensive use of this presentation, which is publicly available[1]

Missile Defense Program Overview For The European Union, Committee On Foreign Affairs, Subcommittee On Security And Defence

28 JUN 07

Dr. Patricia Sanders
Executive Director
Missile Defense Agency

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There are several concerns about this expanded deployment:

1. Will it work in principle?

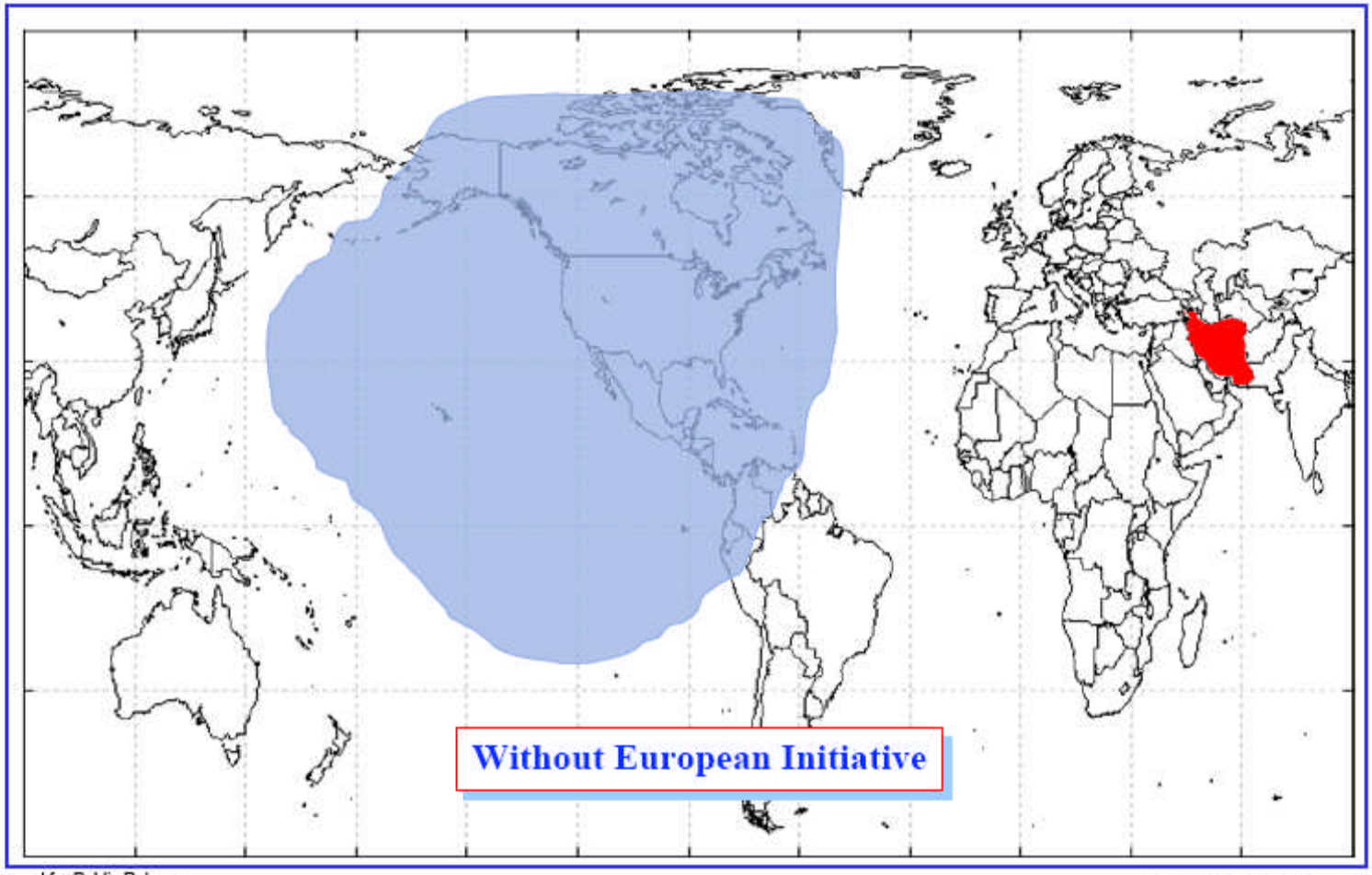
2. Can it work in practice, with decoys and countermeasures that can be expected with the first Iranian long-range missiles?

