

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C.**

In the Matter of	)	
	)	
Amendment of Part 2 of the Commission's Rules to	)	ET Docket No. 00-258
Allocate Spectrum Below 3 GHz for Mobile and	)	
Fixed Services to Support the Introduction of New	)	
Advanced Wireless Services, Including Third	)	
Generation Wireless Systems	)	
	)	
Amendment of Parts 1, 2, 27 and 90 of the	)	WT Docket No. 02-8
Commission's Rules to License Services in the 216-	)	
220 MHz, 1390-1395 MHz, 1427-1429 MHz ,	)	
1429-1432 MHz, 1432-1435 MHz, 1670-1675	)	
MHz, and 2385-2390 MHz Government Transfer	)	
Bands	)	

To: The Commission

**COMMENTS OF GANNETT CO., INC.**

David P. Fleming  
Senior Legal Counsel  
GANNETT CO., INC.  
7950 Jones Branch Road  
McLean, VA 22107

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## **SUMMARY**

Gannett Co, Inc. operates KUSA-TV, a television station licensed to Denver, Colorado. In producing KUSA's seven daily newscasts, as well as other informational programming, Gannett makes heavy use of microwave BAS facilities operating in the 2025-2110 MHz spectrum. Production of KUSA's news and informational programming is impossible without consistent use of these facilities.

The Fourth Notice of Proposed Rulemaking proposes to allow the Department of Defense to operate satellite uplinks in several locations, including Buckley AFB near Denver, in the same 2025-2110 MHz spectrum. Engineering data shows, however, that such spectrum sharing in Denver would result in significant interference, rendering the broadcasters' systems essentially inoperable.

Accordingly, Gannett respectfully requests that the Commission consider alternatives to the proposal outlined in the NPRM. Such alternatives include (1) keeping the uplinks in their current spectrum and using narrower channels, (2) relocating the uplink at Buckley AFB further from the Denver metropolitan area, (3) operating the uplink facility at a lower power, (4) reducing side lobe leakage with skirts of microwave-absorbing material, and (5) limiting how low the angle of the mainbeam of the antenna may be above the horizon. The Commission should consider these alternatives, and others, singly or in combination, to reduce the impact on broadcasters' BAS operations.

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To: The Commission

**COMMENTS OF GANNETT CO., INC.**

**INTRODUCTION**

Gannett Co., Inc. (“Gannett”) respectfully submits its comments in response to the Commission’s July 7, 2003 *Fourth Notice of Proposed Rulemaking* (“NPRM”)<sup>1</sup> in the above-

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<sup>1</sup> *In the Matter of Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems and Amendment of Parts 1, 2, 27 and 90 of the Commission’s Rules to License Services in the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands*, Fourth Notice of Proposed Rulemaking, ET Docket No. 00-258 and WT Docket No. 02-8, FCC 03-134 (Released July 7, 2003).

captioned proceedings. Gannett's interest in this particular NPRM stems primarily from its operation of KUSA-TV ("KUSA"), a television station licensed to Denver, Colorado.<sup>2</sup>

The NPRM proposes to allow operation of United States Department of Defense ("DOD") satellite telemetry, tracking and control ("TT&C") uplink facilities at 11 specific sites in the 2025-2110 MHz spectrum, which is already used by television Broadcast Auxiliary Service ("BAS")<sup>3</sup> facilities.<sup>4</sup> This proposal endeavors to accomplish several laudable goals, such as ensuring that spectrum is available for these important DOD operations and enabling the development and deployment of advanced wireless services ("AWS"), including third generation wireless ("3G") systems. Denver, Colorado is one of the 11 locations involved in the NPRM proposal.<sup>5</sup> As licensee of KUSA, Gannett is particularly concerned about interference that would be caused to Denver area 2 GHz BAS operations by DOD's operation of high powered uplinks in the same band.<sup>6</sup> In particular, KUSA has extensive BAS facilities operating in and around

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<sup>2</sup> Gannett is a large diversified news and information company, with operations in 44 states, the District of Columbia, and several locations abroad. As a broadcaster, the company owns and operates 22 television stations covering 17.8 percent of the USA. In addition, it is the largest newspaper group in the US, with 100 daily newspapers, including USA TODAY, and a variety of non-daily publications and USA WEEKEND. As noted in the NPRM, Denver is the 18th largest broadcast market in the country.

<sup>3</sup> Although "BAS" is generally used to refer to a broad wide range of auxiliary facilities and frequencies, the term is used herein, as in the NPRM, to refer to stations (TV Pickups, TV Studio Transmitter Links, Inter-City Relays) operating in the 2025-2110 MHz band that are targeted for sharing with DOD.

<sup>4</sup> NPRM ¶ 26.

<sup>5</sup> *Id.* ¶ 29.

<sup>6</sup> These comments focus on spectrum sharing at the Denver location. As discussed below, of the 11 locations outlined in the NPRM, Denver presents the worst case in terms of interference, due to the topography of the area and the proximity of the proposed operations to the metropolitan area. Preliminary engineering studies show, however, that BAS operations at all or most of the 11 locations could suffer significant interference as a result of the spectrum sharing proposal. Specifically, Gannett also owns WLBZ(TV) in Bangor, Maine, which is near another of the 11 uplinks listed in the NPRM. While the

Denver on a consistent basis. These BAS operations, which use the spectrum involved in the NPRM's sharing proposal, are crucial to KUSA's extensive news operations and public information programming, and are therefore important to KUSA's business and to the public welfare generally. An engineering analysis conducted for Gannett by Cavell, Mertz & Davis, Inc., ("CMD"), Gannett's consulting engineers ("CMD Study", see **Exhibit 1**) shows that the NPRM's spectrum sharing proposal creates a high risk of significant interference to KUSA's BAS operations. Indeed, the sharing proposal would render KUSA's BAS facilities essentially inoperable.<sup>7</sup>

Because of the above difficulties, Gannett respectfully requests that the Commission and NTIA consider alternatives to the proposal given in the NPRM. One alternative is keeping the uplinks in their current spectrum and using narrower channels, as broadcasters have been required to do in the 2 GHz band. Although NTIA has said that physically relocating all of the uplinks is not practical, the possibility of relocating the uplink at Buckley AFB should be considered as another alternative. Also, a lower power uplink facility could mitigate interference to the broadcasters. Similarly, reducing side lobe leakage with skirts ("pie-plate shrouds") of microwave-absorbing material – combined with limitations on how low the angle of the mainbeam of the antenna may be above the horizon – should be considered. Use of such

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geographic separation to the uplink is greater in Bangor than in Denver, Gannett is similarly concerned that the proposed band sharing not adversely affect the BAS operations of WLBZ.

<sup>7</sup> Other Denver area broadcasters have BAS facilities that operate in the same spectrum and many of their receive sites are collocated with KUSA's BAS facilities. Through local coordination, the four stations licensed in the band have divided the seven BAS channels so that three of them have two frequencies each, and the fourth station has one frequency. All of these broadcasters would suffer similar adverse consequences as a result of the spectrum-sharing proposal outlined in the NPRM.

alternatives, singly or in combination, must be considered, particularly since effective, real-time coordination between DOD and broadcasters appears highly unlikely.

### **KUSA'S BAS FACILITIES ARE VITAL TO THE PUBLIC INTEREST**

KUSA's extensive news and information programming cannot be carried out without use of the BAS facilities. At a time where the Commission is focused increasingly, and justifiably, on broadcasters' obligation to serve their local communities by providing news and information programming, it would not be prudent to adopt spectrum policies that would dramatically limit Denver broadcasters' ability to create such programming.

KUSA is licensed to Denver, but the station provides a regional television service. Consistent with its obligation to serve the interests of this broad audience, KUSA is a news leader in the Denver area. The station broadcasts seven daily newscasts – at 5:00 A.M., 6:00 A.M., Noon, 4:00 PM, 5:00 P.M., 6:00 P.M, and 10:00 P.M. In producing these newscasts, KUSA makes extensive – on some days virtually continuous – use of its BAS facilities for Electronic News Gathering (“ENG”) purposes.<sup>8</sup>

As has been shown in the record of this proceeding, live news coverage is the backbone of the modern newscast. The majority of live news is ENG-based, at 2 GHz.<sup>9</sup> Because KUSA serves a regional audience, its newscasts often require live reports from locations throughout the region. To illustrate this, **Exhibit 2** provides a snapshot of BAS operations at KUSA during one

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<sup>8</sup> The nature and importance of BAS/ENG operations to live news coverage is well-documented in the record and described in the NPRM. The Commission notes that “broadcasters intensively use all seven 2 GHz BAS channels.” NPRM ¶ 22.

<sup>9</sup> *Id.* ¶ 28.

recent week – October 20-24, 2003. It shows clearly the extent to which virtually every news program depends on BAS to cover breaking news, as well as for everyday tasks such as traffic reporting. On any given day, several of KUSA's eight receive sites are used for ENG purposes at least once and often numerous times, even in a single news program. When a crisis or unusual event occurs, the use escalates. This is shown in **Exhibit 3**, which details KUSA's use of BAS to cover wild fires on October 29, 2003. **Exhibit 3** shows that KUSA made almost constant use of its BAS facilities to keep its audience informed about these dangerous fires and the consequences for the Denver community.

Like other broadcasters, KUSA provides weather information as part of its newscasts. Such information is often of critical importance to KUSA's audience. For example, Colorado is second only to Oklahoma in annual number of tornados. Colorado is also known for its harsh winters. In order to keep the public informed about dangers and other difficulties associated with extreme weather, KUSA must be able to provide live coverage of important weather events as part of its newscasts and emergency response programming. Of course, such live reporting involves use of its 2 GHz BAS facilities.

Events of international or national importance occur in the Denver area regularly. Significant examples include the Oklahoma City bombing trial in Denver and the tragedy at Columbine High School. KUSA covers such events during its newscasts with live reports from remote locations. Again, as **Exhibit 3** shows, such coverage relies heavily on the use of 2 GHz BAS facilities. Reporting on such events is important to Gannett in a broader sense as well, since such coverage is often shared with other Gannett television stations, and may also be fed to the broadcast network.

Tragedies such as September 11th show the importance of broadcast news in times of national crisis or emergency. On the 11th, the broadcast media took the lead in communicating details about the day's occurrences, emergency information, the government's response, and other important information to the American people. Of course, such programming often involved live reports from remote locations, which, in turn, involved the use of BAS facilities. The 11th provides a recent and striking example of newscasting in times of crisis. Broadcasters, however, often find themselves disseminating critical public safety information in times of emergency and crisis. Because of the important public interest role that the broadcast media plays in such situations, and the extent to which the public relies on live coverage of breaking news, it is critical that station personnel be able to manage any interference to the infrastructure *at all times and quickly*.

As shown below, however, without modifications to the spectrum sharing proposal outlined in the NPRM, interference to Gannett's BAS facilities would severely handicap its ability to provide the kind of live news coverage its audience has come to expect. This result would be inconsistent with KUSA's and the Commission's desire that licensees serve the public interest by producing high-quality local news and informational programming.

**THE PROPOSAL OUTLINED IN THE NPRM WOULD RENDER KUSA'S 2 GHZ FACILITIES – AND FACILITIES IN AND AROUND DENVER GENERALLY – INOPERABLE**

An examination of the engineering involved in the spectrum sharing proposal shows that significant modifications would be necessary for BAS and DOD to share the 2 GHz band, as proposed in the NPRM.<sup>10</sup>

**Assumed Technical Parameters of the DOD Uplinks Suggest They Will Have a Serious Adverse Impact on BAS**

Unfortunately, the NPRM is somewhat vague concerning the details of the proposed DOD operations in the 2 GHz band and about how coordination would work, which makes it difficult to formulate a complete response to the Commission's proposal.<sup>11</sup> Nonetheless, it is possible to make educated, conservative assumptions about DOD's proposed operations in order to study the feasibility – from perspectives of interference and coordination – of the spectrum sharing proposal outlined in the NPRM. Such an analysis is provided in the CMD Study, which concludes that, as proposed, the spectrum sharing contemplated in the NPRM will prove totally infeasible in Denver.<sup>12</sup>

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<sup>10</sup> The 11 DOD TT&C uplinks that the NPRM proposes to move to 2 GHz currently operate in the band 1761-1842 MHz. Underlying the proposal, as noted above, is the objective of clearing the 1710-1755 MHz band for 3G. To that end, some government systems will be shifted up to the 1755-1770 MHz band. Relocating TT&C out of the top nine megahertz of that band (*i.e.*, 1761-1770 MHz), makes more spectrum available for this purpose. Nine megahertz represents about 11 percent of the total spectrum currently in use for TT&C. NPRM ¶ 26.

<sup>11</sup> The NPRM notes that broadcasters have asked NTIA for the specifics of its TT&C operations and that NTIA has reported that they have “not yet been developed.” *Id.* ¶ 27. Concerning coordination, the NPRM simply states that “NTIA has emphasized to us that DOD is willing to assume the full burden of coordinating these 11 TT&C earth stations to avoid causing interference to incumbent BAS operations.” *Id.*

<sup>12</sup> CMD Study at 4-7.

