

**Private Eyes in the Sky:**  
*Emerging Technology and the Political Consequences of Eroding Government  
Secrecy*

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**ABSTRACT**

How do emerging technologies that erode governments' near-monopolies on intelligence information affect public support for leaders and their foreign policies? Information gathering technologies – like imagery satellites – that were once the domain of state governments are now increasingly available to commercial and private actors. As a result, non-government entities can reveal information whose disclosure was once firmly controlled by states. We argue that non-government entities with access to these technologies serve as alternative information sources that can verify government claims or reveal activities governments have not previously acknowledged. Using an original survey experiment we find that commercial satellite imagery can serve as an informational cue that shifts public opinion, and, depending on its content, either attenuates or bolsters the effect of similar cues from government sources. The findings advance academic and policy debates over secrecy in international relations and on the effect of emerging technologies in the security domain.

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After returning to Washington following his May 2018 summit with North Korean leader Kim Jong-un, President Donald Trump tweeted that “everybody could feel safer now” because “There is no longer a Nuclear Threat [*sic*] from North Korea (Baker and Sang-Hun 2018).” Within months, however, researchers at the Center for Strategic and International Studies (CSIS) released commercial satellite imagery that challenged Trump’s claim, identifying 13 hidden missile operating bases north of the 38th parallel (Bermudez Jr., Cha, and Collins 2018). Even if the missile operations did not explicitly violate the terms of the summit agreement, this imagery cast doubt on the president’s continued insistence that the rockets and missiles “have stopped (Sanger and Broad 2018).”

The contradictions between President Trump’s claims and North Korea’s nuclear program became even more stark following an aborted second summit with Kim in February 2019. Days after the failed meeting, CSIS released more commercial satellite imagery revealing that North Korea had begun reconstituting one of the missile sites that it had partially dismantled after the first summit (Bermudez Jr. and Cha 2019). Even President Trump was forced to acknowledge that North Korea had been steadily adding to its nuclear arsenal (Sanger and Broad 2019).

How do emerging technologies that erode governments’ near-monopolies on information in the national security domain affect foreign policymaking? States have historically held an information advantage in this realm relative to private actors because of the high barriers to developing intelligence gathering infrastructure and organizations. A growing research program on secrecy in international relations has identified incentives states have to control information in the national security realm. In some cases, keeping information secret minimizes scrutiny of potentially norm-violating behavior or circumvents domestic and international pressure to take action in situations that leaders would rather avoid (McManus and Yarhi-Milo 2017; Carson and

Yarhi-Milo 2017; Carson 2018; O'Rourke 2018). In other cases, states may choose to disclose information in ways that serve their interests, either through public announcements or selective disclosure to international monitoring agencies (Carnegie and Carson 2018; 2019).

Much of this literature presumes that states maintain control over what we term the *disclosure decision* – the choice governments make regarding whether, when, and how to release sensitive information about foreign actors. In recent decades, however, monitoring technologies – such as imagery-gathering satellites – that were once the domain of highly capable superpowers have proliferated into the private sector. This diffusion of information technology has enabled non-government actors to monitor world events more seamlessly, chipping away at state control over the disclosure decision. Non-state actors now have a say in how information relevant to a country's national security interests is collected and disseminated.

We advance the study of secrecy in international relations by investigating whether technologies that reduce information asymmetries between leaders and their publics shift public opinion. We explore whether these shifts constrain the government's freedom of action in making foreign policy. New technologies, ranging from commercial satellites to social media, present citizens with vast quantities of information that might influence public preferences (Baum and Potter 2019). At the same time, recent research demonstrates that democratic leaders are indeed responsive to public opinion when making foreign policy choices (Tomz, Weeks, and Yarhi-Milo 2020). The role emerging technologies play in influencing public attitudes, therefore, merits further investigation.

Drawing on insights from political science, management science, and psychology, we propose two pathways – *verification* and *revelation* – that chart how the disclosure of sensitive security information collected using non-government technologies can shape public attitudes

towards political leaders and their foreign policies. Under the verification mechanism, non-government actors with access to information gathered by systems like commercial satellites provide an independent check on a government leader's claims in the foreign policy arena. The information they supply can either confirm or contradict government claims, potentially bolstering or weakening support for the leader and her policies. Under the revelation mechanism, non-government actors can unmask previously unacknowledged information that governments might seek to keep hidden, or shine a spotlight on activities about which the government is legitimately unaware. The disclosure of this information might generate public pressure for the government to take action in cases the government might have otherwise ignored or tolerated.

To test these mechanisms, we field original survey experiments that explore how disclosure of commercial satellite imagery affects public preferences toward leaders and their foreign policy decisions. We find the verification of a president's claims by commercial satellite firms can be just as influential in shaping public attitudes toward the president and his policies as information supplied by government intelligence agencies. When information released by commercial firms supports a president's claims during a hypothetical nuclear crisis, respondents are, on average, more likely to perceive the president as trustworthy, more likely to vote for the leader in future elections, and slightly more likely to support the president's plans to address the crisis compared to a baseline condition in which no such verification occurs. This increased favorability toward the leader and his proposed policies is comparable in magnitude to situations when similarly confirming information is released by government intelligence agencies. When commercial firms release information that contradicts the president's claims, respondents are, on average, less likely to perceive the president as trustworthy, less likely to vote for the leader in future elections, and less likely to support the president's plan to deal with the nuclear threat.

When commercial satellite firms reveal information about a rival state's use of chemical weapons against its citizens that was previously undisclosed to the public, we find the public is more supportive of using force to punish the rival, relative to a baseline condition without revelation. Case studies in the appendix provide additional support for these mechanisms by illustrating the role that commercial satellite imagery played in influencing U.S. public opinion and policy towards North Korea's nuclear program, China's militarization in the South China Sea, and Beijing's internment of Uighurs throughout western China.

This paper contributes to three bodies of policy relevant international relations scholarship. First, we advance the study of secrecy beyond the incentives and disincentives states have to disclose sensitive information. Specifically, we investigate what happens when states no longer have near-exclusive control over the disclosure decision. Second, the paper contributes to debates on the effect of informational cues on public support for foreign policy. Researchers have previously explored how elites, international organizations, humanitarian agencies, and domestic opposition groups can influence public opinion toward foreign policy decisions (Chapman and Reiter 2004; Fang 2008; Chapman 2009a; Grieco et al. 2011; Busby et al. 2019). We extend this research by examining whether non-government actors armed with information gathering technologies can provide informational cues in the foreign policy arena, and how these cues interact with those supplied by government elites. Third, we contribute to scholarly and policy debates on the role of emerging technologies in international relations. Recent studies have explored how technologies like drones, cyber capabilities, and autonomous weapons affect public support for the use of force, but have largely overlooked the role of commercial information-gathering technologies (Walsh and Schulzke 2018; Horowitz 2016).