3. Does it pose a threat to Russian missiles, by a capability to intercept those launched at Europe or the United States?

4. Is there a better way to do the job?

Slide 13 (from (1)) shows the defended area in 2013 without the deployments in Europe,

Ballistic Missile Coverage
Against Long-Range Iranian Missiles



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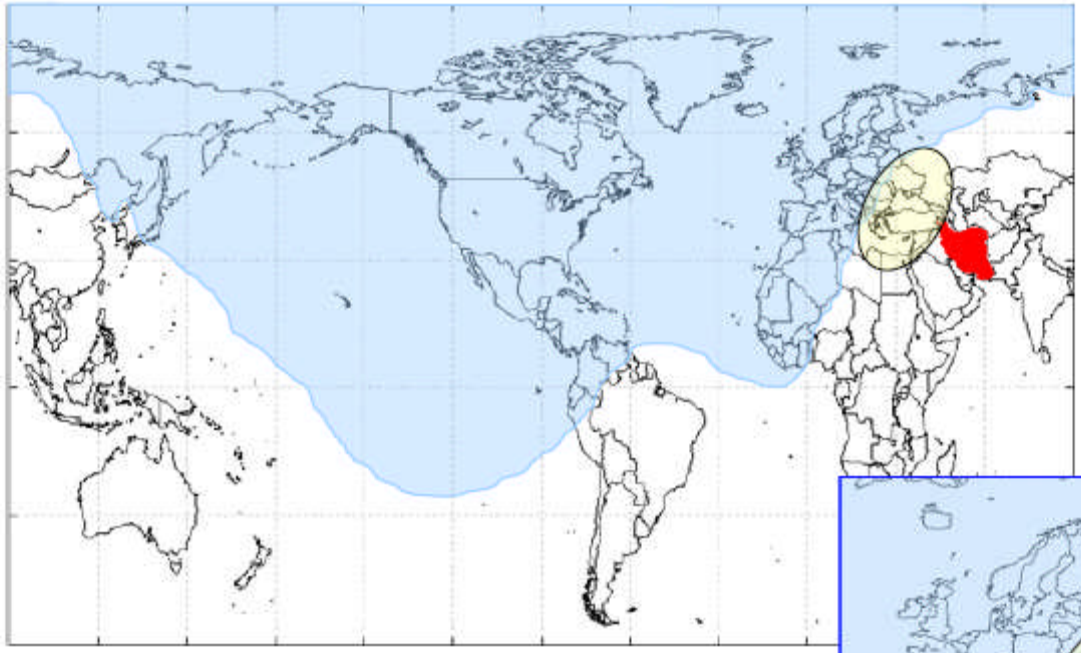
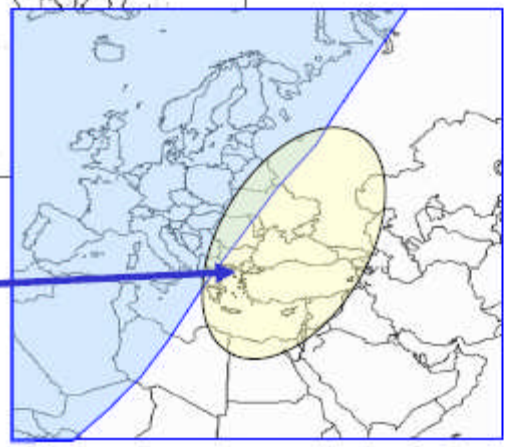
while Slide 14 shows the expanded coverage from the European defense, that includes a transportable x-band radar in the "Caspian area."

Capability Provided Versus Iranian Ballistic Missile

BMD System With Interceptor Field (Poland) + Midcourse Radar (Czech Republic) + Forward Based Radar





Can be covered by National or NATO-deployed short- and medium-range systems

Only part of Europe is protected; southeastern Europe will need to be defended by shorter range missile defense components such as the Patriot PAC-3 and the Theater High-Altitude Air Defense system-- THAAD.