The power differential between the 2 GHz BAS facilities and the proposed DOD satellite uplinks – 12 watts for the BAS facilities and up to 10,000 watts for the uplinks – is substantial and problematic. Moreover, Buckley Air Force Base, where the uplink is located, is less than one mile outside of the Denver/Aurora Urbanized Area.<sup>13</sup> Thus, DOD’s uplink would operate in close proximity to, and at a much higher power than, Gannett’s BAS facilities. In addition, CMD points out that there is no intervening terrain to block the interfering signal from the high powered earth stations.<sup>14</sup> The result of this situation is predictable. The engineering study shows that, given the nature and location of the BAS facilities involved and the likely DOD operations in the area, the contemplated spectrum sharing would result in substantial one-way interference from the DOD uplink to the KUSA 2 GHz BAS operations.<sup>15</sup> Even if power at the uplink were reduced to 10 watts, interference would still be a problem throughout much of the metro area.<sup>16</sup> In short, if the DOD uplinks are operated at the 100 watts to 10,000 watts cited in the NPRM, 2 GHz BAS channels in the area would be rendered wholly unusable. As CMD states, “there is no practical way to properly engineer a receive site that is within line of sight of an uplink.”<sup>17</sup> On

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<sup>13</sup> As CMD points out, another of the 11 uplinks is located in the Colorado Springs area – at Schriever Air Force Base – which is not within the Denver television market or the KUSA Grade B contour, but, consistent with its regional focus, is within the KUSA operational area and is near the site of one of its eight regularly-used BAS receivers. *Id.* at 1 and Figure 1.

<sup>14</sup> The Buckley AFB uplink is within line of sight to seven of the eight KUSA receive sites, with no terrain shielding whatsoever. The Schriever AFB uplink is within line of sight of the eighth BAS location. *Id.* at Figures 2-9.

<sup>15</sup> *Id.* at 5.

<sup>16</sup> *Id.* at Figures 10-17.

<sup>17</sup> *Id.* at 5.

the other hand, as the FCC has noted, operation of the broadcast facilities would have infinitesimal impact, if any, on the DOD operations.<sup>18</sup>

### **Examples of Past Spectrum Sharing are Inapposite or Do Not Support the Current Proposal**

The Commission notes that broadcasters have shared the 2 GHz band with government users successfully in the past. Specifically, the NPRM states that NASA has shared spectrum in this band alongside BAS operations.<sup>19</sup> From this, the NPRM concludes that, with coordination, it is likely that DOD's proposed operations in the band can be coordinated successfully with broadcast incumbents.<sup>20</sup>

Gannett respectfully submits that the successful sharing between NASA and broadcasters is an example of little relevance to the instant spectrum-sharing proposal. NASA operations occur in remote areas, far removed from the BAS facilities. Due to this large geographic separation, interference does not occur. Not surprisingly, then, this shared use of has worked well. The NPRM proposal, by contrast, involves broadcasters sharing spectrum with a *nearby* government party that *gives but does not receive* interference, and that would *inevitably cause*

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<sup>18</sup> NPRM ¶ 31.

<sup>19</sup> *Id.* at n. 59. This reasoning, like much of the relevant portion of the NPRM, takes place against the background of the NTIA's 2002 Viability Assessment ("NTIA Report"). On this issue, that report states:

The 2025-2110 MHz band is used primarily by the electronic news gather[ing] services, space operations, earth exploration-satellite operations and space research. NASA has very effectively coordinated with other users of the band. The DOD coordination would be similar in nature and *since the ground operations are usually in remote areas*, it would appear to be feasible for DOD to operate on a coordinated basis in this band.

NTIA Report at 16 (emphasis added).

<sup>20</sup> NPRM ¶ 30.

such interference. In short, the proposal in the NPRM bears little resemblance to the NASA situation so far as the Denver market is concerned.<sup>21</sup>

The NPRM also discusses Commerce Department uplink operations at three locations – at Wallops Island, Virginia; Seattle, Washington; and Honolulu, Hawaii – noting that these operate “with the same status that DOD requests for its 11 TT&C earth stations.”<sup>22</sup> Those facilities, however, operate with a fixed beam on one channel and therefore do not raise the same sorts of interference concerns presented by the NPRM proposal. Like the sharing with NASA uplinks, which are located in remote areas, these Commerce Department operations are unlike those proposed for the Denver market.

### **The Proposal Involves Intractable Coordination Problems**

The NPRM suggests that large geographic separations would be required to ensure that DOD satellite uplink operations do not interfere with the BAS operations.<sup>23</sup> The CMD Study

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<sup>21</sup> Denver microwave users also have the benefit of their experience sharing with the Federal Government in the 18 GHz band, which resulted in making that band wholly unavailable for non-government licensees. In light of this history, Gannett is concerned about the proposal at 2 GHz to require broadcasters to coordinate any *future* BAS facilities with DOD. Specifically, the NPRM provides that existing BAS operations will have priority (*i.e.*, “first-licensed facilities have the right of protection”) when the uplinks move into the spectrum. However, it also proposes, despite the benign effect of BAS on the uplinks, that “once a DOD earth station has been coordinated, new BAS stations within these 11 areas [must] coordinate their systems with the local DOD facility.” *Id.* ¶ 31. The experience at 18 GHz was that such coordination was fraught with service-crippling delays. Such a result here would constrain the deployment of services in the 2 GHz band, as specifically prohibited in the current and proposed rules. *See* 47 C.F.R. 2.106 n. US346 (current rules); NPRM ¶ 26 (proposed rules).

<sup>22</sup> *Id.* at n. 59.

<sup>23</sup> The Commission notes that “DOD TT&C earth stations use extremely large antennas and high transmitter output powers to produce highly focused and very powerful mainbeams and could have *large coordination areas*. *Id.* ¶ 30 (emphasis added). Citing NTIA, the NPRM states that “[f]or Buckley Field, ... the nominal coordination distance is 363 statute miles.” *Id.* at n. 83.

confirms this. Thus, the facts are akin to those that led NTIA to conclude that frequency sharing between incumbent systems and 3G systems in the 1755-1770 MHz bands would not be feasible. In making that determination, NTIA focused, *inter alia*, on the large distance separations that would be needed in order to prevent interference.<sup>24</sup>

Numerous other factors suggest that the spectrum-sharing proposal outlined in the NPRM would likely prove unworkable. As noted above, the nature of current frequency sharing among broadcasters at 2 GHz depends on real-time coordination and mutual cooperation. The NPRM proposal seems to contemplate real-time coordination between broadcasters and DOD.<sup>25</sup> While broadcasters successfully coordinate among themselves in using shared BAS facilities, there is reason to question whether real-time coordination with the DOD uplink facilities would prove workable.

It is difficult to fully address the NPRM proposal, as the NPRM gives no specific data concerning how often and for what duration the DOD transmissions would occur. If they occur on a *frequent* yet unpredictable basis, broadcasters would be unable to use the band effectively for live news operations. Indeed, even if such frequent use were to occur on a predictable basis, the spectrum would be unavailable for broadcasters, because, as shown above, they rely on consistent, not intermittent, access to the spectrum in order to produce newscasts and emergency/informational programs. Predictable, infrequent use by DOD might be acceptable, but this would depend on the precise details of DOD's operations, which have not been provided.

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<sup>24</sup> NTIA Report at 21.

<sup>25</sup> NPRM ¶ 31 (noting the need to coordinate even short-term operations). Although the precise manner in which the FCC authorizes these temporary operations has been changed by recent revisions to Part 74 licensing rules, the inference concerning the need for real time coordination remains.

The most problematic aspect of the proposed sharing could arise in the context of a national emergency, when both parties may have the greatest need for the spectrum. With respect to certain DOD operations, it might be impossible or unwise for the government to share details of its operations with non-government personnel, due to, for example, national security concerns. If the government is unable or unwilling to share details, real-time coordination will be impossible.<sup>26</sup> To the extent that real-time coordination was attempted in such a case, the government and the public should be concerned about the effect of that coordination on national security.

While coordination difficulties would likely be at their worst in times of great regional or national crisis, these are the precise times that access to BAS facilities is most crucial. Broadcasters would want to inform their audience of all relevant information as quickly, accurately, and completely as possible. This would inevitably involve remote, live reporting, and therefore use of 2 GHz ENG facilities. However, in such situations, DOD use of the spectrum is likely to be even heavier and more secret than usual. Real time coordination in such circumstances would be severely compromised, if it were possible at all. Thus, while Gannett recognizes the legitimate needs the government uplinks serve, it is justifiably doubtful about the ability of broadcasters to achieve effective coordinated use of the spectrum under such circumstances.

Difficulties are exacerbated by the different objectives of DOD and the BAS operators in the band. The broadcasters that use the 2 GHz ENG spectrum all have the common goal of

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<sup>26</sup> The Commission notes that “implicit in the concept of successful coordination is that the affected parties would know each others’ operational parameters.” *Id.* at n. 87.

“getting the story.” Even though they are competitors, if they don't cooperate on a continuing basis, nobody wins. The NPRM, on the other hand, proposes addition of another user, DOD, with different objectives, and, importantly, with no incentive to cooperate because it only gives interference and receives none. Even if a transmission were coordinated in advance by DOD, a major news event might develop which would conflict with the coordinated transmission. While broadcasters have the same goal of covering the news and therefore would likely coordinate successfully amongst themselves in such a situation; DOD's mission is completely different. DOD therefore has little or no incentive to cooperate with the broadcasters.

In short, while Gannett does not dispute that the government operations contemplated serve an important public welfare role, it is equally clear that the BAS facilities that would be rendered useless under the NPRM proposal are also vital to the public interest. The Commission should ensure that localism and the public interest are served by considering alternatives to the NPRM proposal.

### **Alternative Proposals Must Be Considered**

As described in the CMD Study, one alternative would be to take the same approach with the DOD uplinks as was recently taken with the BAS band. Specifically, when 35 MHz (30 percent) of the BAS band was reallocated for use by the Mobile Satellite Service, the remaining BAS band was rechannelized into narrower channels. DOD is losing 9 MHz (only 11 percent) of its TT&C spectrum to the Advanced Wireless Service and could be required to reconfigure in a similar manner.<sup>27</sup>

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<sup>27</sup> CMD Study at 7.

As another alternative, tailored specifically for the Denver market, the uplink at Buckley AFB could be relocated to a more remote site, further from the metro area. The NTIA study asserts that relocating all of the uplink facilities would be too costly and impractical. However, relocating one of them, in order to preserve vital news and information-related channels in the 18th largest television market in the country, should be included as an option.

As shown in the CMD study, a lower power uplink facility could mitigate interference to the broadcasters.<sup>28</sup> The level of suppression required in Denver to provide full interference protection to BAS sites, by itself, may be so low as to be unworkable for the DOD. However, in combination with other options, reduced power is certainly a factor in reducing interference.

Shielding the interfering signals coming from the high-power uplinks is another option to be considered as part of a mix of solutions. Reducing side lobe leakage with skirts (“pie-plate shrouds”) of microwave-absorbing material – combined with limitations on how low the angle of the mainbeam of the antenna may be above the horizon – should be considered.

The alternatives are demonstrably limited and each has its pitfalls and negatives. In light of the devastating affect of the proposed DOD operations on BAS facilities, the search for solutions must comprise numerous alternative approaches.<sup>29</sup> The combination that may work in

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<sup>28</sup> *Id.* at 8.

<sup>29</sup> The Commission suggests several factors that would help but which do not seem to be available here, including terrain shielding, uplink antennas that are directed “out to sea,” the fact that each TT&C channel is “*expected* to impact only one BAS channel,” and antennas that *may* be at high elevation angles. NPRM ¶ 30 (emphasis added). As noted above, in Denver there is *no* terrain shielding. The option of pointing antennas out to sea clearly is unavailable for uplinks in Colorado. While an uplink may be *expected* to impact only one BAS channel, the NTIA study notes that “[i]t is *imperative* that all remote tracking stations be able to command *every* satellite.” NTIA Report at 21 (emphasis added).

one market, where there is some terrain shielding and there is some geographic separation between the BAS and DOD operations, may not work in a market, like Denver, where neither of those factors is present. In a market like Denver the only solution may be to remove the uplink to a more remote location.<sup>30</sup>

The Commission is rightly concerned that the proposed sharing will pose significant problems.<sup>31</sup> The prospects for effective real-time coordination between parties of vastly divergent goals and unequal bargaining power are dim, at best. Gannett, therefore, urges the Commission and will work with the FCC, to find a combination of approaches that would include, but not be limited to, such factors as reduced power, mainbeam elevation limits, side lobe suppression, and geographic separation, in order to achieve a level of signal injection by the uplink, into the BAS spectrum, that would not cause objectionable interference to BAS operations.

## **CONCLUSION**

BAS facilities are crucial to the ability of KUSA and other Denver broadcasters to produce news and information programming, and therefore to the ability of KUSA and Denver broadcasters to serve the public interest. Unfortunately, the spectrum-sharing proposal outlined in the NPRM would render KUSA's BAS facilities, and the BAS facilities in the Denver area generally, useless. Without these facilities, KUSA would be unable to serve the local community effectively, which would damage the public interest immeasurably and would run

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<sup>30</sup> Gannett has not undertaken the engineering studies to identify an alternative frequency band where the uplink TT&C operations might be moved. This would, of course, resolve the issue of BAS interference, and would be a solution Gannett would likely support.