## THEORY

### *State Secrecy and the Disclosure Decision*

States have historically possessed a near-monopoly on the apparatus used to gather intelligence on foreign entities. The financial, material, and human resources needed to develop and operate networks of covert agents, satellites, reconnaissance aircraft, and other technical collection systems were typically beyond the reach of non-state actors.<sup>1</sup> Gathering this sensitive information and monitoring the behavior of foreign actors was therefore the near-exclusive province of intelligence agencies and their state masters.

Once intelligence agencies collected information, government officials typically controlled whether, when, and how to release this information. We refer to this as the “disclosure decision,” the government’s choice to publicly release or acknowledge information that was initially secret and concealed from one or more audiences.<sup>2</sup> These authorized disclosures can take a variety of forms, including announcements by senior government officials, press releases, and the provision of information directly to media outlets or non-governmental organizations.

When deciding whether to disclose this information, governments weigh the political, strategic, and operational benefits against potential costs, both at home and abroad. In some cases, governments might publicly disclose information to mobilize support from domestic and international audiences. During the Cuban Missile Crisis, for example, the U.S. ambassador to the United Nations famously confronted his Soviet counterpart with reconnaissance imagery revealing Soviet missile sites in Cuba (Dobbs 2008, 129–32). Governments might also reveal information

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<sup>1</sup> To be sure, many large multinational firms had access to information about foreign entities, but this information was typically reserved for internal consumption and not released to broader audiences.

<sup>2</sup> This comports with the definition of secrecy developed in Carson 2018, 5. We distinguish this authorized disclosure of information from unauthorized leaks of government-held information in the form of leaks to the media or other non-governmental entities. For a more comprehensive treatment of this phenomenon, see Sagar 2013

about a rival to demonstrate their capacity to hold the rival at risk. Israel’s military and intelligence services, for instance, often release information about the locations and identities of Hezbollah personnel to signal that Israel can target the group (Rierner and Sobelman 2019). Moreover, states seeking to enforce compliance with international agreements often disclose sensitive information to “name and shame” violators. In so doing, states can rally allies around efforts to punish these violators and dissuade other states from engaging in deviant behavior (Keohane 1984; Finnemore and Sikkink 1998; Keck and Sikkink 1998).<sup>3</sup>

Disclosing sensitive security information, however, is not without its drawbacks. In some cases, governments withhold state secrets because public disclosure would offer little or no tangible political benefit. Information about a rival’s military installations, for example, might be useful for warplanning, but yield little political purpose if publicly released. In other instances, governments may be reluctant to disclose information for fear of exposing the sources and methods used to obtain intelligence. This “disclosure dilemma” may therefore compel states to pass information to allies or international organizations that can act on this information without exposing its source (Carnegie and Carson 2019, 270). Or, states may refrain from exposing the deviant behavior of adversaries to avoid normalizing their transgressions in ways that would undermine international regimes (Carnegie and Carson 2019). Exposing information about rivals can also trigger destabilizing security competition, both by provoking other states to respond to a rival’s transgressive behavior and by fueling domestic pressures for more confrontational policies among hawkish elites and the general public (Carnegie and Carson 2018; Carson 2018).

Governments considering whether to disclose sensitive information also weigh the possibility that sensitive information will be exposed without authorization (Carson 2018, 39).

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<sup>3</sup> In some cases, however, shining a spotlight on this activity has been accompanied by domestic backlash or even an intensification of deviant behavior. See Hafner-Burton 2008; Risse, Ropp, and Sikkink 1999

This concern is not altogether new; governments have long contended with the threat of leaks to the media by rogue actors, a risk that expands as private actors and oversight agencies such as legislatures and the courts gain access to this material (Sanger 2009, 1–26; Sagar 2013). Recent advances in information and communications technology, however, have expanded the distribution of access to sensitive information beyond government circles.

### ***Proliferation of Information Technologies and the Erosion of the Disclosure Decision***

The development and proliferation of new information-gathering technologies by non-state actors has weakened state control over both the collection of information and the disclosure decision. The disclosure of sensitive information by third party, non-government actors – such as think tanks, private firms, humanitarian organizations, and the media – can amplify both the benefits and drawbacks discussed above. Leaders have traditionally benefited from what Baum and Potter (2008, 43) termed the “elasticity of reality,” the ability of elites to frame foreign policy events in ways that may depart from an accurate depiction of these events. The proliferation of new technologies that gather and publish data revealing locations and actions of friendly and rival actors could erode, though not eliminate, this elasticity. For example, data from fitness tracking apps coupled with commercial satellite imagery pinpointed the location of previously secret U.S. military bases (Hern 2018). Similarly, photos posted on Instagram revealed Russian air defense personnel were present in Ukraine, even after repeated Russian denials (Szoldra 2014). The risk that new technologies might expose sensitive activities may cause states to think twice before initiating covert operations, or make it harder for states to tacitly collude with rivals by shrinking the “backstage” space where states previously colluded to dampen escalatory pressures (Joseph and Poznansky 2018).

Among the technologies that erode the disclosure decision are commercial imagery satellites, artificial intelligence enabled analysis of social media and internet data, and internet-based ship and aircraft tracking. These tools can monitor the behavior and proclivities of foreign officials, reveal movements of government and military personnel, and identify illicit and illegal activities (Ball 2018; *The New York Times* 2019). Private actors with this information can choose to disclose it, often without the political and operational constraints that guide a government's disclosure decision. This information can subsequently propagate quickly to audiences around the world due to the increased connectivity provided by ever expanding internet and mobile networks.

Although non-government actors have access to a range of information gathering technologies, we focus on commercial imagery satellites for two reasons. First, non-government actors have increasingly resorted to commercial satellite data to easily and legally verify and reveal information about foreign actors. Satellite overflights do not violate international law, and both international and domestic laws allow private firms to collect and sell information obtained via satellite. This imagery enables analysts and activists from outside of government to provide a visual depiction of a state's or group's activities that is easily accessible to viewers and can be more readily understood than text-based disclosures (Perkins and Dodge 2009; Aday and Livingston 2009). Second, commercial imagery is increasingly becoming available to non-government entities who can easily access high resolution images at little cost. As remote sensing technologies advance and satellite production and launch costs decrease, dozens of U.S. and international firms will deploy ever greater numbers of satellites, leading to more frequent imagery collection across a growing number of locations (Johnson 2019). The commercial satellite firm Planet, for instance, already operates more than 150 satellites that image large swaths of the globe on a daily basis (Planet 2019).

Governments have recognized the potential for commercial satellite firms to work at cross-purposes with national objectives, and have taken steps to limit the ability of these firms to collect or divulge sensitive information. The United States government, for instance, restricts the resolution of imagery that private firms can release, mandates time delays on the release of imagery from certain geographic areas, and entirely prohibits imagery collection in other areas, such as Israel and the Occupied Territories (Berger 1994; Twing 1998). In some cases, the United States government has simply purchased all available high-resolution commercial imagery of certain areas to prevent it from being released to the public or to foreign governments. These efforts, however, do not entirely halt the collection and dissemination of sensitive information. Actors prohibited from accessing imagery from firms based in one country, can turn to a growing number of firms operating from other states.