The overall MDA system involves the detection of launch by means of the infrared energy of the missile flame, observed by global-coverage satellites such as the Defense Support Program-- DSP-- or the to-be-deployed SBIRS-High. The Iranian missile would then be detected by the Caspian forward-deployed radar, and then with higher precision by the radar in the Czech Republic that would be used to assign interceptors from Poland to intercept individual elements in the "threat cloud"-- among them, one hopes, the missile warhead.

It is not clear what interceptor type is to be deployed in Poland. It appears that instead of the standard three-stage interceptors with a burnout speed of 8.3-8.5 km/s, MDA intends to deploy a two-stage interceptor with a burnout speed of approximately 5-7 km/s.

Either of these interceptors would carry an exo-atmospheric kill vehicle-- EKV-- that would maneuver to collide with the intended target and would destroy it by the kinetic energy of the impact, in which every kg of the

interceptor would have an energy relative to the target several times that contained in an equal mass of high-explosive. The impact of the collision is intended to destroy or disable the nuclear warhead contained in the missile and it is hoped will damage or throw off course any bomblets of chemical or biological agent that might be loaded into a long-range missile.

There is by now substantial experience with the EKV, which in the absence of countermeasures can work quite well by means of a homing system that works in the visible or in the infrared to guide the EKV to within a fraction of a meter of its intended target.

President Putin of Russia has objected to the European deployment of the MDA radar and interceptors, although it is not clear for what reason. He has offered the United States and Europe the cooperative employment of an old Russian radar now located in Azerbaijan, which offer has been rebuffed by the United States.

Now we address the four questions I raised earlier in my presentation.

1. The system will probably work against the Iranian ICBM-- likely to be a liquid-fueled ICBM for a good many years. It might work also against the

solid-fueled IRBM-- Intermediate-Range Ballistic Missile-- aimed for Europe, providing there are no countermeasures. But the more important case is the one in which Iran, having decided to launch a missile against the United States or against Europe decides to make it work by the addition of simple countermeasures such as those described extensively in the year 2000 report, "Countermeasures"[2].

2. Iran is very likely to use a countermeasure such as a large enclosing balloon for the warhead that separates from the ICBM, in which case the interceptor will be unable to see the warhead within, and will have to strike someplace with very little probability of hitting the warhead. Even more effective would be the use of a small enclosing balloon for the warhead, simply to ensure that the many decoy balloons can be of the cheapest spherical form. This is extensively described in the Countermeasures volume. Under those circumstances, the defense is helpless and MDA has recently admitted to that, counting on some future development of a multiple-KV interceptor that could attack many balloons with one interceptor.

Prominent among earlier justifications for missile defense was the specter of the use of biological or chemical agents, and the Countermeasures volume

describes in detail that the more effective approach for the offensive (not particularly oriented toward a countermeasure to defense) would be to package the chemical or biological munitions in small bomblets, separated soon after the missile burns out, so that they will fall individually through space to reentry and to the target area.

Although bomblets are chosen for simple military effectiveness they are also a perfect countermeasure against the EKV-oriented mid-course missile defense. So it must be accepted that if Iran would deploy the worst of the WMD-- biological agents such as smallpox or other living agents-- that mid-course or terminal missile defense are irrelevant to this threat. This is conveniently ignored by MDA and its supporters, together with the effectiveness of countermeasures.

A 1999 national intelligence estimate[3] has this to say about countermeasures by nascent missile powers:

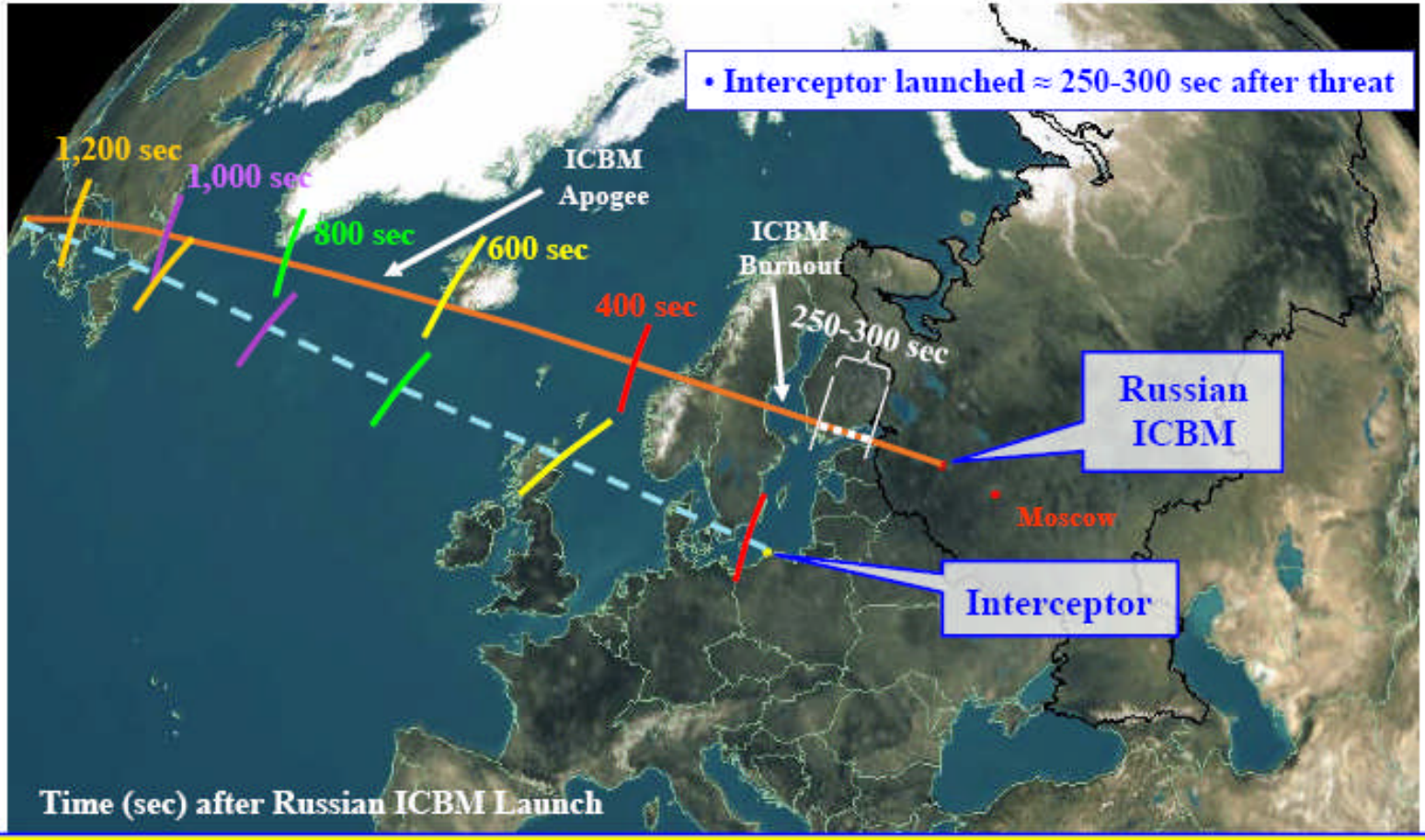
Penetration Aids and Countermeasures
We assess that countries developing ballistic missiles would also develop various responses to US theater and national defenses. Russia and China each have developed numerous countermeasures and probably are willing to sell the requisite technologies.

- ***Many countries, such as North Korea, Iran, and Iraq probably would rely initially on readily available technology —including separating RVs, spin-stabilized RVs, RV reorientation, radar absorbing material (RAM), booster fragmentation, low-power jammers, chaff, and simple (balloon) decoys—to develop penetration aids and countermeasures.***
- ***These countries could develop countermeasures based on these technologies by the time they flight test their missiles.***

3. President Putin has objected to the deployment of missiles in Poland and the radar in the Czech Republic, and MDA has countered (Ref. 1) that the interceptors cannot intercept a Russian ICBM headed for the United States. But they could surely intercept an IRBM headed for Europe and in fact under many circumstances could intercept also ICBMs launched from Russia toward the United States.