<sup>31</sup> NPRM ¶ 33.

counter to the Commission's long-standing concerns about localism. Accordingly, the Commission should not adopt the spectrum sharing proposal outlined in the NPRM and should instead consider alternatives such as those spelled out in these comments.

Respectfully submitted,

**GANNETT CO., INC.**

By: /s/ David P. Fleming  
David P. Fleming  
Senior Legal Counsel  
GANNETT CO., INC.  
7950 Jones Branch Road  
McLean, VA 22107

November 3, 2003

**Engineering Statement**  
in support of a  
**Comments in Fourth Notice of Proposed Rule Making**  
prepared for  
**Gannett Co., Inc.**

This statement has been prepared on behalf of *Gannett Co., Inc.* (“*Gannett*”) licensee of television station KUSA-TV (Ch 9, Denver, Colorado) and associated 2 GHz Broadcast Auxiliary station KA-35134, in support of comments filed to the Commission’s July 7, 2003 Fourth Notice of Proposed Rulemaking (“NPRM”)<sup>1</sup>. Specifically, the FCC proposed to allow operation of U.S. Department of Defense (“DOD”) satellite telemetry, tracking and control (“TT&C”) uplink facilities at 11 specific sites in the 2025-2110 MHz frequency range.

The 2 GHz broadcast auxiliary (“BAS”) spectrum is currently utilized by broadcast television station Electronic News Gathering (“ENG”) facilities to provide live news reports from any location within the station’s service area. It will be shown in the following that the proposed operation of two of these TT&C uplink facilities near Denver is compatible with the current and future use of these frequencies by broadcasters only if several conditions are met.

**Background**

The U.S. Government has been mandated to relinquish some of its spectrum to make room for new advanced wireless services. In doing so, the National Telecommunications and Information Agency (“NTIA”) released a study<sup>2</sup> showing that DOD TT&C uplink facilities could coexist with current users of the 2025-2110 MHz spectrum because their “operations are usually in remote areas.” The NTIA states that the coordination would be similar to that currently being done by NASA for its space operations.

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<sup>1</sup> *In the Matter of Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems and Amendment of Parts 1, 2, 27 and 90 of the Commission’s Rules to License Services in the 216-220 MHz, 1390-1395 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands*, Fourth Notice of Proposed Rulemaking, ET Docket No. 00-258 and WT Docket No. 02-8, FCC 02-134 (Released July 7, 2003).

<sup>2</sup> See National Telecommunications and Information Administration Report entitled “An Assessment of the Viability of Accommodating Advanced Mobile Wireless (3G) Systems in the 1710-1770 MHz and 2110-2170 MHz Bands,” dated July 22, 2002 (“2002 Viability Assessment”).

## Engineering Statement

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The FCC's NPRM and the NTIA report list 11 TT&C sites that would be operating in the 2025-2110 MHz band. Several of these sites, as noted in the NPRM, are located in close proximity to major television markets. Two of these facilities, Buckley Air Force Base and Schriever Air Force Base, are located within the service area of KUSA-TV. As discussed below, the two fixed locations near Denver would have serious detrimental effects on the ENG activities that are critical to the delivery of the local news by KUSA-TV and other Denver television stations.

In addition, the NTIA report states that the Air Force uses transportable "...earth stations to provide additional coverage during launches, early orbit operations, anomaly resolution, and critical orbit insertion maneuvers. These transportable stations are moved as necessary to accomplish the mission."<sup>3</sup> Although not mentioned in the NPRM, it is not likely that the operational need for transportable uplink facilities will go away. It is also likely that the operation of these transportable facilities would have the same effect on BAS 2 GHz receive locations. If transportable facilities are to be permitted in the BAS band, mandatory coordination of their use must also be specified in the Rules.

### Numerous Receivers Under Each Callsign

The NPRM uses the number of licenses in the FCC's ULS database for the BAS band as an indication of the number of operational BAS stations. While the number of stations is proportional to the number of licenses, we believe that the 1213 TV Pickup callsign figure cited in the NPRM<sup>4</sup> is not indicative of the level of use in this band.

KUSA-TV is licensed to operate on all 7 BAS channels under callsign KA-35134. Most television stations in the market also have 2 GHz BAS licenses that cover all 7 channels. KUSA-TV operates five ENG trucks, a helicopter, as well as several transportable units all under the same callsign. As shown in **Figure 1**, KUSA-TV utilizes eight geographically diverse receive sites to permit its news reporters to send live reports back to the studio. Additionally, temporary receive

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<sup>3</sup> See 2002 Viability Assessment, page 20.

<sup>4</sup> See NPRM paragraph 20.

## **Engineering Statement**

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sites are occasionally utilized (on building rooftops or similar vantage points) to augment the coverage of the existing KUSA-TV receive sites. According to KUSA-TV staff, three other television stations in the Denver market also operate numerous receive sites throughout Denver and the surrounding area. These receive sites are located on mountaintops and downtown building rooftops. It is these receive sites that will receive the interference caused by the proposed TT&C uplink facilities.

As shown above, for each license listed in the FCC's database, there could be numerous sites, eight in the case of KUSA-TV, where harmful interference from the TT&C transmitters could occur.

If all five KUSA-TV ENG trucks, the helicopter, and a transportable system were in operation, that is, in effect, 7 or more users for the one license. To conclude that there are 1213 users for the 1213 TV Pickup callsigns in the FCC's database significantly understates the use of the 2GHz BAS spectrum.

### **Coordination Among Local Users**

As shown above, there are a large number of users of the 2 GHz BAS spectrum within the Denver Market. Each user is licensed to operate on all 7 BAS channels, therefore careful coordination and cooperation among the users in this crowded band is critical to the success of the remote newscasts. Coordination in this band has traditionally been done by "gentlemen's agreement" in concert with the local frequency coordinators. Each station in the market has one or two channels that is coordinated for their primary use. There are four stations in the Denver market that have significant local news operations. Three of these stations have coordinated the primary use of two 2 GHz channels and the remaining station has only one channel coordinated to it. Therefore all 7 BAS channels are heavily used in the Denver market. Periodically, a station will need more than its one or two coordinated channels. When this situation arises, the station staff will coordinate with the other local stations to use other channels. This coordination occurs over a period of hours, if not minutes, and has developed over many years of local stations working together to cover news events.

Ultimately, KUSA-TV and the other Denver broadcasters have a vested interest in coordinating with each other since all stations need to get the remote news program feed link ("ENG

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shot”) back to the studio. In addition, all BAS users have a relatively equal opportunity to cause interference to other users in the band. As is shown elsewhere in this engineering statement, the TT&C uplink facility will cause large amounts of interference to the BAS receive facility but as is stated in the NPRM, BAS “operations are not likely to cause interference to Federal Government operations.”<sup>5</sup>

Further, it is suggested by the NTIA that “it is imperative that all remote tracking stations be able to command every satellite as operational requirements dictate.”<sup>6</sup> This suggests from the outset that the Federal Government’s mission is more important than that of the broadcasters’. If the television station could predict where the next news event would occur then it might be possible to coordinate their operation with the TT&C uplink facility in advance, however this is not the case. The time and location of news events are unpredictable and the full remote reporting capability must be operational and available to the television station at all times.

The disparate missions of the broadcasters and the Federal Government is not conducive to the amiable sharing of frequencies as envisioned by the Commission and the NTIA. A situation where one user causes interference but receives none generates an unequal footing since there is no implicit incentive to coordinate or cooperate. Therefore, the proposed TT&C operation cannot be considered to be “co-equal” users of the spectrum. Allocating these frequencies on a “co-equal, primary” basis as proposed in the NPRM under these circumstances simply will not work.

### **Interference to ENG Receive Sites**

The NPRM suggests that the extremely large coordination distances suggested by NTIA for avoidance of interference from uplink facilities can be reduced if terrain shielding is taken into account.<sup>7</sup> As shown by the terrain profiles in **Figures 2 through 9**, the uplink facility at Buckley Air Force Base is not terrain shielded from five of the eight receive sites currently employed by KUSA-TV. Many of the areas around Denver that would be suitable for additional receive sites

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<sup>5</sup> NPRM at paragraph 31.

<sup>6</sup> 2002 Viability Assessment, page 21.

<sup>7</sup> NPRM at paragraph 30, footnote 83.

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would be eliminated because of the Buckley facility's location in the Denver Metropolitan area, thus the proposed use of these frequencies at Buckley would constrain the deployment of services in the 2 GHz band as specifically prohibited in the current and proposed rules.<sup>8</sup>

Similarly, the area around Colorado Springs near the Schriever Air Force Base uplink facility is within line of sight to 2 GHz receive sites employed by KUSA-TV and other stations in the Denver Market. While Colorado Springs is not in the Denver DMA, news events that occur in this area are pertinent to KUSA-TV's viewers. Here again, these existing and future receive sites are located on mountaintops where there is no terrain shielding possible between the BAS facility and the uplink. The NPRM further suggests that future BAS facilities could be located closer to an uplink facility if the BAS facility is "properly engineered". As shown, there is no practical way to properly engineer a receive site that is within line of sight of an uplink.

Since all frequencies have primary allocations to specific television stations and each frequency is heavily used and reused, it is likely that successful real-time coordination with all of the broadcasters in the Denver market would be difficult for the TT&C facility. This tight coordination has developed over many years of working relationships among the stations involved and adding a new user with different operational requirements would be extremely difficult.

As shown in **Figure 1**, the network of KUSA-TV of 2 GHz receive sites is extensive. The red shading in **Figures 10** through **17** depict areas from which sufficiently strong KUSA-TV ENG signals are now predicted to be received. The green shading represents areas that are predicted to receive carrier-to-interference ratios of 60 dB or greater when the TT&C facilities are operated with a transmitter power of only 10 Watts (30 dB less than the maximum proposed TT&C transmitter power level of ten-thousand Watts<sup>9</sup>). Clearly, this represents a large reduction of the area in which a remote ENG shot is possible. Our previous studies, which assumed operation of a ten thousand Watt TT&C uplink, rendered nearly the entirety of WUSA-TV's network of ENG receivers subject to cochannel interference. Since very little detail is available on the operation of these TT&C facilities,

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<sup>8</sup> Part 2.106, Footnote US346 of both the current and proposed rules.

<sup>9</sup> With a transmitter input power of 10 kW, the estimated effective radiated power of each TT&C system would be in the order of **288 million Watts**.

**Table 1** shows the parameters assumed for both the TT&C uplink and the ENG system that were used in creating these figures.

## **2 GHz Uniquely Suited to Electronic News Gathering**

Although other Broadcast Auxiliary microwave frequencies exist, the superb propagation of 2 GHz frequencies (particularly in harsh terrain and urban canyons) makes this band uniquely suited to news gathering. Further, all alternative BAS microwave bands are now heavily used by fixed, point-to-point microwave systems (such as studio-transmitter links), and as such, would be subject to harmful interference should TV ENG trucks use these frequencies. Thus, preservation of 2 GHz for ENG use is essential.

## **ENG Receiver Front-End Desense, and Receiver Front-End Damage**

As noted in **Table 1**, the interference analysis presumed that only “side lobe” signals (some 40 dB less in amplitude than that of the main lobe) would reach the KUSA-TV ENG receivers. However, signal amplitudes in the TT&C antenna main lobe may reach power levels exceeding 288 million Watts<sup>10</sup>. Should signals approaching this amplitude reach the sensitive KUSA-TV ENG sites, permanent damage to the ENG microwave receiver is likely. As noted in the NPRM, it is possible for TT&C transmitters to transmit at elevation angles as low as 3° above the horizon. Conversely, in order to maximize their receive coverage, many of the KUSA-TV ENG receivers are located at high elevations “looking” downward. As a result, the probability of the KUSA-TV equipment being “blinded” (either temporarily or permanently) is likely<sup>11</sup>.

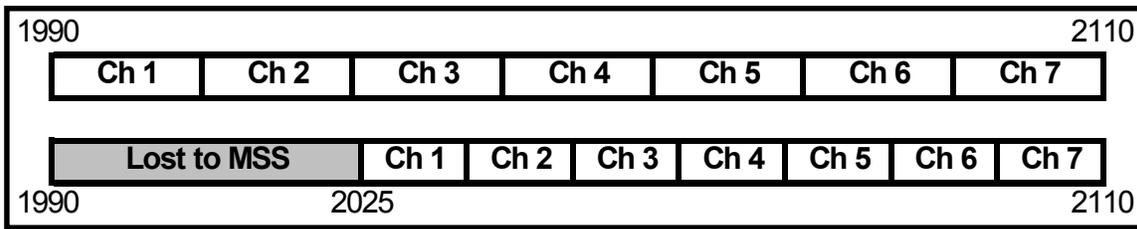
## **Broadcasters Spectrum has Already Been Taken Away**

Recently, broadcasters were required by the FCC to relinquish a portion of the 2 GHz BAS band to a new Mobile Satellite Service. As is noted in the NPRM, the broadcasters’ 2 GHz spectrum was reduced from 1990-2110 MHz to 2025-2110 MHz as shown in the following figure:

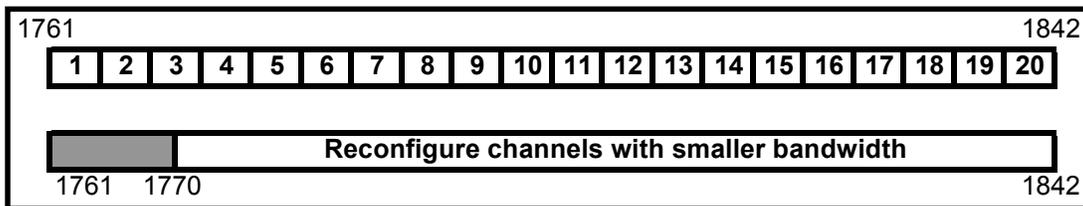
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<sup>10</sup> Assuming an 11 meter Earth Station antenna with a gain of 44.6 dB and an input power of 10 kW.