### ***Verification, Revelation, and the Political Consequences of Privatizing the Disclosure Decision***

How might the proliferation of commercial imagery satellites affect foreign policymaking? Specifically, does commercial satellite imagery that verifies government statements or reveals previously undisclosed information affect public support for foreign policy decisionmakers and their policies? Does commercial satellite imagery move public attitudes more or less than government-provided information?

We outline two pathways that explain how the disclosure of satellite imagery by non-government actors affects public attitudes toward leaders and their foreign policies. In short, non-government actors can exercise the disclosure decision in two types of situations. First, they can verify claims made by government officials. We call this the *verification* mechanism. In some cases, non-government entities release imagery that comports with government claims. For

example, media organizations and think tanks used commercial satellite imagery to validate U.S. and Saudi government reports of a September 2019 attack on Saudi Arabian oil facilities (Kirkpatrick et al. 2019; Brumfiel 2019). In other cases, non-government actors reveal commercial satellite information that directly refutes or fails to support the government's official statements. This was the case when imagery raised doubts about North Korea nuclear developments following the Trump-Kim summits.

In a second category of situations, non-government actors act as information revealers and divulge information that the government has not previously acknowledged. We call this the *revelation* mechanism. In some instances, governments hope to keep information about activities like covert operations hidden from public view, fearful that exposure could trigger hostile reactions from other states or domestic opposition from dovish anti-interventionists. In other cases, governments intentionally hide information about other state's capabilities or actions, fearful that revelation could mobilize demands for more aggressive or escalatory responses that the government would prefer to avoid (Carson 2018). Finally, imagery can reveal the existence or extent of a problem about which governments were genuinely unaware.

Under both the verification and revelation mechanisms, non-governmental actors provide the general public with informational cues that can shape their attitudes toward leaders and their policies. A large body of research suggests that members of the public are "rationally ignorant" in foreign policy matters, relying instead on cognitive shortcuts in the form of informational cues, which Bullock (2011, 497) defines as "message[s] that people may use to infer other information and by extension, to make decisions."<sup>4</sup> The extent to which these cues can shape public opinions, however, depends in large part on the positions supplied by cue-givers and perceptions of cue-

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<sup>4</sup> See also Holsti 2009. The classic assertion that the general public is 'rationally ignorant' in formulating opinions on complex public policy matters comes from Downes 1957

givers as relevant and reliable sources of information on the issue at hand. One body of scholarship characterizes the transmission of these cues as a top-down process. The information provided and positions taken by policy elites, non-government organizations, and international institutions serve as reference points for a citizen's decision about whether to support or oppose a particular policy.<sup>5</sup>

The proliferation of sources of policy-related information has made it easier for members of the public to receive these cues. Even individuals who are uninterested in foreign policy are now inundated with information, particularly about highly salient foreign policy crises (Baum 2005). Given that commercial satellite imagery is frequently presented via news outlets, social media, and the internet, it may act as a top-down cue that affects public attitudes on matters related to foreign policy. Specifically, the ground truth presented in satellite imagery may serve as a cue that bolsters or weakens confidence in a government leader's claims or in the cues of other elite sources. Indeed, several studies find that when non-government sources supply neutral policy information, the information can attenuate the effects of partisan elite cues (Bullock 2011; Boudreau and MacKenzie 2014; Guisinger and Saunders 2017).

Moreover, as the top-down model suggests, we argue that the extent to which satellite imagery affects public preferences is shaped, in large part, by the perceived credibility of its source, which can range from satellite firms themselves to think tanks and advocacy groups. Research from management science suggests, not surprisingly, that high credibility sources have a greater impact on the attitudes and behaviors of information recipients than low credibility sources (Wilson and Sherrell 1993). The credibility of information sources is generally thought to be determined by perceptions of trust and competence (Peters, Covello, and McCallum 1997; Wathen

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<sup>5</sup> On the influence of partisan elites, see Zaller 1992; Berinsky 2007; and Berinsky 2009. On cue-taking from military service members and veterans, see Golby, Feaver, and Dropp 2018; and Jost and Kertzer 2019. On international organizations, see Chapman and Reiter 2004; Thompson 2006; Fang 2008; Chapman 2009b; Grieco et al. 2011; Guardino and Hayes 2018; and Busby et al. 2019.

and Burkell 2002). When faced with competing cues, publics are expected to follow those from sources they consider more trustworthy (Hetherington 1998). Levi and Stoker (2000, 476) argue the attributes embodying trustworthiness vary along two general dimensions: 1) whether trustees act in ways that are ethical, fair, or honest; and 2) whether they retain competence in the domains where trust has been conferred. Among the factors that shape perceptions of ethicality and fairness are the independence and autonomy an institution enjoys when carrying out its functions (Thompson 2006). Competence is based on whether a source is perceived as having the technical capacity and specialized expertise—in the form of physical assets, personnel, and processes—to generate reliable information (Carpenter and Krause 2012; Hafeez, Zhang, and Malak 2002).

Depending on their perceived autonomy from government influence and technical capabilities, the non-government entities that release commercial satellite imagery should provide a meaningful verification check on the claims of government officials and provide informational cues for the public. Whether satellite imagery confirms or contradicts the claims made by government officials about a foreign rival will shape public attitudes toward these officials and their policies for dealing with that rival. Specifically, we posit that:

- H1<sub>A</sub>: When commercial firms and non-state actors release satellite imagery that *confirms* the statements of government leaders, members of the public will be more likely to perceive these statements as accurate and will be more likely to support these leaders and their future statements compared to statements not verified by satellite imagery. (Similarly, when multiple entities release confirmatory information, public support and perceptions of accuracy will be at their highest.)
- H1<sub>B</sub>: When commercial firms and non-state actors release satellite imagery that *confirms* the statements of government leaders, members of the public will be more likely to support *policies* these leaders propose to address national security crises compared to statements not verified by satellite imagery. (Similarly, when multiple entities release confirmatory information, public support for these policies will be at its highest)

H2<sub>A</sub>: When commercial firms and non-state actors release satellite imagery that *contradicts* the statement of government leaders, members of the public will be less likely to perceive these statements as accurate and will be less likely to support these leaders and their future statements compared to statements not verified by satellite imagery. (Similarly, when multiple entities release contradicting information, public support and perceptions of accuracy will be at their lowest.)

H2<sub>B</sub>: When commercial firms and non-state actors release satellite imagery that *contradicts* the statement of government leaders, members of the public will be less likely to support policies these leaders propose to address national security crises compared to statements not verified by satellite imagery. (Similarly, when multiple entities release contradicting information, public support for these policies will be at their lowest.)

