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Considering the Laptop Ban: Risks, Costs, Benefits, and Alternatives

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In March, the U.S. Department of Homeland Security (DHS) banned electronics larger than smartphones from being carried onto aircraft destined for the U.S. from 10 airports in the Middle East and North Africa. DHS cited credible intelligence of a threat from explosives being smuggled onto aircraft. The United Kingdom followed suit with a similar ban. In recent weeks, DHS has been considering expanding this ban to include flights from Europe to the U.S.[1]

Many policymakers in the U.S. are wondering whether the so-called laptop ban is the correct solution to the newest threat to aviation security. Classified intelligence is essential to answering this quandary, but so are proper risk-management and cost–benefit frameworks. Good security requires that officials consider the costs and benefits of potential policies in determining how they can effectively mitigate the many threats facing the U.S.

Basics of Risk Management

Risk exists everywhere. Whether through extreme activities such as sky diving or more ubiquitous ones like driving a car, everyone faces risks that they explicitly (e.g., buying car insurance) or implicitly (e.g., driving carefully) try to manage. For the U.S. government, there are countless risks to manage. To do so, the government must understand how serious any given risk is, how it compares to other risks, and what the costs and benefits of potential solutions are.

Risk in the security sphere is often calculated with the following formula:[2]

Risk = Threat × Vulnerability × Consequences

- where *threat* is a measurement of potential adversaries and their capability and intent to engage in harmful activity (for example, Great Britain is not a threat to the U.S. because while it has significant military capabilities, it has no desire to attack the U.S.; conversely, a single terrorist marooned on a desert island may have a significant desire to harm the U.S. but lacks the capability to do so);
- *vulnerability* refers to how susceptible an entity is to harmful activities (an M1 Abrams tank, for example, is not vulnerable to bullets but is vulnerable to high explosives); and
- *consequence* is a measure of the impact of a given harmful activity (if an adversary breaks into a secret U.S. military installation only to find it deserted, for example, the consequences of the attack to the U.S. are nil, but if a terrorist sneaks a bomb aboard a plane and detonates it over a city, the consequences—which must also include the second-order effects, such as reduced demand for air travel should a bomb explode on a plane—are high).

This paper, in its entirety, can be found at **http://report.heritage.org/ib4710**

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Costs and Benefits of the Laptop Ban

Within a cost–benefit framework, the benefit from the laptop ban is the reduction in risk.

$$Benefit = (Threat_{no} \times Vulnerability_{no} \times Consequences_{no}) - (Threat_{ban} \times Vulnerability_{ban} \times Consequences_{ban})$$

DHS is responsible for determining what effect any proposed policy would have on threat, vulnerability, and consequence:

- **Threat:** The ban might marginally deter attackers flying from affected regions through the perception of greater security.

- **Vulnerability:** Within affected regions, manually operated bombs would no longer be an option. For a bomb to be smuggled aboard, it would have to be on a timer, set to go off at a specific pressure or altitude, or be remotely activated to succeed, thus reducing the window for a successful attack. Additionally, the fact that it is relatively easy to subject checked bags to additional scrutiny reduces the likelihood of a bomb making it onto the plane.[3]

- **Consequence:** There could be a minor reduction in the consequences of a successful attack Cargo holds are generally located immediately below passengers, often with one bay at the front of the plane and another at the rear. Any significant explosion would likely have a destructive effect on the aircraft regardless of whether it was in the main cabin or the cargo hold. For explosions that do not destroy the aircraft outright, a bomb in the cargo hold may be less deadly than one in the cabin.

It appears that the principal advantage of the laptop ban would be a reduction in vulnerability: It would be harder to attack a plane originating from Europe and the Middle East. That said, a determined attacker could still attack the plane by changing the device from manually operated to remotely activated. Alternatively, an attacker could fly from a region that is not affected by the ban—including most of Africa and Asia, Latin America, or even the U.S.—and still bring a manually activated bomb into the cabin. The threat—Islamist terrorists—and the consequences—a plane exploding in the sky causing reduced air travel for the near future—are largely unchanged by the ban.

On the other side of the equation are the costs of this ban. The cost is a function of several factors, including:

- **Reduced productivity on planes and increased logistical costs and delays to travel.** The International Air Transport Association posits that such a ban on Europe would result in approximately $1 billion in such costs.[4]

- **Reduced air travel and tourism**. According to the U.S. Travel Association, visitors from Europe spend around $60 billion annually on travel and tourism in the U.S. Making travel more difficult or restrictive would reduce the number of fliers, especially business travelers who may use flight time to get work done.

- **Increased likelihood of damage, theft, or compromise of devices**. Currently, many airlines ban devices in checked baggage to reduce the risk of fires. Should devices be forced into the baggage hold, the potential for theft or damage would also increase. From a cybersecurity perspective, these devices are also vulnerable to compromise.