<sup>11</sup> According to manufacturer’s data provided to the undersigned, most receivers for digital applications will tolerate a maximum input signal level of –25 dBm. Depending on the type of receive antenna, we predict this maximum limit will be exceeded by ten or more dB.



Because of the number of users, the loss of 35 MHz (30%) of BAS spectrum has forced the broadcasters to use smaller channel bandwidths. In addition, the FCC’s mandate for digital television is expected to result in the need for high-definition ENG facilities in these reduced bandwidth channels. DOD is losing 9 MHz to AWS which represents only 11% of the total spectrum currently in used for TT&C. As shown in the figure below, the TT&C band could be reconfigured in a similar manner. This would eliminate the need for dual receivers in new satellites<sup>12</sup> and also eliminate the complicated coordination that would be required to use the BAS spectrum.



The NTIA states that relocating the entire TT&C band would “free up frequencies in the 1755-1850 MHz band for other DOD usage.”<sup>13</sup> Unfortunately, broadcasters were not offered the luxury of relocating to another portion of the spectrum and, as shown above, were forced to compensate by using less bandwidth.

### Other Alternatives

The Commission has asked for recommendations for alternatives to the permitting of TT&C uplinks to use the BAS spectrum. One possibility, in addition to the reconfiguration concept proposed above, is to relocate the uplink facilities to areas where terrain shielding would prevent interference to systems in television markets where there is significant use of the 2 GHz spectrum. Our evaluation revealed (when using only 10 Watts of satellite uplink transmitter power) sufficient

<sup>12</sup> See NPRM at paragraph 1, footnote 4.

<sup>13</sup> See 2002 Viability Assessment, page 20.

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terrain shielding exists between the Schriever Air Force Base and all but one of the KUSA ENG sites<sup>14</sup>. Thus, it appears that coexisting in the 2 GHz band is feasible provided that sufficient distance and terrain shielding is employed. This alternative was mentioned in the 2002 Viability Assessment, however it was suggested that this option was too costly and impractical to relocate all of the DOD TT&C facilities.

As shown by the interference analysis, a lower power uplink facility could mitigate interference to the broadcasters, however the power level suggested by these interference studies will likely be too low for an uplink facility to accomplish its mission.

### Conclusion

After considering the specific locations and terrain involved between the Buckley Air Force Base uplink and KUSA-TV ENG receivers, it is clear that “frequency coordination” is not a viable option. Similarly, interference from the Schriever Air Force Base uplink is predicted to result in unacceptable levels of interference to the KUSA-TV Colorado Springs receive facility.

Based on our analysis, the only viable method of sharing the 2 GHz ENG band is to secure uplink sites that are sufficiently distant and terrain shielded from television ENG licensees so as not to cause harmful interference to the ENG operation. Using other existing uplinks located in remote areas or relocating the Denver uplinks seems like the only viable way for broadcasters and DOD to coexist within the 2 GHz ENG band. Alternatively, compression of the existing TT&C spectrum, in a similar manner to what has recently been mandated for broadcasters, may provide the necessary solution without adversely affecting the heavily utilized BAS spectrum.

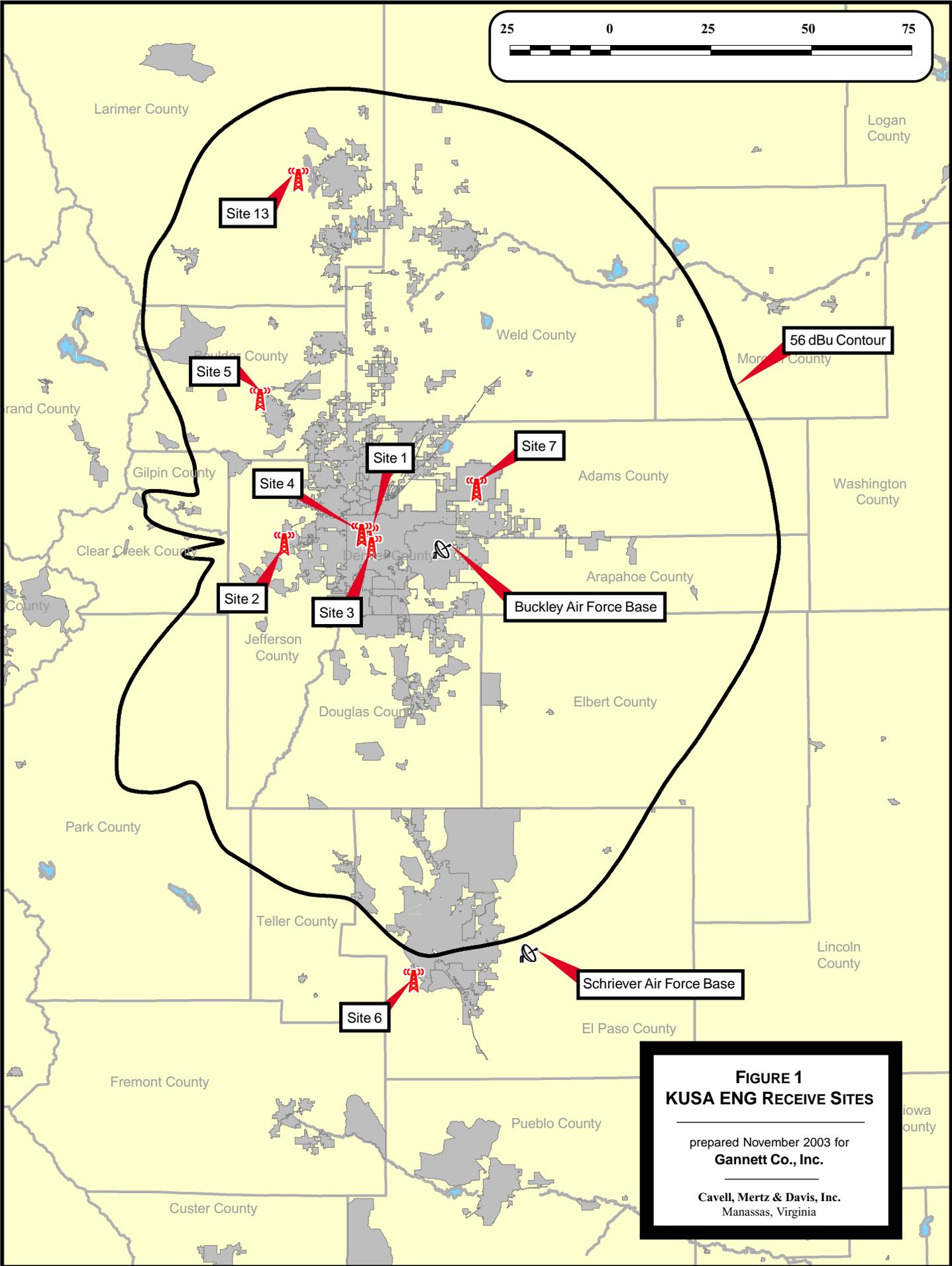
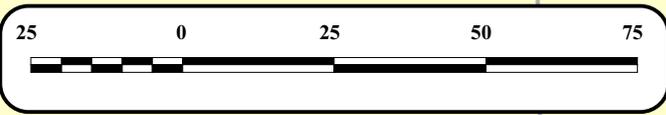
Garrison C. Cavell  
Daniel G. Ryson  
Michael D. Rhodes, P.E.

### **Cavell, Mertz & Davis, Inc.**

7839 Ashton Avenue  
Manassas, Virginia 20109  
November 3, 2002  
(703) 392-9090

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<sup>14</sup> Only the Colorado Springs ENG facility, “Site 6”, suffered harmful interference from the Schriever uplink.



**FIGURE 1**  
**KUSA ENG RECEIVE SITES**

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Manassas, Virginia

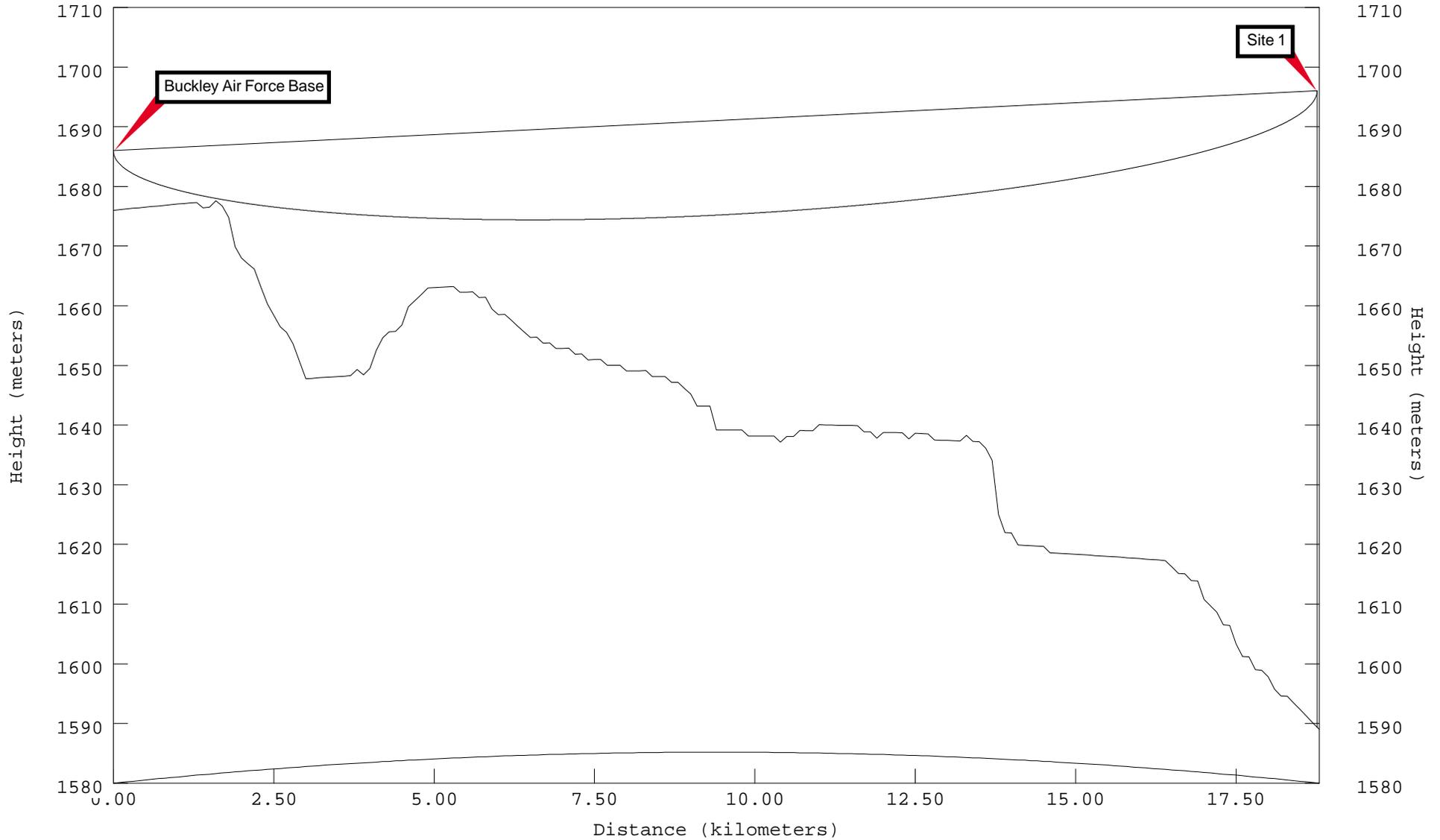
**FIGURE 2A**  
**TERRAIN PROFILE**  
**FROM BUCKLEY AIR FORCE BASE**  
**TO SITE 1**

prepared November 2003 for  
**Gannett Co., Inc.**

**Cavell, Mertz & Davis, Inc.**  
Manassas, Virginia

Study: Buckley to KUSA1  
TX Site: Buckley AFB  
RX Site: KUSA 1  
TX --> RX: 18.77 km, 280.7 degrees

TX Latitude: N39-42-55.00  
TX Longitude: W104-46-29.00  
RX Latitude: N39-44-47.00  
RX Longitude: W104-59-25.00