We also expect that if commercial satellite firms and other non-state actors reveal previously unacknowledged information about a rival state's aggressive activities, it could mobilize public opinion in favor of more assertive policies. Specifically,

H3: The use of satellite imagery by commercial firms and non-state actors to reveal previously unacknowledged information about a rival's aggressive activities will generate greater support for more assertive policies in response to these activities compared to situations without revelation by satellite imagery.

These predictions are premised in part on the notion that the satellite imagery provided by commercial firms and other non-state actors is at least as persuasive to the public as similar imagery provided by government sources. There are reasons to doubt this proposition. Government intelligence agencies enjoy relatively high levels of public support, with an overwhelming majority viewing intelligence agencies as effective in accomplishing their missions (Slick, Busby, and Burns 2019). In contrast, recent polling suggests the public is far less likely to trust leaders of technology companies to provide fair and accurate information to the public, relative to military sources (Gecewicz and Rainie 2019). Nevertheless, the technical capability of commercial firms coupled with their relative autonomy and independence from governmental interference may lead the public to view them as credible sources. We therefore posit that:

H4: The information disclosed by commercial firms and similar non-state actors will move public opinion at least as much as the same information disclosed by government intelligence agencies.

## **METHODOLOGY**

We test these hypotheses using two original survey experiments. While experiments allow researchers to precisely identify the effects of variables of interest, scholars debate whether the findings of these experiments are valid beyond the confines of their tightly controlled settings.<sup>6</sup> Despite the ongoing debate, we believe survey experiments remain useful tools for studying public preferences because experiments are grounded in the assumption that research subjects rely on the same conceptual and cognitive processes as non-experimental subjects making judgments in the real world (Schelling 1961, 55; Levendusky and Horowitz 2012, 328). More importantly, public preferences may influence the choices of elected officials and generate meaningful consequences on political outcomes (Tomz, Weeks, and Yarhi-Milo 2020).

We field our survey experiments on 2,067 adults across the United States in January 2020. Respondents were recruited using Lucid, an online sampling service, and randomly assigned to treatment groups using the Qualtrics survey platform. Researchers have increasingly used online samples as a cost-effective means of recruiting respondents, but online convenience samples often lack the representativeness of national probability samples. Lucid, however, uses quota sampling to recruit samples that better align with U.S. Census demographics than other online convenience samples (Coppock and McClellan 2019). To be sure, Lucid samples are not nationally representative across all dimensions. Our sample, for instance, overrepresents military veterans, underrepresents Hispanics, and underrepresents respondents with an annual household income

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<sup>6</sup> On the benefits of experimental research see Gerber and Green 2012, 1–17; For potential limitations of experimental research see Hyde 2015.

over \$75,000.<sup>7</sup> Although the experimental sample is not nationally representative, any theory or argument that applies to the American population should also apply to a subset of that population, making our sample useful for theory testing (Coppock and McClellan 2019).

In our experiments, which we describe in greater detail below, we present hypothetical foreign policy crises that vary the role satellite imagery plays. Because various actors can release satellite imagery, we also vary the source of the imagery (e.g. commercial firms, government agencies, think tanks). The survey instrument then solicits respondents' opinions on the president and his proposed handling of the crises. The instrument also collects demographic data, assesses respondent knowledge of international affairs, and includes manipulation checks to ensure subjects received and internalized the treatment.<sup>8</sup>

## **TESTING THE VERIFICATION LOGIC**

The first experiment assesses the political effects of verification. All respondents are told that in 2025, “the President of the United States announces that a rival country is accelerating development of nuclear weapons and is preparing to test a new missile capable of hitting the United States.”<sup>9</sup> Respondents are then randomly assigned into one of eleven experimental conditions that vary whether an organization supports or refutes the president's claims, and whether the verifying organization is a U.S. government intelligence agency or a non-government actor armed with commercial satellite imagery (experimental design in Table I).

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<sup>7</sup> Appendix B, Section 4 compares the experimental sample to a nationally representative one.

<sup>8</sup> See Appendix B. We do not drop respondents who fail the manipulation check. Doing so may produce biased estimates of the treatment effect. See (Aronow, Baron, and Pinson 2019)

<sup>9</sup> We set the scenario in 2025 – after the end of a potential second Trump administration – to minimize the likelihood that responses will be biased by anti-Trump sentiment.

In the baseline condition, no entity supports or refutes the president’s claims. In the other experimental conditions, respondents are told that shortly after the president’s announcement an entity “released imagery of the rival’s nuclear and missile research facilities.” We vary whether the entity is “Planet Labs, a private U.S. firm that operates commercial satellites”; the “Central Intelligence Agency (CIA)”; or the “Brookings Institution, an independent public policy think tank.” Including a think tank in our research design allows us to assess whether varying the nature of the non-government source of the imagery shapes public preferences. Think tanks are generally considered to have substantive expertise, which could make them a more persuasive outside voice than a firm that solely operates commercial satellites.(McGann 2020; Shepard 2011) We then vary whether the imagery reveals activity that “supports” or “contradicts” the president’s statement.

To better simulate real world complexity in which the public receives information from multiple—at times, contradictory—sources, we include four additional conditions in which respondents receive verification information from both the CIA and the commercial firm. In these treatments, the CIA and the commercial firm can be unified in supporting the president’s statement, unified in contradicting the president’s statement, or offer conflicting information regarding the president’s statements. Across all experimental conditions, we indicate that the information was reported to the public by the media, regardless of whether information originated from a government or non-government source.<sup>10</sup> Respondents are then asked to rate the accuracy of the president’s statement; the president’s trustworthiness; their willingness to “vote for this president in the next election”; and their willingness to support the President’s proposed policy for dealing with the rival state.

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<sup>10</sup> Appendix A includes the full survey instrument.

Because the experimental design randomizes assignment to treatment conditions and holds all other elements of the scenario constant, differences in public approval of the leader and his policies can be attributed to the two factors we manipulate: 1) the source of information (e.g. intelligence community, commercial satellite firm, or think tank using commercial satellite imagery); and 2) whether the information source confirms or contradicts the leader’s statement.