1. Some news reports say that DHS has tabled the ban, while others suggest that it is still under consideration. Whatever the current state of play, this issue and the recommendations in this *Issue Brief* remain worthy of consideration. Robert Schroeder, "Homeland Security Calls U.S.-EU Laptop Ban Story 'Absolutely Wrong,'" Fox Business, May 30, 2017, http://www.foxbusiness.com/markets/2017/05/30/homeland-security-calls-us-eu-laptop-ban-story-absolutely-wrong.html (accessed June 1, 2017).
2. U.S. Department of Homeland Security, Risk Steering Committee, DHS Risk Lexicon*: 2010 Edition*, September 2010, https://www.dhs.gov/xlibrary/assets/dhs-risk-lexicon-2010.pdf (accessed May 30, 2017).
3. Security checkpoints for people and carry-on goods are inherently more chaotic than checked baggage security, which deals only in luggage. While increasing scrutiny at either will result in more delays, checked baggage will be affected less detrimentally than would be the case at traditional checkpoints.
4. Christopher Jasper, Guy Johnson, and Marine Strauss, "Wider Laptops Ban to Cost Passengers $1 Billion, Airlines Warn," Bloomberg, May 17, 2017, https://www.bloomberg.com/news/articles/2017-05-17/wider-laptops-ban-would-cost-airlines-1-billion-iata-head-says (accessed May 24, 2017).

- **Increased fires in the cargo hold caused by electronics.** The Federal Aviation Administration (FAA) cites 152 reported incidents of fire or near-fire incidents on planes due to lithium batteries since 1991. Sixty-five incidents, or about 20 per year, have occurred since 2014.[5] The FAA has warned that such lithium fires can lead to dangerous explosions and such fires have been implicated in the crashes of at least three cargo planes. More fires could occur as a result of a laptop ban, and since they would occur in the cargo hold, customers and flight crews would also be less aware and less able to deal with such fires. Although planes have fire-suppression systems,[6] the FAA has warned that existing fire-suppression systems are "incapable of preventing such an explosion."[7] As such fires increase, so does the likelihood that a fire-suppression system will fail or be overcome, possibly resulting in the destruction of the aircraft. Greater investments in fire-suppression systems could therefore be necessary.

There is also the chance that European countries could place a similar ban on laptops for U.S. flights to Europe, which would result in the imposition of similar costs.

Weighing the Options

A laptop ban would result in at least several billion dollars in guaranteed costs and losses, as well as increased potential for additional losses from theft or damage to devices and possible aircraft fires from electronics. On the other hand, aircraft would benefit from being less vulnerable to manually activated explosive devices from regions where the ban is in effect while remaining vulnerable in other regions to remotely or independently detonated bombs.

Without access to current intelligence, it is impossible to fully assess the nature of the risk. The Department of Homeland Security should therefore:

- **Conduct a robust risk analysis that considers classified information and other relevant data.** Any policy options should be considered carefully through a risk-based, cost–benefit framework. DHS should use policies that provide positive security benefits at the lowest cost and, to the extent possible, avoid policies that cause more harm than good. The appropriate congressional committees should be informed of the results of such assessments.

- **Look for smart solutions.** The threat of explosives being smuggled aboard aircraft means that the U.S. must consider policies ranging from greater scrutiny at checkpoints to employing more bomb-sniffing dogs and equipment abroad. These policies would have costs and benefits, weaknesses and strengths. It is up to policymakers to find the solutions that best handle the risks facing the nation.[8]

Secure Skies and Prosperous Homeland

The U.S. faces countless threats each day and as a rule should set policy based on risk assessments that consider the costs, benefits, alternatives, and what the enemy might do. Doing so will maximize U.S. security while keeping America prosperous and free.

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5. U.S. Department of Transportation, Federal Aviation Administration, Office of Security and Hazardous Materials Safety, "Lithium Batteries & Lithium Battery-Powered Devices: Aviation Cargo and Passenger Baggage Events Involving Smoke, Fire, Extreme Heat or Explosion Involving Lithium Batteries or Unknown Battery Types," as of May 22, 2017, https://www.faa.gov/about/office_org/headquarters_offices/ash/ash_programs/hazmat/aircarrier_info/media/battery_incident_chart.pdf (accessed May 30, 2017).
6. U.S. Department of Transportation, Federal Aviation Administration, Flight Standards Service, "Fire Protection Systems," Chapter 17 in Aviation Maintenance Technician Handbook—Airframe*, Volume 2*, 2012, https://www.faa.gov/regulations_policies/handbooks_manuals/aircraft/amt_airframe_handbook/media/amt_airframe_vol2.pdf (accessed May 30, 2017).
7. U.S. Department of Transportation, Federal Aviation Administration, Flight Standards Service, "Risks of Fire or Explosion When Transporting Lithium Ion or Lithium Metal Batteries as Cargo on Passenger and Cargo Aircraft," Safety Alert for Operators No. 16001, January 2016, https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo/all_safos/media/2016/SAFO16001.pdf (accessed May 30, 2017); Erin Dooley, "Lithium Batteries Could Spark 'Catastrophic' Plane Fires, FAA Warns," *ABC News*, February 9, 2016, http://abcnews.go.com/US/lithium-batteries-spark-catastrophic-plane-fires-faa-warns/story?id=36816040 (accessed May 26, 2017).
8. For more information on such solutions, see David Inserra, "Top Three Things DHS Should Consider Regarding the Laptop Ban," Heritage Foundation *Issue Brief* No. 4711, June 1, 2017, https://www.heritage.org/homeland-security/report/top-three-things-dhs-should-consider-regarding-the-laptop-ban1.