The most relevant figure in (1) is titled "Interceptors Cannot Catch Russian Missiles" but that appears to assume a non-standard interceptor with a burnout speed of only 5-7 km/s to be deployed in Poland, and it clearly states a totally unfounded assumption that interceptor launch will be delayed 250-300 sec after ICBM launch; a more reasonable assumption would be 100 sec, providing 150-200 sec more fly-out range, which at a normal MDA interceptor speed of 8.3 km/sec would be 1245-1660 km, that would clearly make intercept possible.

Interceptors Cannot Catch Russian Missiles



U.S. European Interceptor Site Cannot Affect Russian Strategic Capability

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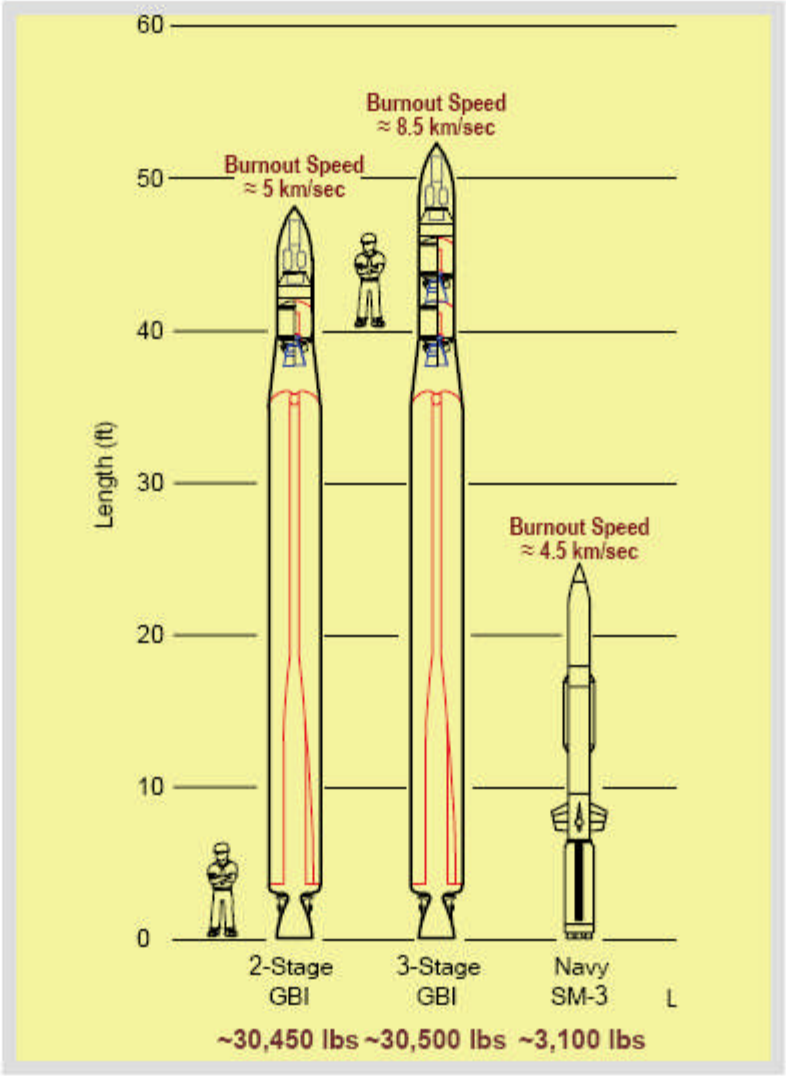
This figure is highly misleading