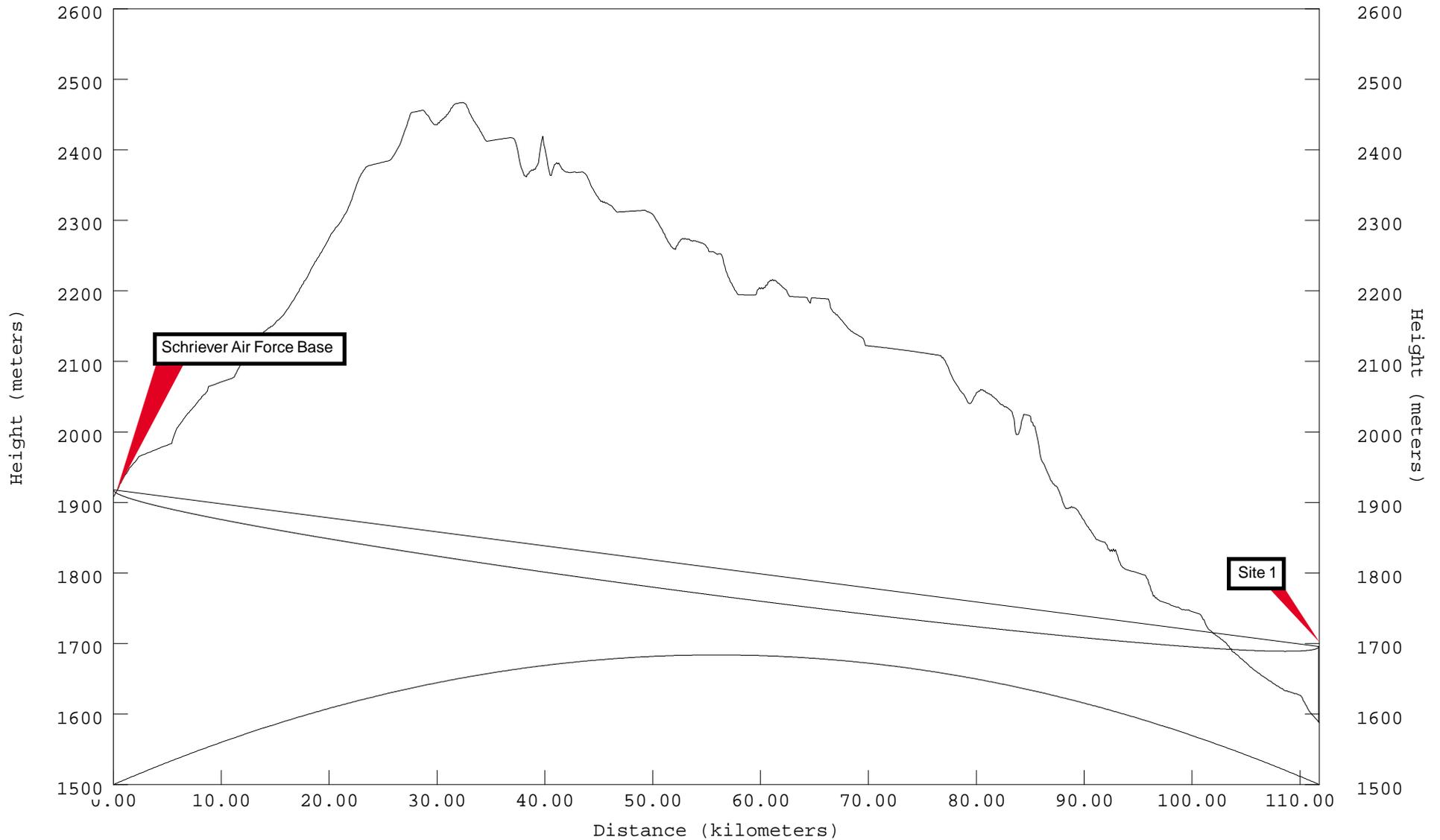
**FIGURE 2B**  
**TERRAIN PROFILE**  
**FROM SCHRIEVER AIR FORCE BASE**  
**TO SITE 1**

prepared November 2003 for  
**Gannett Co., Inc.**

**Cavell, Mertz & Davis, Inc.**  
Manassas, Virginia

TX Latitude: N38-48-21.00  
TX Longitude: W104-31-43.00  
RX Latitude: N39-44-47.00  
RX Longitude: W104-59-25.00

Study: Schriever to KUSA1  
TX Site: Schriever AFB  
RX Site: KUSA 1  
TX --> RX: 111.73 km, 339.3 degrees



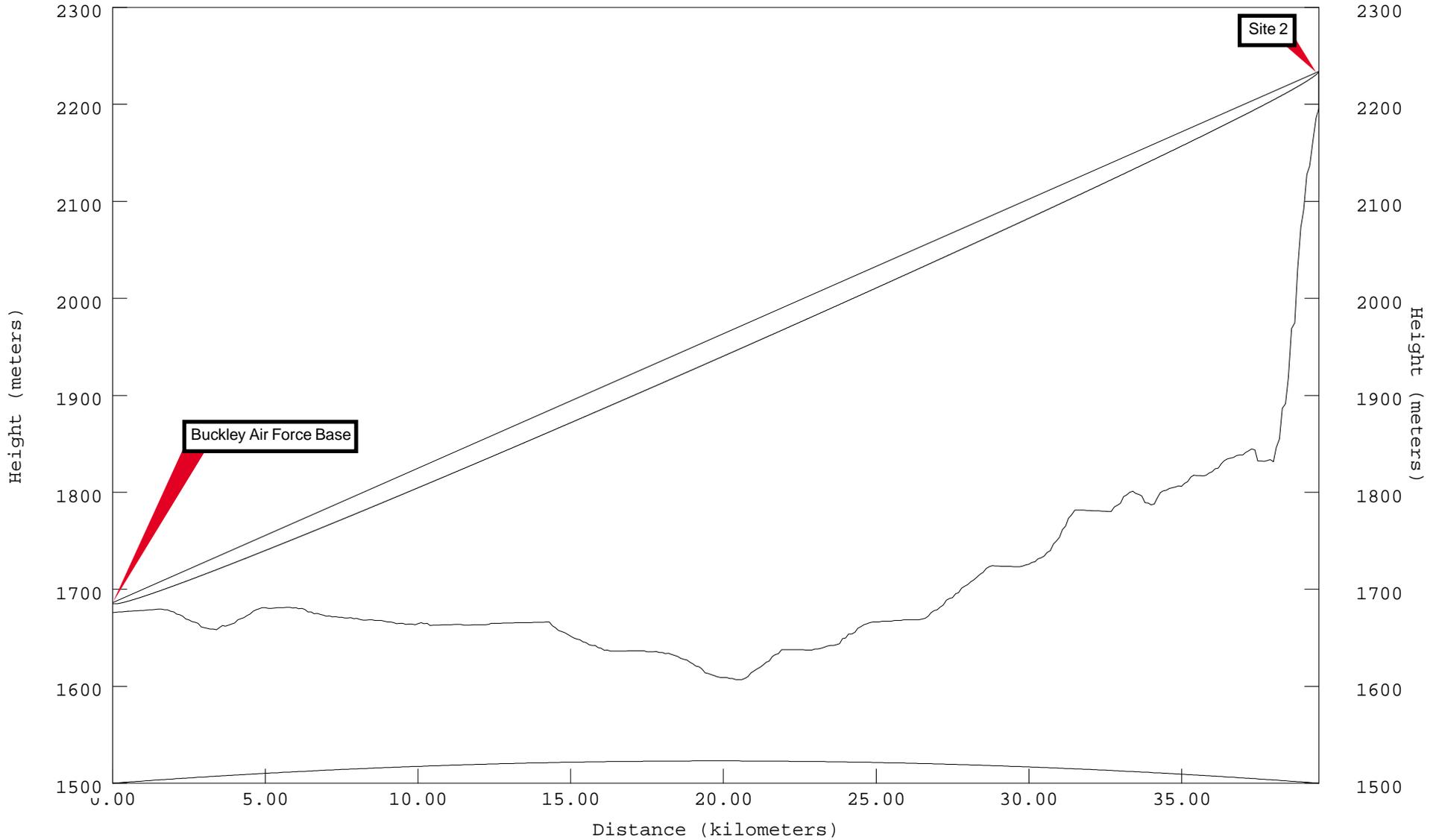
**FIGURE 3A**  
**TERRAIN PROFILE**  
**FROM BUCKLEY AIR FORCE BASE**  
**TO SITE 2**

prepared November 2003 for  
**Gannett Co., Inc.**

**Cavell, Mertz & Davis, Inc.**  
Manassas, Virginia

Study: Buckley to KUSA2  
TX Site: Buckley AFB  
RX Site: KUSA 2/9  
TX --> RX: 39.48 km, 272.4 degrees

TX Latitude: N39-42-55.00  
TX Longitude: W104-46-29.00  
RX Latitude: N39-43-46.00  
RX Longitude: W105-14-08.00



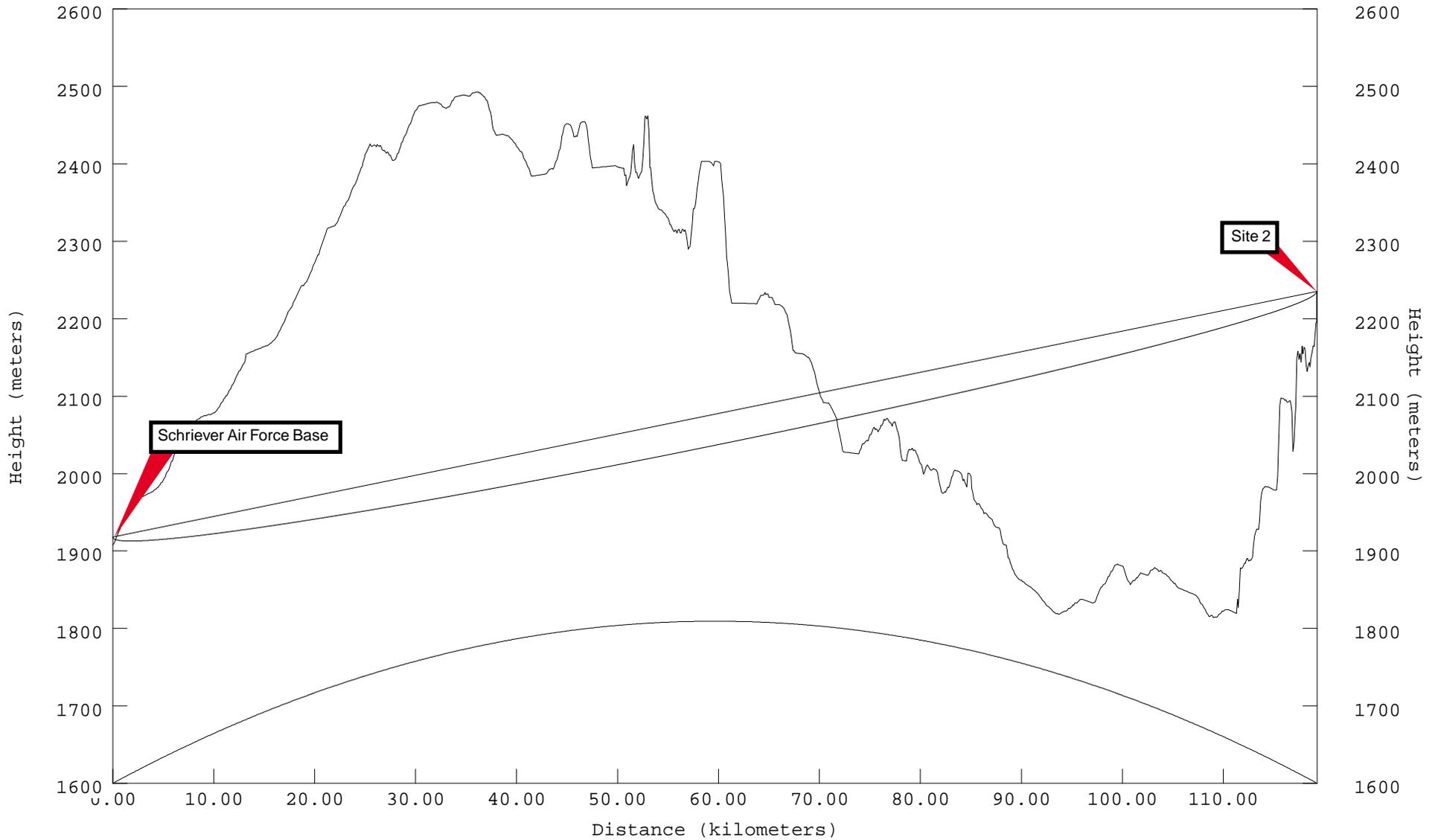
**FIGURE 3B**  
**TERRAIN PROFILE**  
**FROM SCHRIEVER AIR FORCE BASE**  
**TO SITE 2**

prepared November 2003 for  
**Gannett Co., Inc.**

**Cavell, Mertz & Davis, Inc.**  
Manassas, Virginia

Study: Schriever to KUSA2  
TX Site: Schriever AFB  
RX Site: KUSA 2/9  
TX --> RX: 119.26 km, 329.6 degrees

TX Latitude: N38-48-21.00  
TX Longitude: W104-31-43.00  
RX Latitude: N39-43-46.00  
RX Longitude: W105-14-08.00