**Table I. Experimental design (Verification)<sup>11</sup>**

	POTUS Only	Government: CIA		Commercial Satellite Firm: Planet Labs		Think Tank: Brookings	
	<i>No Verification</i>	<i>Supports</i>	<i>Contradicts</i>	<i>Supports</i>	<i>Contradicts</i>	<i>Supports</i>	<i>Contradicts</i>
Single/No Verification	N=188 (Baseline)	N=180	N=185	N=187	N=194	N=193	N=188
Additional Verification: CIA Supports				N=188	N=189		
Additional Verification: CIA Contradicts				N=192	N=183		

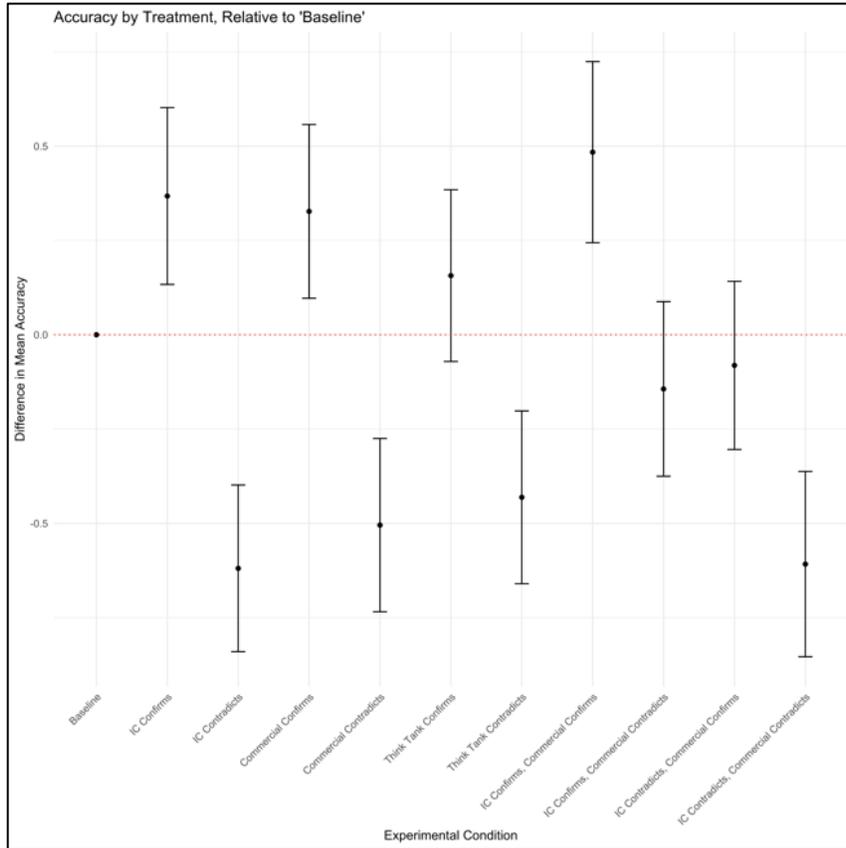
*Findings: Verification*

As a first step, we examine how verification affects perceptions of the president’s accuracy and his willingness to tell truth. Studies have shown that leaders that lie can suffer political punishments and have trouble advancing their policy objectives (Fearon 1994; Gelpi and Grieco 2015). To measure perceived accuracy, the survey instrument asks respondents, “Based on the information in the scenario, how accurate or inaccurate would you consider the president’s statement on the rival country’s nuclear weapon and missile development?” (Figure 1) Respondents provide inputs using a 5-point scale. The survey also collects qualitative data by posing an open-ended question that asks respondents to explain why they judged the president’s statement as accurate or inaccurate. Because the accuracy of a leader’s statements might shape the public’s perceptions of the president’s trustworthiness, the survey instrument asks, “How

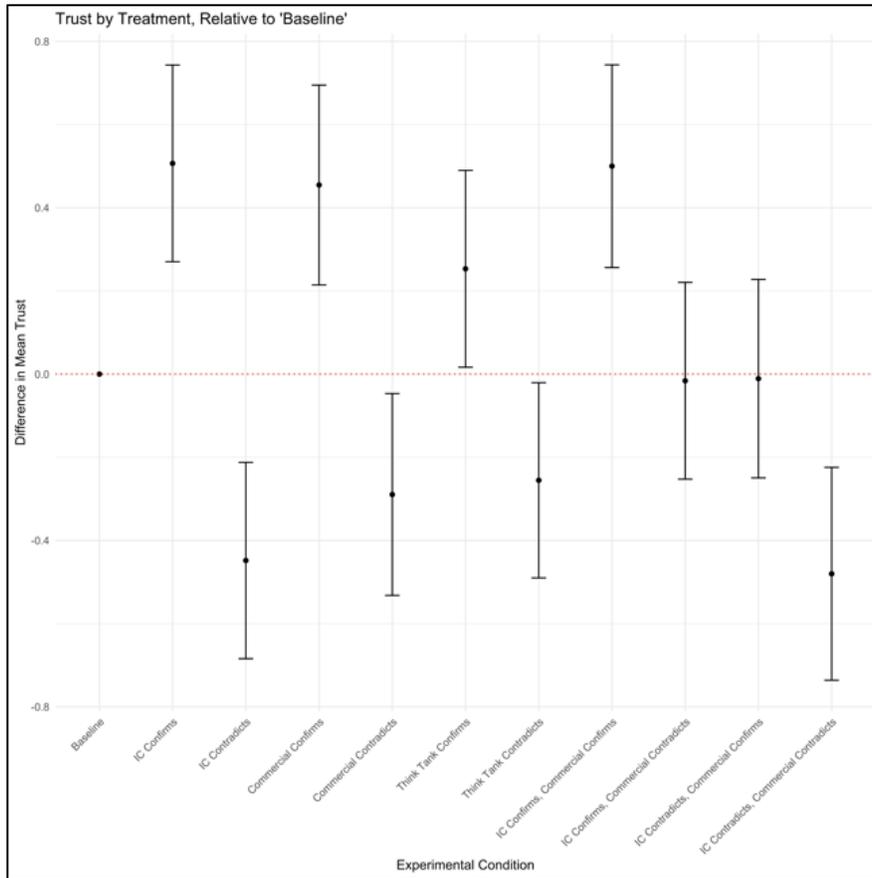
<sup>11</sup> We do not include think tanks in the treatment conditions that feature multiple “verifiers,” and focus instead on the effect of multiple verification by government and commercial entities.

trustworthy or untrustworthy would you consider the president to be based on this scenario?”  
 (Figure 2) Respondents answer along a 5-point scale ranging from “very untrustworthy” to “very trustworthy.”

**Figure 1.**



**Figure 2.**



Consistent with hypothesis H1<sub>A</sub>, confirmation of the president’s statements by the commercial satellite firm has a positive and statistically significant effect on perceived accuracy and trust, relative to the baseline condition of no verification.<sup>12</sup> The effect sizes of commercial confirmation on both accuracy and trust are similar in magnitude to the effect of confirmation by the CIA. The comparable effects of confirmation by intelligence agencies and commercial firms provides support for hypothesis H4, suggesting that private firms can offer just as significant of a cue as those from government agencies with specialized expertise. In interpreting this finding, we

<sup>12</sup> To more systematically examine these findings, we employ ordinary least squares (OLS) models to test their significance. See Appendix B, Section 1.1-1.2. The appendix also examines the effects of verification on respondent perceptions of the accuracy of the president’s future statements.

posit that the relative independence of a commercial firm from political influence might offset any perception of government intelligence agencies as more capable in the intelligence domain, a possibility we explore in greater detail below. When both the CIA and the commercial firm confirm the president's statement, perceived accuracy is at its highest ( $\mu_{\text{accuracy}}=3.63$ ), while perceived trust ( $\mu_{\text{trust}}=3.53$ ), is equal to the condition in which only the CIA offers confirmation.