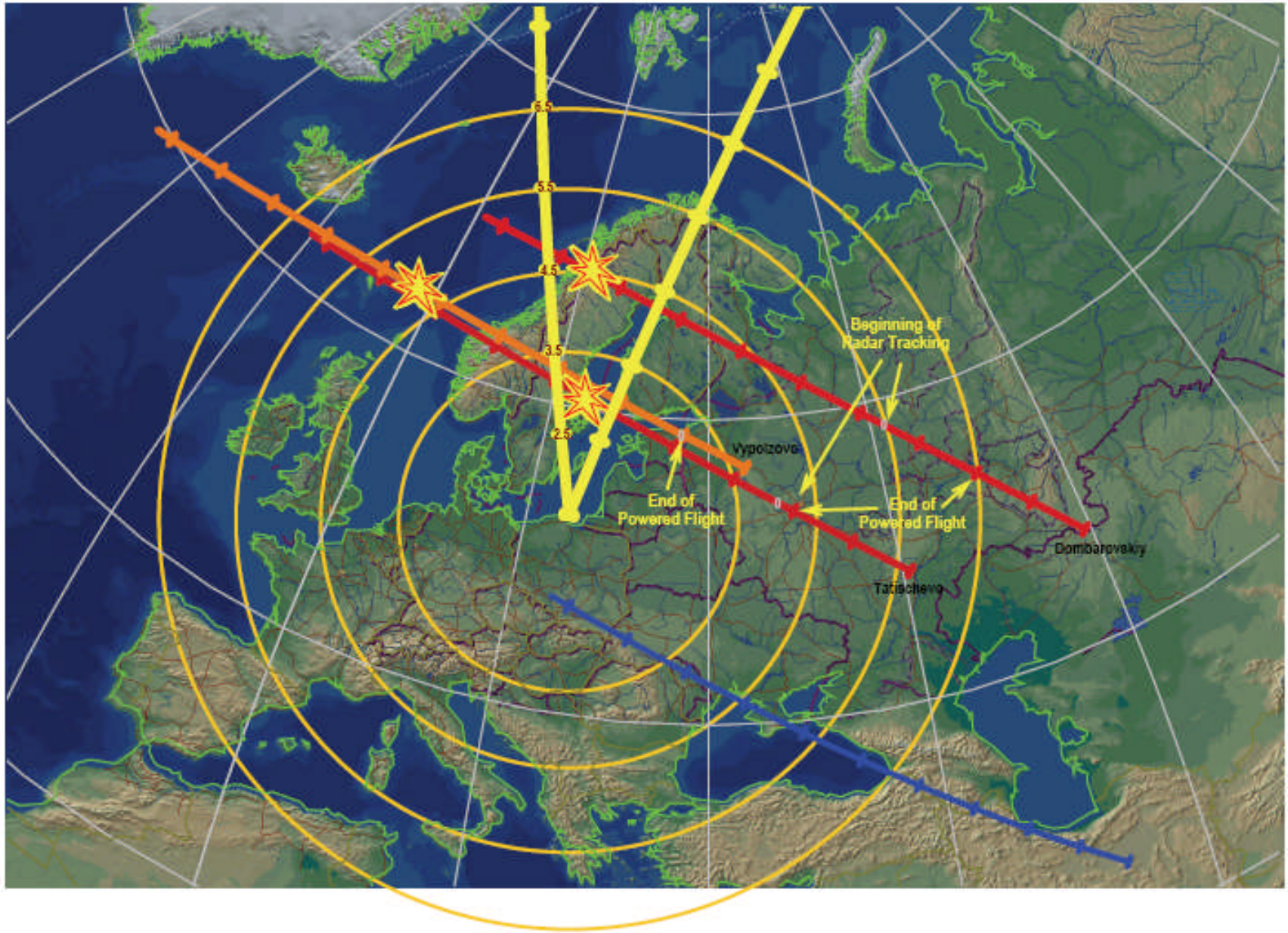
For a maximum of ten missiles (and that is all that are planned within the five-year defense program!) this would require a substantial and costly additional test program if these low-performance interceptors were to be used only in Poland. The high-performance standard interceptor could indeed intercept, as shown in these charts provided by Ted Postol.