**FIGURE 4A**  
**TERRAIN PROFILE**  
**FROM BUCKLEY AIR FORCE BASE**  
**TO SITE 3**

prepared November 2003 for  
**Gannett Co., Inc.**

**Cavell, Mertz & Davis, Inc.**  
Manassas, Virginia

Study: Buckley to KUSA3

TX Site: Buckley AFB

RX Site: KUSA 3

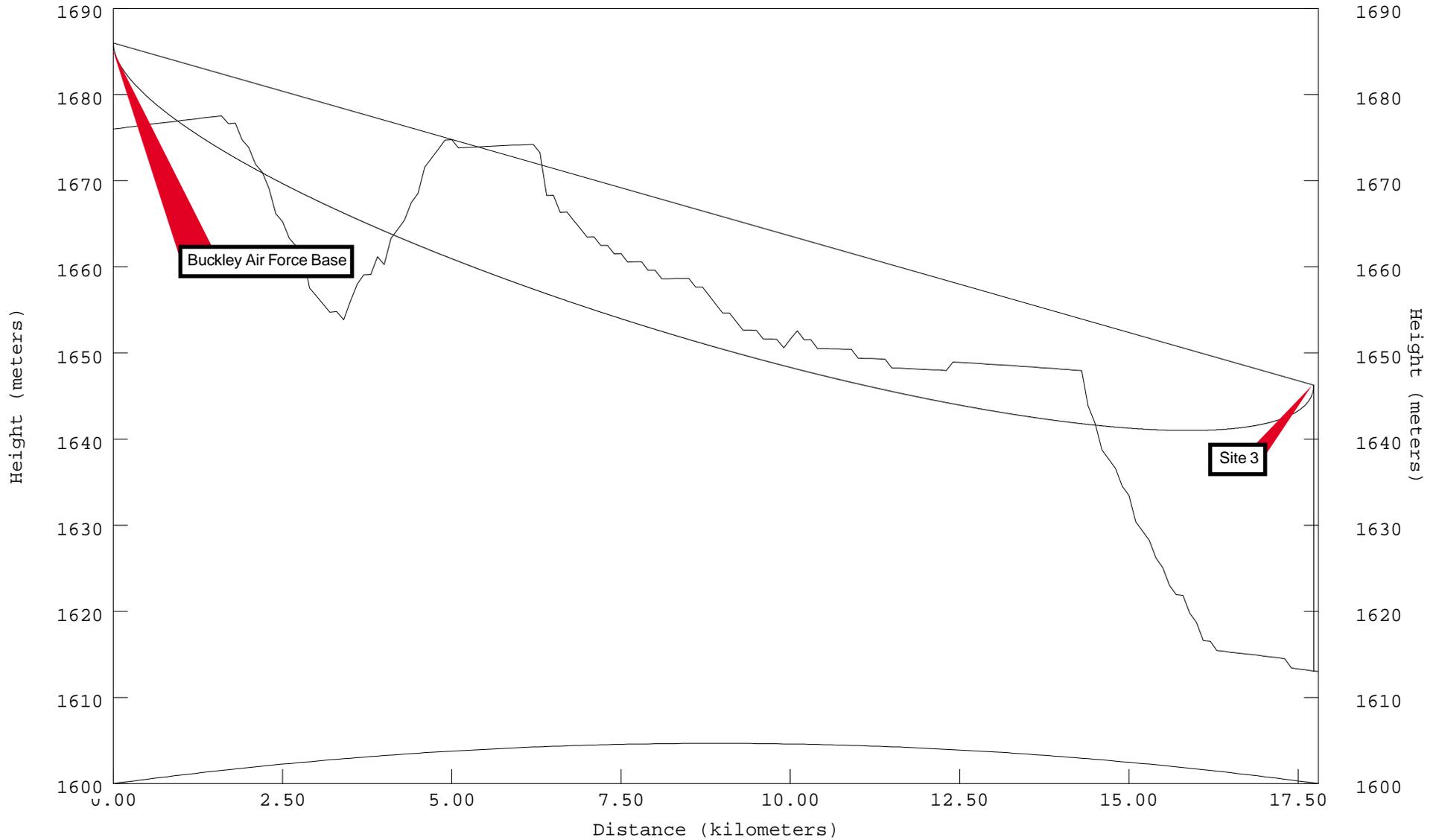
TX --> RX: 17.73 km, 272.3 degrees

TX Latitude: N39-42-55.00

TX Longitude: W104-46-29.00

RX Latitude: N39-43-17.00

RX Longitude: W104-58-54.00



**FIGURE 4B**  
**TERRAIN PROFILE**  
**FROM SCHRIEVER AIR FORCE BASE**  
**TO SITE 3**

prepared November 2003 for  
**Gannett Co., Inc.**

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Manassas, Virginia

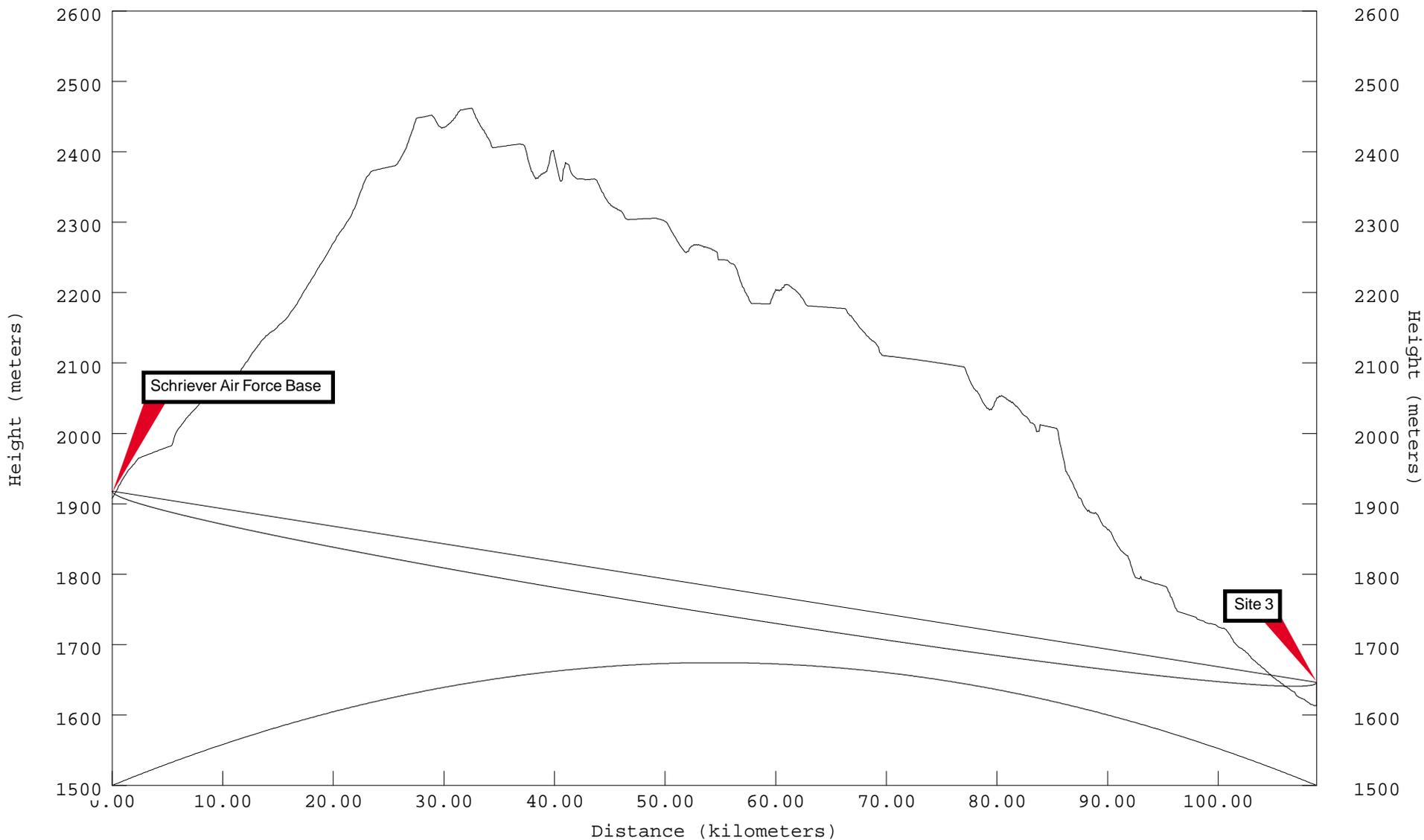
TX Latitude: N38-48-21.00  
TX Longitude: W104-31-43.00  
RX Latitude: N39-43-17.00  
RX Longitude: W104-58-54.00

Study: Schriever to KUSA3

TX Site: Schriever AFB

RX Site: KUSA 3

TX --> RX: 108.88 km, 339.2 degrees



**FIGURE 5A**  
**TERRAIN PROFILE**  
**FROM BUCKLEY AIR FORCE BASE**  
**TO SITE 4**

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**Cavell, Mertz & Davis, Inc.**  
Manassas, Virginia

Study: Buckley to KUSA4

TX Site: Buckley AFB

RX Site: KUSA 4

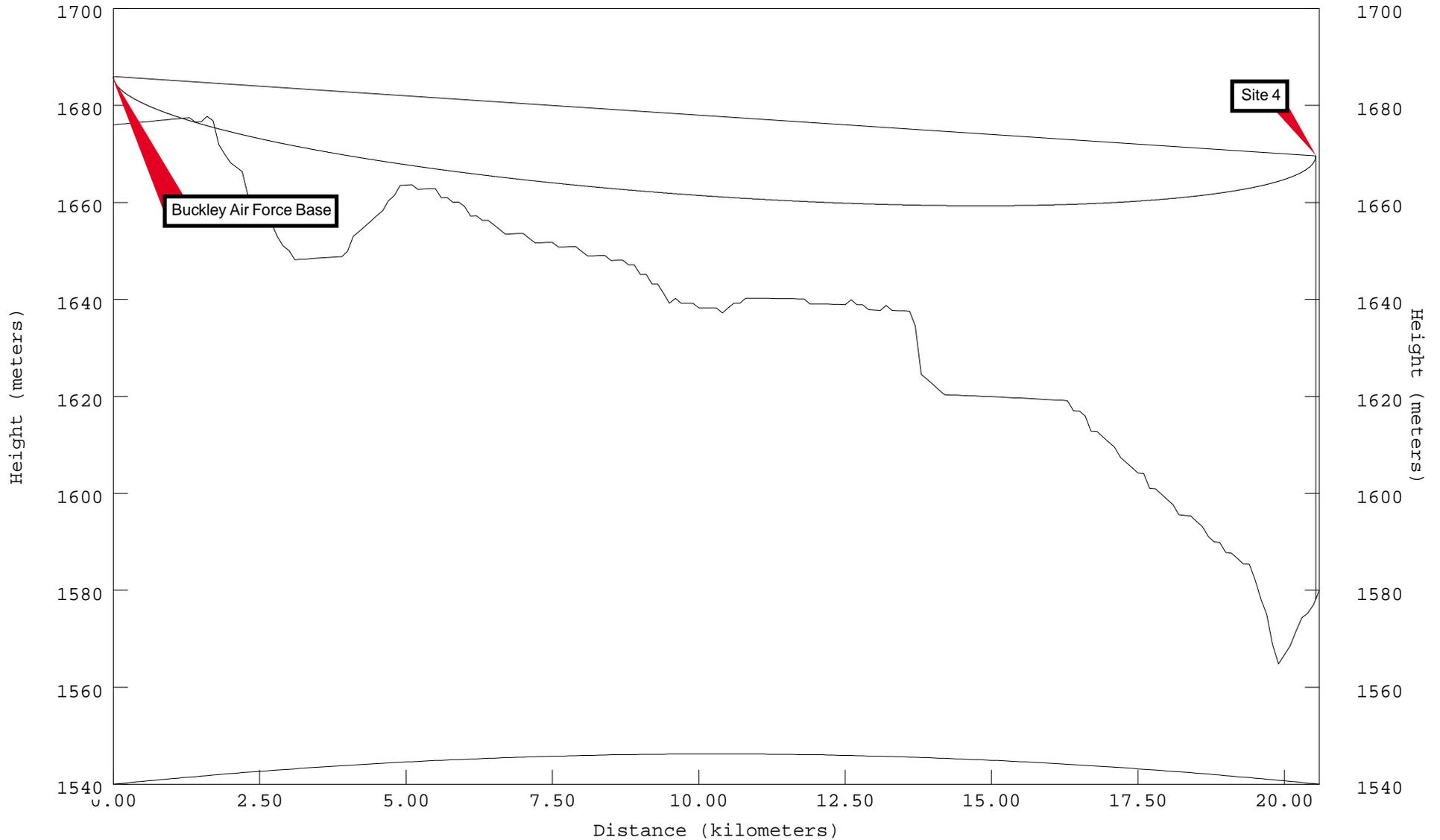
TX --> RX: 20.54 km, 281.2 degrees

TX Latitude: N39-42-55.00

TX Longitude: W104-46-29.00

RX Latitude: N39-45-03.00

RX Longitude: W105-00-37.00



**FIGURE 5B**  
**TERRAIN PROFILE**  
**FROM SCHRIEVER AIR FORCE BASE**  
**TO SITE 4**

prepared November 2003 for  
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Manassas, Virginia