Interestingly, the effect sizes of confirmation by think tanks on accuracy and trust are modest compared to those of confirmation by commercial technology firms, suggesting the difference in effect sizes might be attributed to variation in the ways respondents perceived these sources. Specifically, respondents may have not fully understood the role of think tanks. In some cases, subjects indicated in their free response answers that the think tank's independence and trustworthiness led them to be persuaded by its analysis. "The think tank is independ[e]nt," wrote one respondent. "They are not under control of the party in p[o]wer." In other cases, respondents viewed the think tank as politically biased with its own agenda. "I'm always wary of potential biases from think tanks," wrote one respondent. "Private think tanks have their own agendas," wrote another. "Why would I trust them?" Still others viewed the president as being privy to information to which the think tank may not have access. "I would believe the president's statements are backed by unbiased intelligence reports from the military and other governmental agencies such as the CIA," wrote one respondent. "I would place my belief in those groups as opposed to a think tank." Another respondent wrote that the president "likely has information that that bleeding heart liberal think tank does not." Finally, several respondents confused the think tank for a private company. "I believe the United States president...will protect the United States," wrote one respondent. "Unlike an independent company, that will probably work for special interest and gain." These divergent (and, at times, incorrect) interpretations prevent us from being

able to draw any definitive conclusions from the think tank treatment conditions. Broadly, however, findings comparing commercial and government sources provide support for H1<sub>A</sub>.

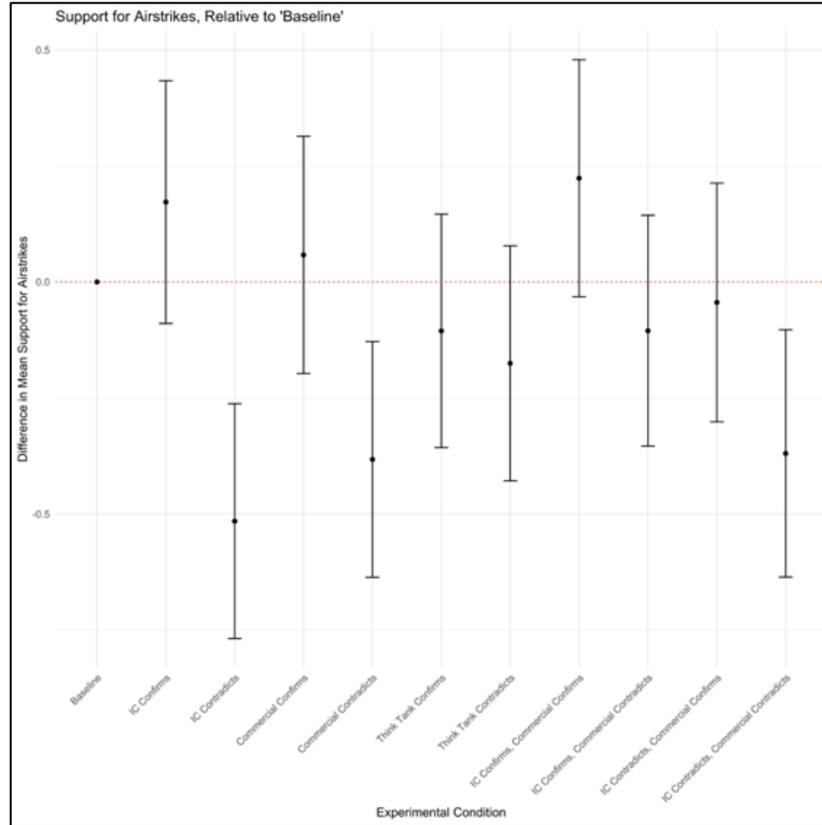
Consistent with hypothesis H2<sub>A</sub>, contradiction has a negative and statistically significant effect on both perceived accuracy and trust, relative to the baseline. Contradiction by the government's intelligence agency generates, on average, a slightly larger substantive drop in perceptions of the president's accuracy and trustworthiness than contradiction by either commercial technology firms or think tanks. This likely reflects the fact that a dissenting view from the president's own intelligence agency, which presumably has access to the same information as the president does, would be especially surprising and therefore more likely to move opinion in a downward direction. When both the CIA and the satellite firm contradict the president's statement, the perceived mean trust ( $\mu_{\text{trust}}=2.55$ ) and accuracy ( $\mu_{\text{accuracy}}=2.54$ ) are roughly equivalent in magnitude to the condition where only the CIA contradicts the president ( $\mu_{\text{accuracy}}=2.53$ ;  $\mu_{\text{trust}}=2.58$ ).

Finally, in circumstances where the intelligence agency and satellite firm release conflicting information about the president's statement, perceived trust and accuracy is not distinguishable from the baseline condition. Critically, this suggests that information from commercial satellite firms can offset the cues from government entities, rendering the public unable to update their assessments meaningfully in the face of conflicting signals.

Beyond affecting public perceptions of presidential accuracy and trust, verification may also affect public support for a leader's proposal to use force in response to the hypothetical nuclear crisis. Respondents are told, "A week after making his initial statement, the president announces that he is considering launching airstrikes against the rival country's nuclear weapon and missile research facilities to prevent this adversary from developing weapons that can threaten the United

States.” Respondents are then asked, “How much do you oppose or support this plan?” Figure 3 illustrates differences in mean support for airstrikes across experimental conditions.

**Figure 3.**



Consistent with Hypothesis H1<sub>B</sub>, confirmation of the president’s statement by the CIA, the commercial satellite firm, or both entities together moves support for airstrikes in the expected direction relative to the baseline condition.<sup>13</sup> Although these effects are in the expected direction, they fall short of being statistically distinguishable from mean support for strikes in the baseline condition. This suggests respondents may, on average, be averse to the use of force, regardless of the confirmatory verification of the president’s statements. Indeed, in line with hypothesis H2<sub>B</sub>, support for airstrikes decreases considerably when the president’s claims about the rival nation’s