Relative Sizes and Weights of Candidate European Missile Defense Interceptors



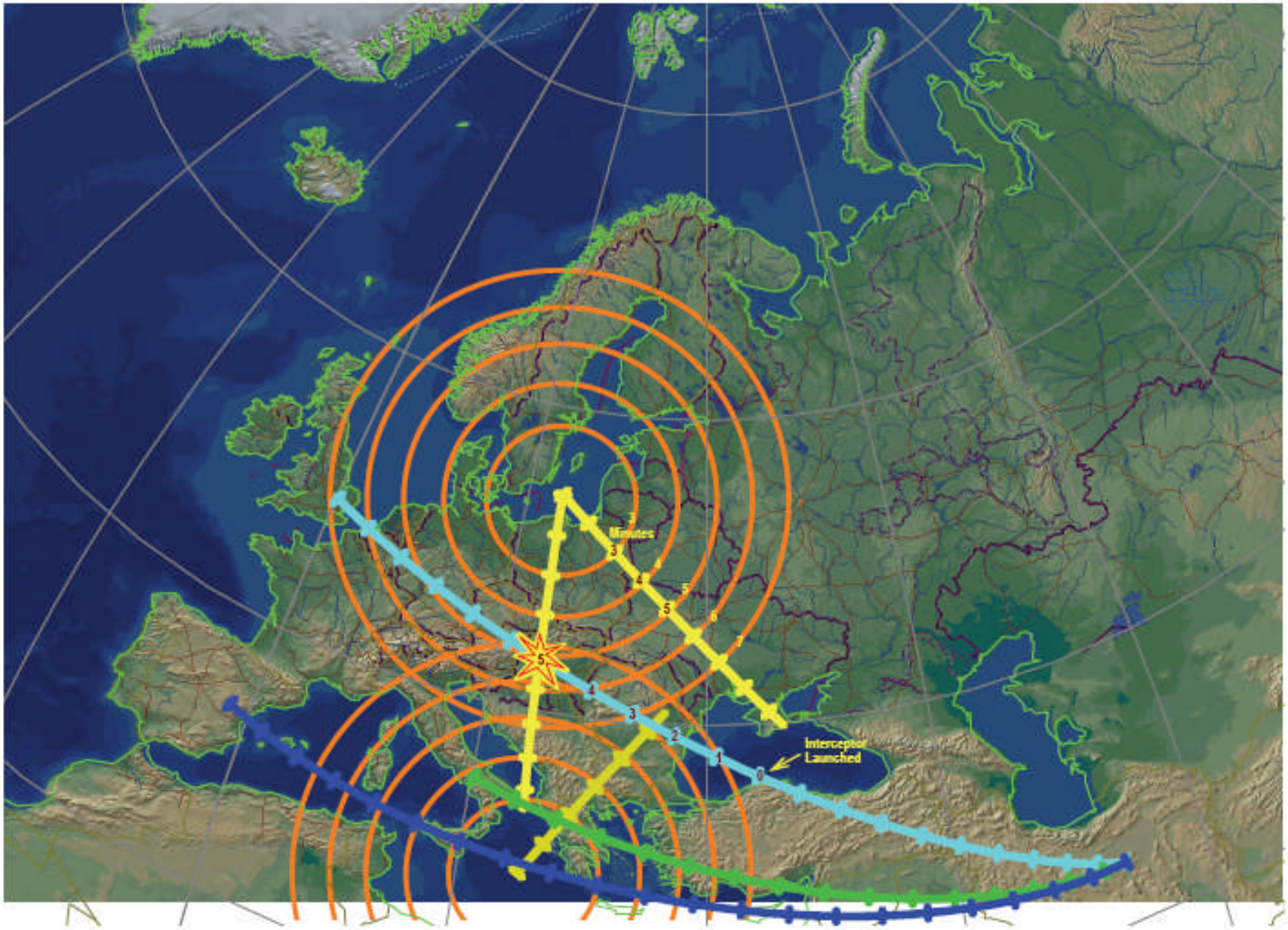
The 2-stage interceptor may have a burnout speed of 7 km/s, but why deploy a different interceptor of slightly inferior capability?

Timelines and Events for Intercepts with Three-Stage Variant of the GBI



4. Are there alternatives to the Czech-Polish deployment? Yes. If indeed the interceptors are of the 5-km/s variety, the Aegis system deployed on cruisers uses a low-performance "Standard Missile-- SM3" with a burnout speed of 4.5 km/s, essentially equivalent to the BMD interceptor. An Aegis cruiser deployed in the Baltic Sea and another in the Mediterranean could thus provide equivalent protection of Europe against Iranian missiles.