Study: Schriever to KUSA4

TX Site: Schriever AFB

RX Site: KUSA 4

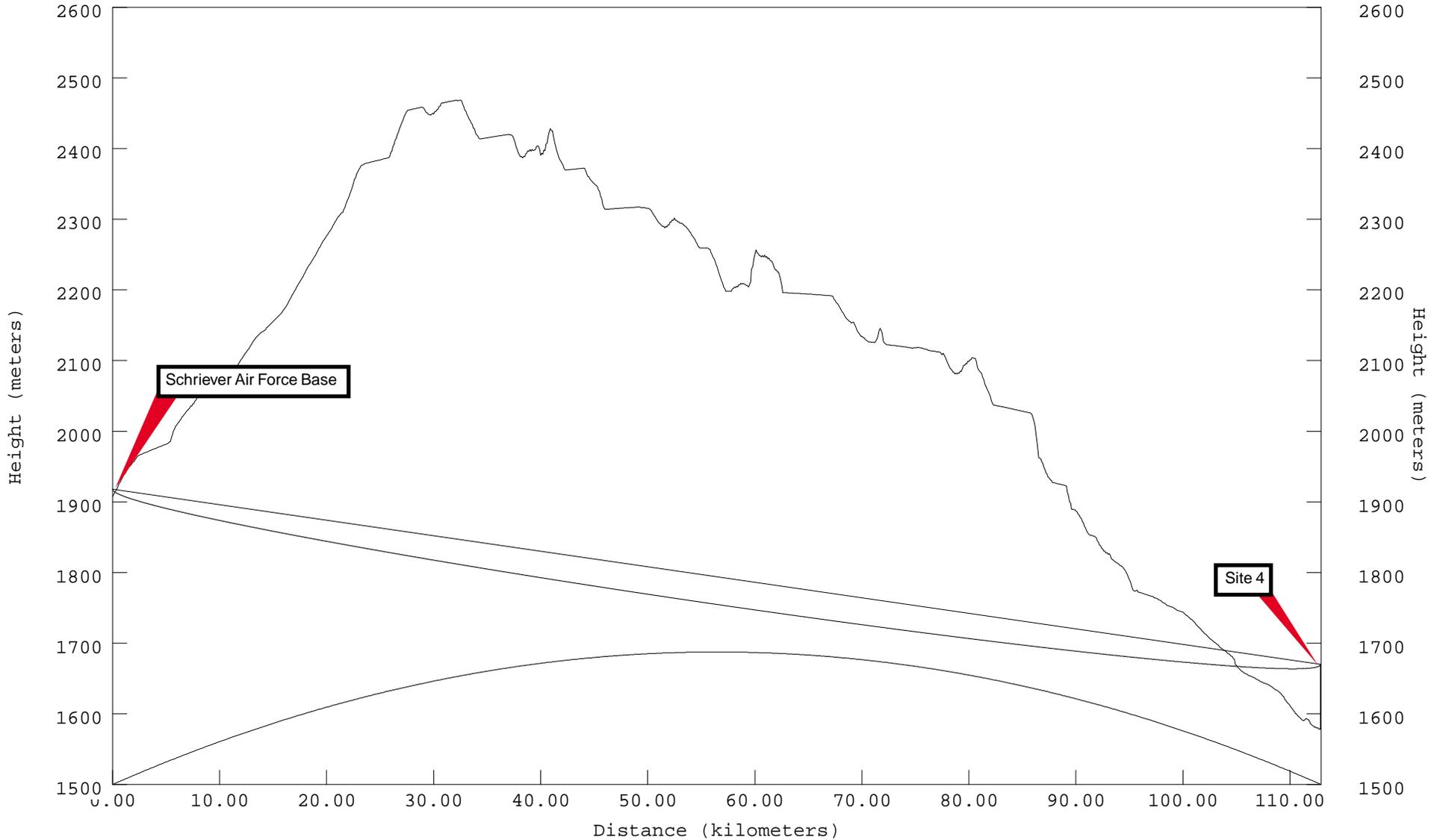
TX --> RX: 112.82 km, 338.6 degrees

TX Latitude: N38-48-21.00

TX Longitude: W104-31-43.00

RX Latitude: N39-45-03.00

RX Longitude: W105-00-37.00



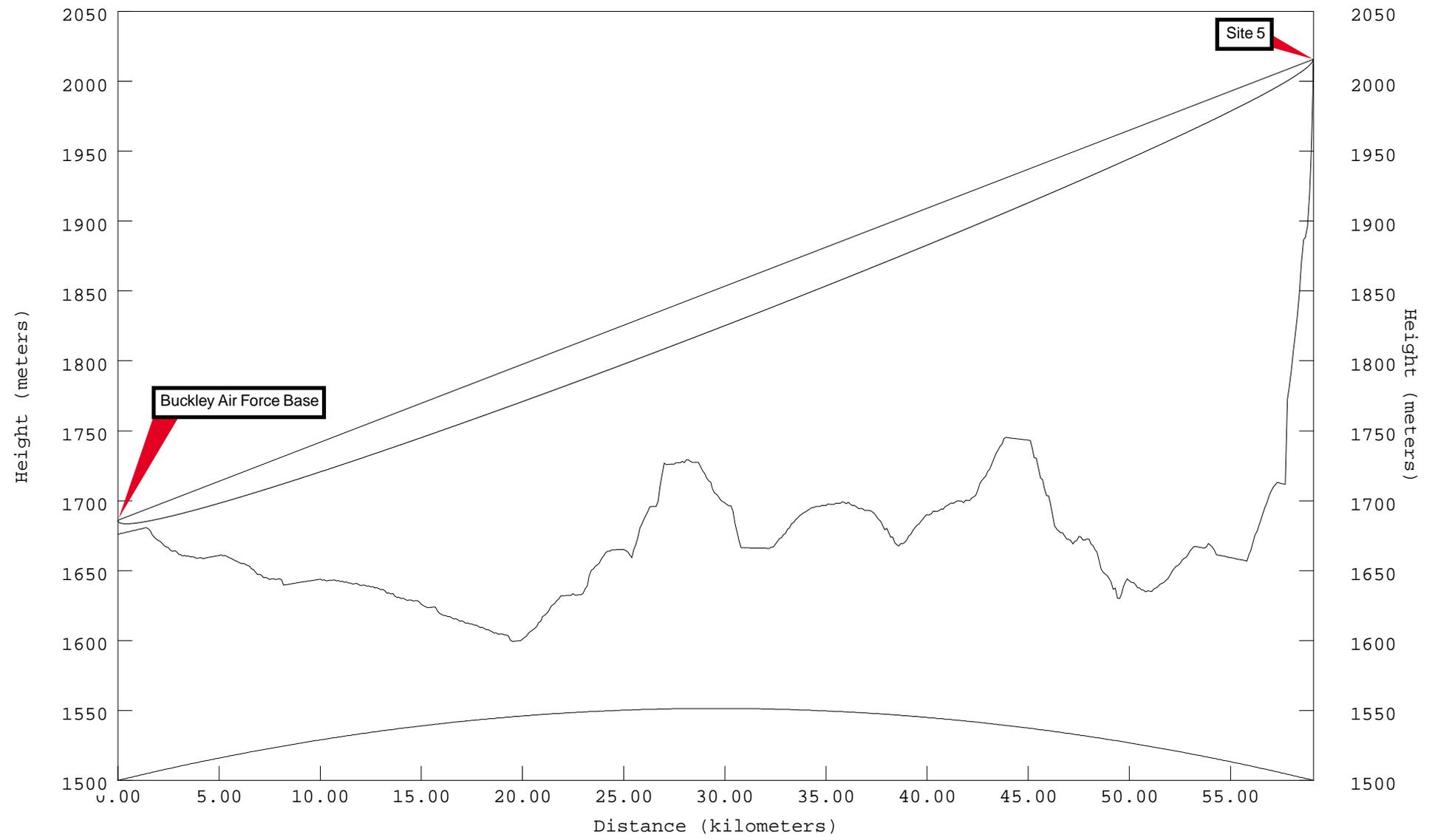
**FIGURE 6A**  
**TERRAIN PROFILE**  
**FROM BUCKLEY AIR FORCE BASE**  
**TO SITE 5**

prepared November 2003 for  
**Gannett Co., Inc.**

Cavell, Mertz & Davis, Inc.  
Manassas, Virginia

Study: Buckley to KUSA5  
TX Site: Buckley AFB  
RX Site: KUSA 5  
TX --> RX: 59.08 km, 309.9 degrees

TX Latitude: N39-42-55.00  
TX Longitude: W104-46-29.00  
RX Latitude: N40-03-18.00  
RX Longitude: W105-18-27.00



**FIGURE 6B**  
**TERRAIN PROFILE**  
**FROM SCHRIEVER AIR FORCE BASE**  
**TO SITE 5**

prepared November 2003 for  
**Gannett Co., Inc.**

**Cavell, Mertz & Davis, Inc.**  
Manassas, Virginia

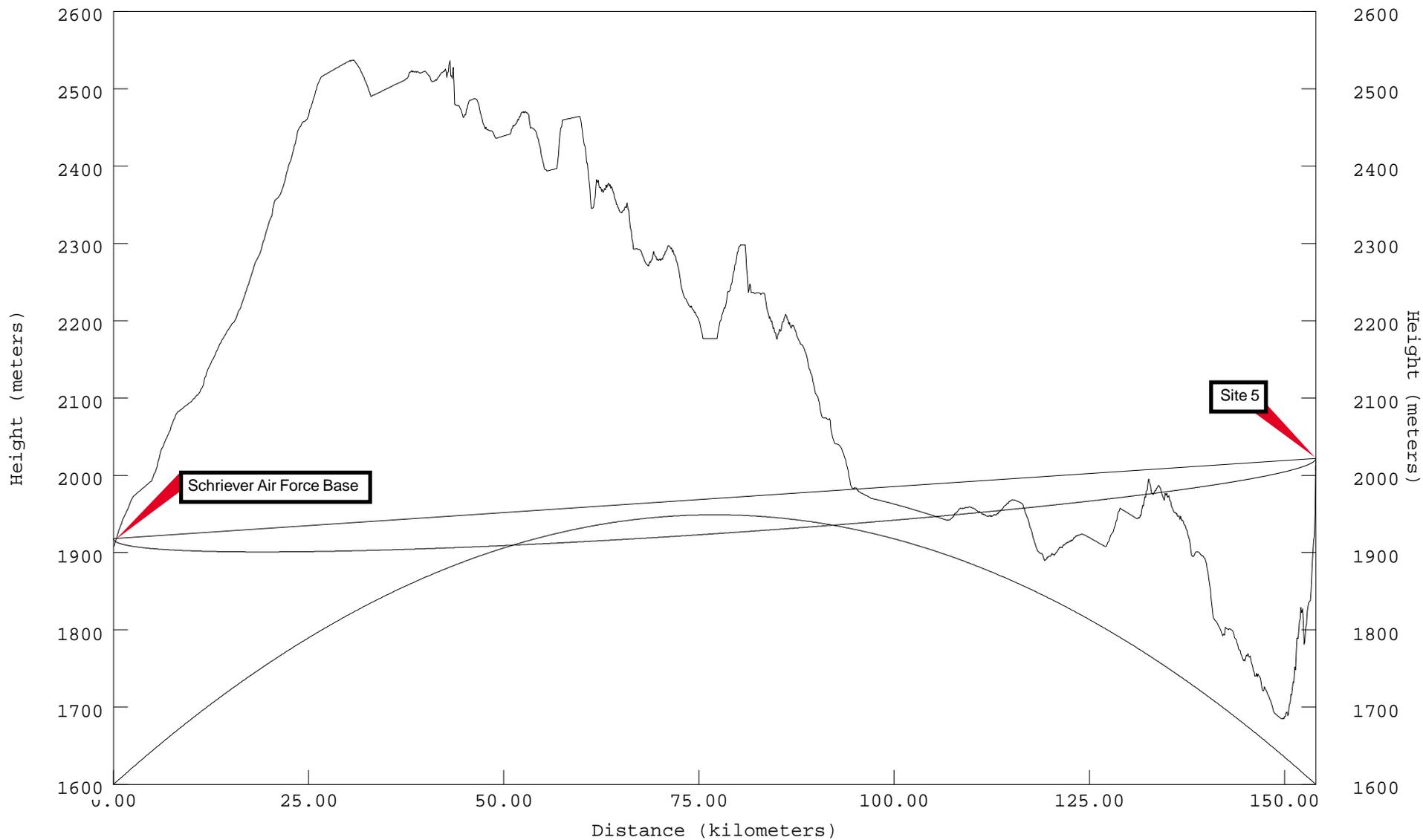
TX Latitude: N38-48-21.00  
TX Longitude: W104-31-43.00  
RX Latitude: N40-03-18.00  
RX Longitude: W105-18-27.00