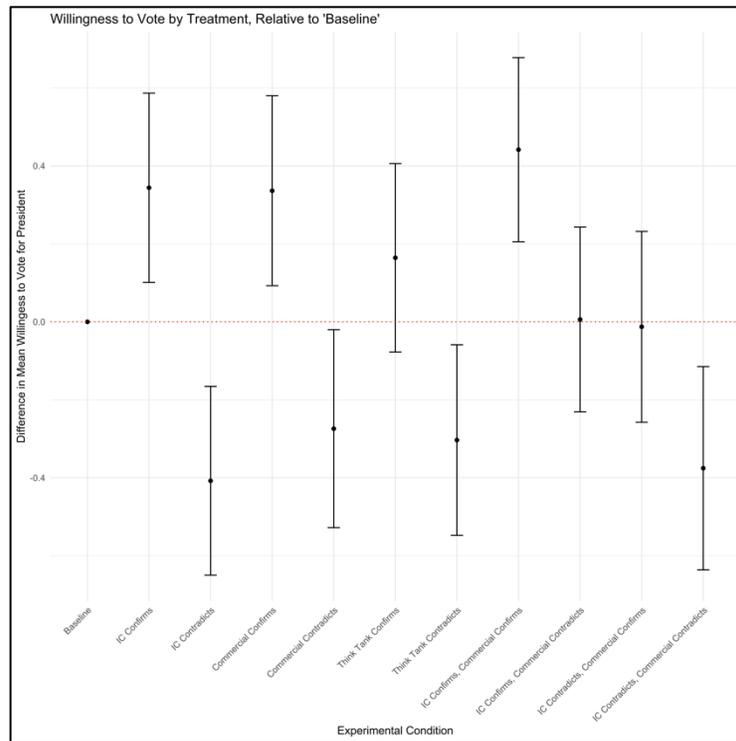
<sup>13</sup> See Appendix B, Section 1.3 for means and significance testing.

missile and nuclear program are contradicted by the commercial firm, the CIA, or both entities together. Interestingly, however, simultaneous disconfirmation by both entities ( $\mu_{\text{strike support}}=2.50$ ) generates an effect on support for strikes that is largely indistinguishable from when either the CIA ( $\mu_{\text{strike support}}=2.36$ ) or commercial firm ( $\mu_{\text{strike support}}=2.49$ ) individually disconfirm the president's claims.

When the commercial firm and CIA release conflicting information, the overall effects are attenuated and not statistically distinguishable from the baseline condition. As with the perceptions of trust and accuracy, this highlights how contradictory commercial cues can offset those from government sources. Finally, we are again unable to explain the findings from the think tank treatments. Both confirmation and contradiction of a president's statement by a think tank move support for airstrikes in a negative direction, but the findings are not distinguishable from the baseline condition.

In addition to affecting public attitudes toward a leader's policies, confirmatory or contradictory verification may also have longer term political consequences. Specifically, information revealed by verification could affect the public's willingness to support the leader at the ballot box during future elections. To be sure, the public's willingness to hold a leader accountable for his deception may not extend to the next election, particularly for voters who cast their ballots for multifaceted reasons that extend beyond foreign policy or those that care little about a leader's past inconsistencies (Snyder and Borghard 2011). To assess these political effects, the survey instrument asks respondents, "If a similar scenario were to play out in the real world, how much more or less likely would you be to vote for this president in the next election?"

Figure 4.



As Figure 4 illustrates, confirmation of the president’s statements by a commercial source, the CIA, or both entities combined has a positive and statistically significant effect on the willingness of respondents to vote for the president (H1A).<sup>14</sup> When a think tank is the source of satellite imagery that confirms the president’s claims, there is a positive, but not statistically significant effect. The largest substantive effect is generated when both the CIA and the commercial satellite firm offer confirmatory evidence. Similarly, individuals who receive disconfirming information from these actors and think tanks are, on average, less likely to vote for the president’s reelection, with disconfirming information from the intelligence agency generating a slightly larger negative effect on respondents’ likelihood to cast a vote for the president. Finally, when a commercial firm releases information that conflicts with that released by an intelligence agency it can once again negate the latter’s effect in moving public opinion.

<sup>14</sup> See Appendix A, Section 1.4 for means and significance testing.

These findings conflict with some recent studies in sociology and political psychology that suggest voters will tolerate lying leaders, particularly if they are strongly motivated to vote for them at the ballot box (Swire-Thompson et al. 2020; Swire et al. 2017; Hahl, Kim, and Zuckerman Sivan 2018). This raises the possibility that overwhelmingly confirming or disconfirming evidence could shape attitudes and public support toward leaders.

## TESTING THE REVELATION LOGIC

The second experiment provides support for the revelation logic. All respondents are told, “the Red Cross has reported that the Syrian government launched a chemical gas attack that killed over 250 civilians, primarily women and children.” Respondents are also told “the U.S. Secretary of State publicly announces that he cannot confirm whether the Syrian government is responsible for the attack.” Respondents are then randomly assigned to one of four experimental conditions. In the baseline condition, respondents receive no additional information. In the three treatment conditions, respondents are told that either the CIA, Planet Labs, or Brookings uses satellite imagery to reveal that Syrian forces carried out the attack (experimental design in Table II). After treatment, respondents are asked to rate their willingness to support limited military operations against the Syrian unit.

**Table II. Experimental design (Revelation)**

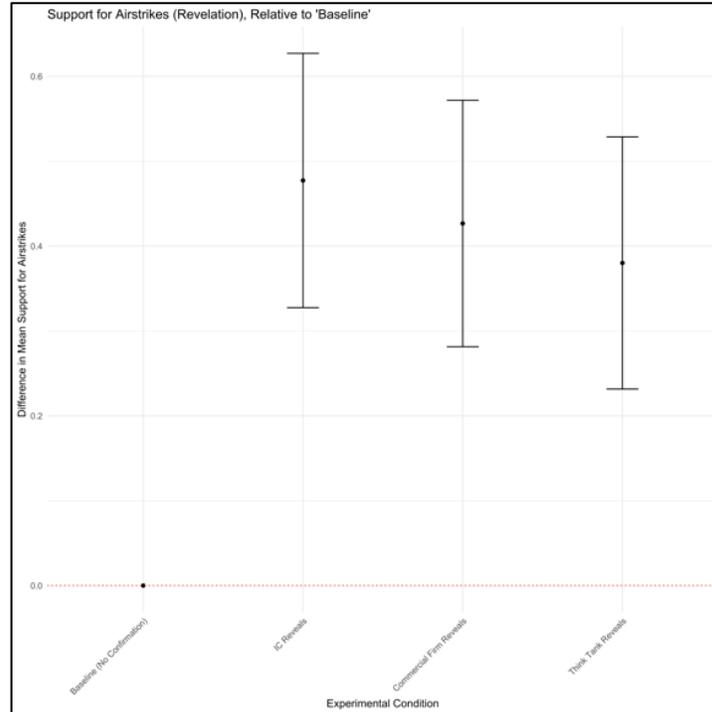
No Revelation (Baseline)	Government Reveals	Private Firm Reveals	Think Thank Reveals
<i>No attribution for attack</i> N=519	<i>Attributed to Syria</i> N=505	<i>Attributed to Syria</i> N=521	<i>Attributed to Syria</i> N=522

### *Findings: Revelation*

To assess whether the revelation of previously undisclosed information shapes public support for the use of force, and whether the source of information matters, we ask respondents,

“would you support or oppose a U.S.-led airstrike against the Syrian military unit that is reportedly responsible for launching the attack?” Respondents answer using a 5-point scale ranging from “strongly oppose” to “strongly support.”