Aegis Engagement Timelines for Defense of UK from the Baltic Sea



Furthermore, a much more effective intercept could be mounted against liquid-fueled ICBMs and perhaps against solid-fueled IRBMs by a boost-phase intercept, and those interceptors would ideally be placed in Azerbaijan. For instance, the American Physical Society boost-phase intercept study of 2004[4] on p. S94 (p. 132 of the PDF file) states

Defending against the liquid-propellant missile by the 6.5-km/s interceptor with a single site would require the site to be located in the Caspian Sea or Turkmenistan (Fig. 5.16, upper left). As Figure 5.17 (upper left) shows, the only new opportunity that would be offered by employing a second site would be the possibility of locating one site in Azerbaijan and a second site in Afghanistan. However, a single site located in Azerbaijan could provide a comparable defense

In summary, the European sites, including the radar forward-deployed in the Caspian Sea area (which could perfectly well be Azerbaijan) will contribute to the overall MDA capability, but that contribution is multiplied by the small probability that the Iranian missiles will not have penetration aids in the form of balloon decoys that will nullify the midcourse system.

The system will have a capability to intercept Russian ICBMs directed at the United States or Europe, particularly those launched from farther East.

The alternatives to deployments in Poland and Czech Republic include the positioning of two Aegis cruisers in the Mediterranean and in the Baltic Sea, as well as the stationing of boost-phase interceptors in Azerbaijan, together with the forward-deployed radar, that will give greater capability not nearly so vulnerable to the use of decoys by Iran.

The question of effectiveness and utility of missile defenses is not new. Here is the first portion of an article that Hans Bethe and I published in March, 1968. But there have been changes, in that the interceptors for the current US missile defense systems are uniformly non-nuclear.

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Anti-Ballistic-Missile Systems

The U.S. is now building a "light" ABM system. The authors argue that offensive tactics and cheap penetration aids could nullify the effectiveness of this system and any other visualized so far

by Richard L. Garwin and Hans A. Bethe

Last September, Secretary of Defense McNamara announced that the U.S. would build "a relatively light and reliable Chinese-oriented ABM system." With this statement he apparently ended a long and complex debate on the merits of any kind of anti-ballistic-missile system in an age of intercontinental ballistic missiles carrying multimegaton thermonuclear warheads. Secretary McNamara added that the U.S. would "begin actual production of such a system at the end of this year," meaning

missiles is possible and will lead almost inevitably to demands that the light system, the estimated cost of which exceeds $5 billion, be expanded into a heavy system that could cost upward of $40 billion. The folly of undertaking to build such a system was vigorously stated by Secretary McNamara. "It is important to understand," he said, "that none of the [ABM] systems at the present or foreseeable state of the art would provide an impenetrable shield over the United States. . . . Let me make it very clear that

great cost to reduce the effectiveness of an ABM system even more elaborate than the one the Chinese will face. First, however, let us describe that system.

Known as the Sentinel system, it will provide for long-range interception by Spartan antimissile missiles and short-range interception by Sprint antimissile missiles. Both types of missile will be armed with thermonuclear warheads for the purpose of destroying or inactivating the attacker's thermonuclear weapons, which will be borne through the atmo-

[1] "Missile Defense Program Overview for the European Union Committee on Foreign Affairs, Subcommittee on Security and Defence," by Dr. Patricia Sanders, Executive Director, Missile Defense Agency (available at T:/2nwgfu -- Garwin abbreviation for http://tinyurl.com/2nwgfu or tinyurl.com/2nwgfu).

[2] "Countermeasures," A Technical Evaluation of the Operational Effectiveness of the Planned U.S. National Missile Defense System, UCS-MIT Study, A.M. Sessler (Chair of the Study Group), J.M. Cornwall, R. Dietz, S.A. Fetter, S. Frankel, R.L. Garwin, K. Gottfried, L. Gronlund, G.N. Lewis, T.A. Postol, and D.C. Wright, April 2000 (available at tinyurl.com/2jhsum).

[3] "Foreign Missile Developments and the Ballistic Missile Threat" Statement for the Record to the Senate Foreign Relations Committee on Foreign Missile Developments and the Ballistic Missile Threat to the United States Through 2015, by Robert D. Walpole, National Intelligence Officer for Strategic and Nuclear Programs, September 16, 1999 (available at tinyurl.com/39zndk)

[4] Available at tinyurl.com/yowpxw