**Figure 5.**



Consistent with hypothesis H3, the revelation of satellite imagery documenting Syrian military culpability increases support for airstrikes, relative to the baseline condition where the president offers no information about the perpetrator of the chemical attack. As Figure 5 illustrates, revelation by the intelligence community generates the highest substantive increase in support (H4), perhaps because perceptions of higher capability of the IC increases the willingness of the public to trust the information and support military action. We investigate this possibility in the following section. Additionally, the revelation of commercial satellite imagery by other actors

generates a positive and significant increase in support for the use of force, providing strong support for the revelation mechanism.<sup>15</sup>

### EXPLORING PERCEIVED ORGANIZATIONAL CHARACTERISTICS

The experimental findings demonstrated that satellite imagery released by commercial entities often have similar effects as information released by government intelligence agencies in shaping public attitudes toward leaders and their policies. To explore the mechanisms underpinning the experimental findings, the survey instrument asked respondents for their general perceptions regarding the politicization (degree of political influence the president has over the organization) and capabilities of various information sources. Respondents were asked post-treatment to rate each entity on a 5-point Likert scale on the degree of influence the president has in shaping assessments from each entity (from 1-“very little influence” to 5-“very high influence”) and how capable it is in collecting and analyzing information on foreign countries (from 1-“very not capable” to 5-“very capable”). We asked these questions post-treatment to avoid priming respondents, and we calculated the mean scores for each entity across all participants.<sup>16</sup>

**Table III: Perceptions of Organizational Characteristics**

<i>Organization</i>	<i>Politicization</i>	<i>Capability</i>
Intelligence Community	3.16 (0.026)	3.77 (0.027)
Commercial Firm	2.89 (0.025)	3.29 (0.024)
Think Tank	2.85 (0.024)	3.27 (0.023)

On average, respondents view the intelligence community as more politicized commercial firms or think tanks. This perception may account for the larger effect size we observe when

<sup>15</sup> See Appendix B, Section 2 for means and significance testing.

<sup>16</sup> Because these questions were posed post-treatment, we present the mean politicization and capabilities measures of all respondents, regardless of which treatment condition they were assigned to in the experiments. We also conduct a standalone survey of a convenience sample of 300 respondents recruited through Amazon’s Mechanical Turk posing only these same questions without treatment. A comparison of the results is presented in Appendix B, Section 3.

intelligence agencies offered disconfirming information (H4). Respondents also view intelligence agencies as more capable in information gathering and analysis than commercial firms and think tanks, whose differences in scores are negligible. Yet commercial firms often generated similar effect sizes when issuing confirming information, suggesting that some combination of its relative independence and technical capacity proved salient to respondents in evaluating leaders and their policies. Although not definitive, these findings can be suggestive of the underlying reasons for the differences we encounter across treatment conditions.

## **CONCLUSION**

This article extends research on the role of secrecy and technology in international relations theory by outlining two pathways by which emerging private-sector information technologies can influence public attitudes towards political leaders and their foreign policies. By verifying the claims of government leaders or revealing previously unacknowledged activities, non-government actors armed with data from systems like commercial satellites can undermine – or, in some cases, bolster – the claims governments make about national security affairs. In turn, this can affect public attitudes toward foreign policy decision-makers and the policies they propose.

A series of original survey experiments provide strong support for the verification and revelation mechanisms. Disclosure of sensitive information by commercial satellite firms can prove just as influential in shaping public attitudes toward leaders and their policies as information supplied by government intelligence agencies. When non-governmental satellite imagery confirms the president’s claims about a threat posed by a hypothetical nuclear rival, respondents are more likely to trust the president, more willing to vote for the president in a future election, and more

likely to support the president's proposal to use force in response to the threat compared to respondents who receive no verification from non-governmental sources. The effect of confirmatory verification by commercial firms is generally comparable in magnitude to that of confirmatory verification by government intelligence agencies. In contrast, when commercial satellite imagery contradicts the president's claims, respondents are less likely to trust him, vote for his reelection, or support his policies than those who receive no verification. The decline in favorable attitudes generated by contradictory commercial verification is generally smaller in magnitude than that generated when the intelligence community releases disconfirming information. We suggest evidence disconfirming a president's statements from the government's own intelligence agencies should be particularly unexpected—and therefore especially informative—in shaping attitudes toward leaders and their policies.

When commercial imagery reveals previously unacknowledged information, it also has the ability to influence public preferences toward foreign policy. Respondents exposed to satellite imagery that reveals a rival state's culpability in human rights violations are more likely to support military intervention than those in a baseline condition where no such information is revealed.

These findings have important implications for theory and policy. For scholars, the experiments suggest new roles for non-governmental actors. International relations research has long examined the role of public opinion and information cues, but it has largely overlooked the role of commercial actors and information gathering technologies in shaping these preferences. The findings also suggest that emerging technologies may leave states less able to manage the disclosure of sensitive information than many academic theories assume. As a result, state decisionmakers may find themselves pressured into action in situations where they might prefer to avoid action or escalation.

For policymakers, our findings suggest that non-state entities equipped with commercial satellite imagery can generate public pressures that reduce a government's freedom of action in the foreign policy arena. As commercial information gathering technologies proliferate, governments will find it harder to lie about or conceal their activities or those of other states. Policymakers must factor this into their calculus as they decide how to develop foreign and publicize their policies. At the same time, non-government actors with access to sensitive information bear a formidable responsibility to only disclose information that is accurate. Releasing inaccurate information has the potential to shift public preferences toward foreign policy and leaders in a way that sows discord and hampers decision-making. The power of commercial satellite imagery to sway public opinion should also raise concerns that nefarious actors might use or manipulate imagery to deliberately cause confusion that complicates a state's ability to execute its foreign policy. Policymakers should posture themselves to counter this type of disinformation.

Our analysis suggests several avenues for future research. First, future studies might test the verification and revelation logics with technologies other than commercial satellites. While we expect our theoretical mechanisms to apply across a range of information gathering technologies, future studies might examine whether different verification and revelation technologies generate smaller or larger shifts in public attitudes toward leaders and their policies than satellite imagery. Second, researchers might explore the generalizability of our theory and findings beyond the United States. Citizens in different national contexts or regime types may react differently to the disclosure of sensitive information by non-governmental actors. The public in some states may be less trusting of private sector firms or may be less willing to question the foreign policies of senior national leaders. Third, scholars might assess the role verification and revelation by commercial technologies play in issue areas beyond national security. For example, can information provided

by commercial satellites about environmental issues shift public preferences in these domains? Our research represents a first step in understanding how information technologies might influence foreign policymaking. Additional studies will expand our understanding of the relationship between information technologies, public opinion, and foreign policy.

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