Study: Schriever to KUSA5

TX Site: Schriever AFB

RX Site: KUSA 5

TX --> RX: 153.99 km, 334.5 degrees



**FIGURE 7A**  
**TERRAIN PROFILE**  
**FROM BUCKLEY AIR FORCE BASE**  
**TO SITE 6**

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Manassas, Virginia

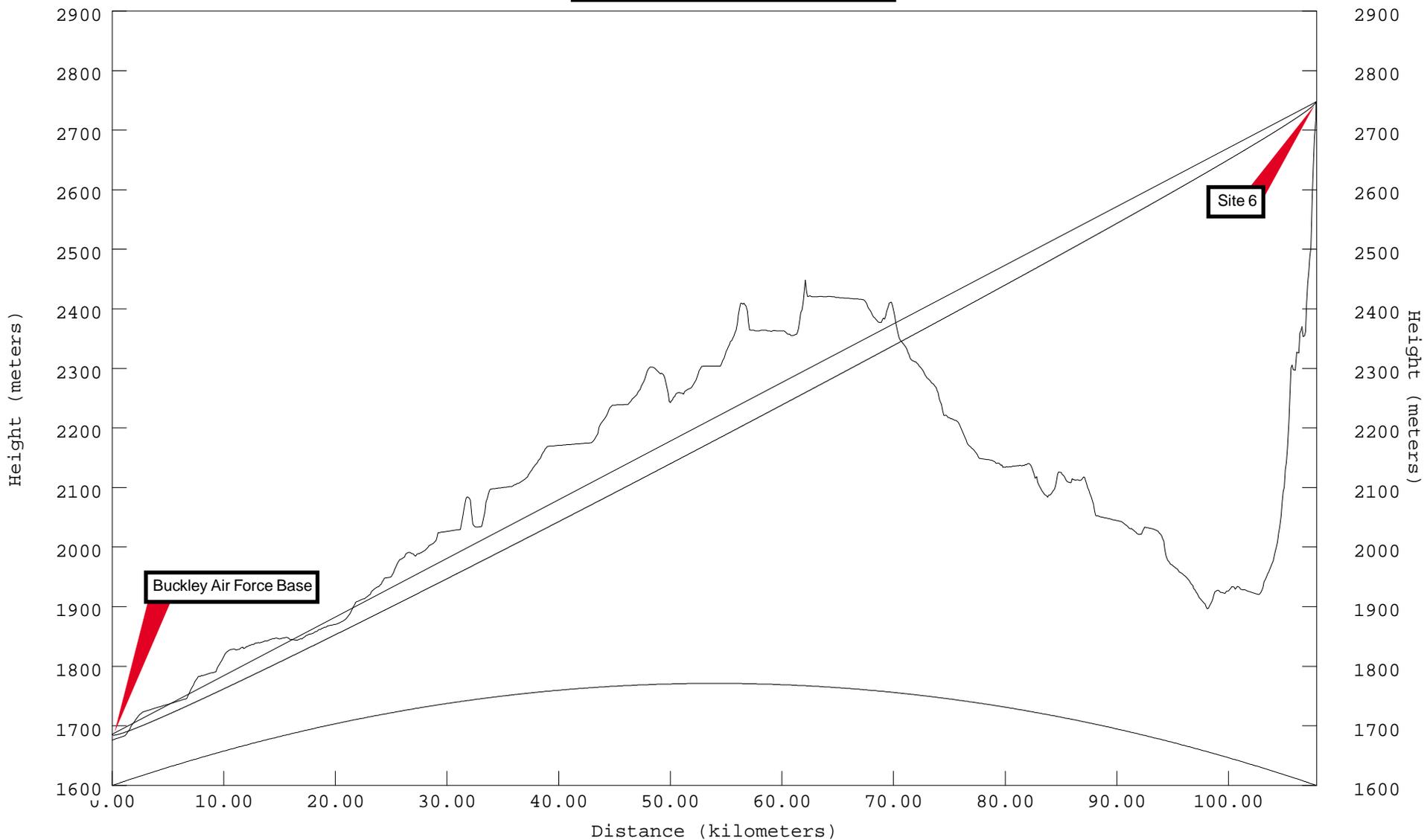
TX Latitude: N39-42-55.00  
TX Longitude: W104-46-29.00  
RX Latitude: N38-44-45.00  
RX Longitude: W104-51-38.00

Study: Buckley to KUSA6

TX Site: Buckley AFB

RX Site: KUSA 6

TX --> RX: 107.83 km, 184.0 degrees



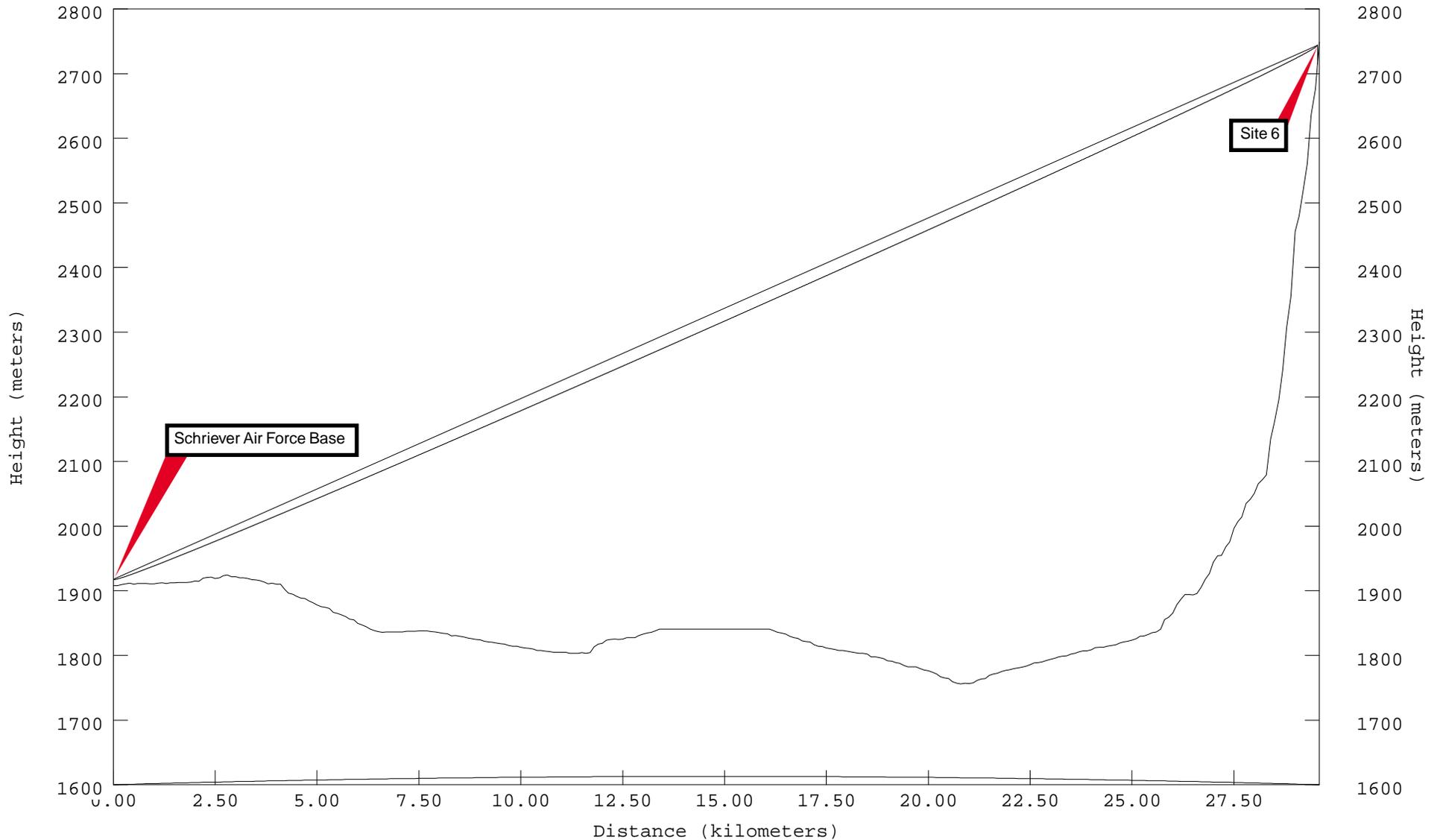
**FIGURE 7B  
TERRAIN PROFILE  
FROM SCHRIEVER AIR FORCE BASE  
TO SITE 6**

prepared November 2003 for  
**Gannett Co., Inc.**

**Cavell, Mertz & Davis, Inc.**  
Manassas, Virginia

TX Latitude: N38-48-21.00  
TX Longitude: W104-31-43.00  
RX Latitude: N38-44-45.00  
RX Longitude: W104-51-38.00

Study: Schriever to KUSA6  
TX Site: Schriever AFB  
RX Site: KUSA 6  
TX --> RX: 29.55 km, 257.1 degrees



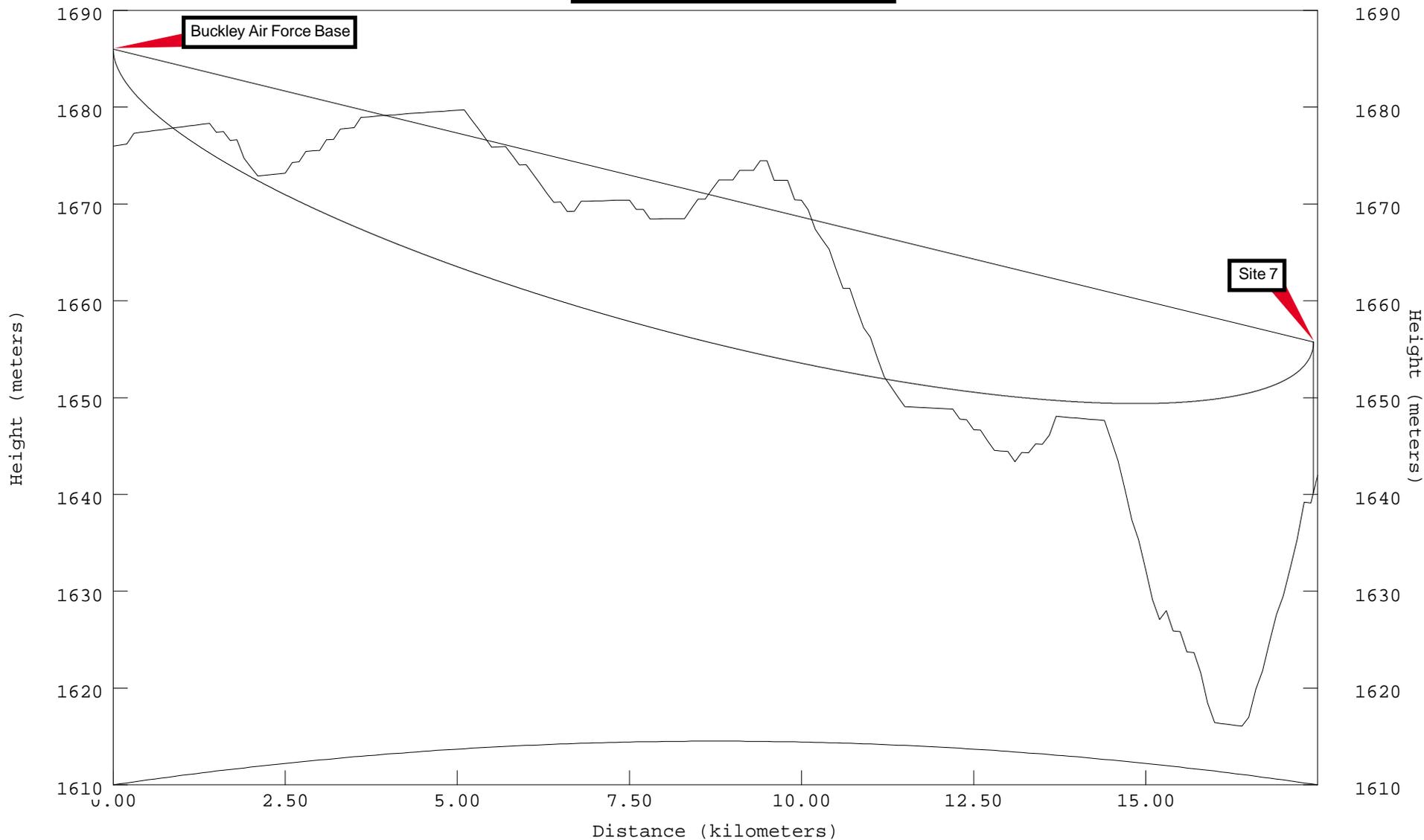
**FIGURE 8A  
TERRAIN PROFILE  
FROM BUCKLEY AIR FORCE BASE  
TO SITE 7**

prepared November 2003 for  
**Gannett Co., Inc.**

**Cavell, Mertz & Davis, Inc.**  
Manassas, Virginia

TX Latitude: N39-42-55.00  
TX Longitude: W104-46-29.00  
RX Latitude: N39-51-07.00  
RX Longitude: W104-40-27.00

Study: Buckley to KUSA7  
TX Site: Buckley AFB  
RX Site: KUSA 7  
TX --> RX: 17.44 km, 29.5 degrees



**FIGURE 8B**  
**TERRAIN PROFILE**  
**FROM SCHRIEVER AIR FORCE BASE**  
**TO SITE 7**

prepared November 2003 for  
**Gannett Co., Inc.**

**Cavell, Mertz & Davis, Inc.**  
Manassas, Virginia

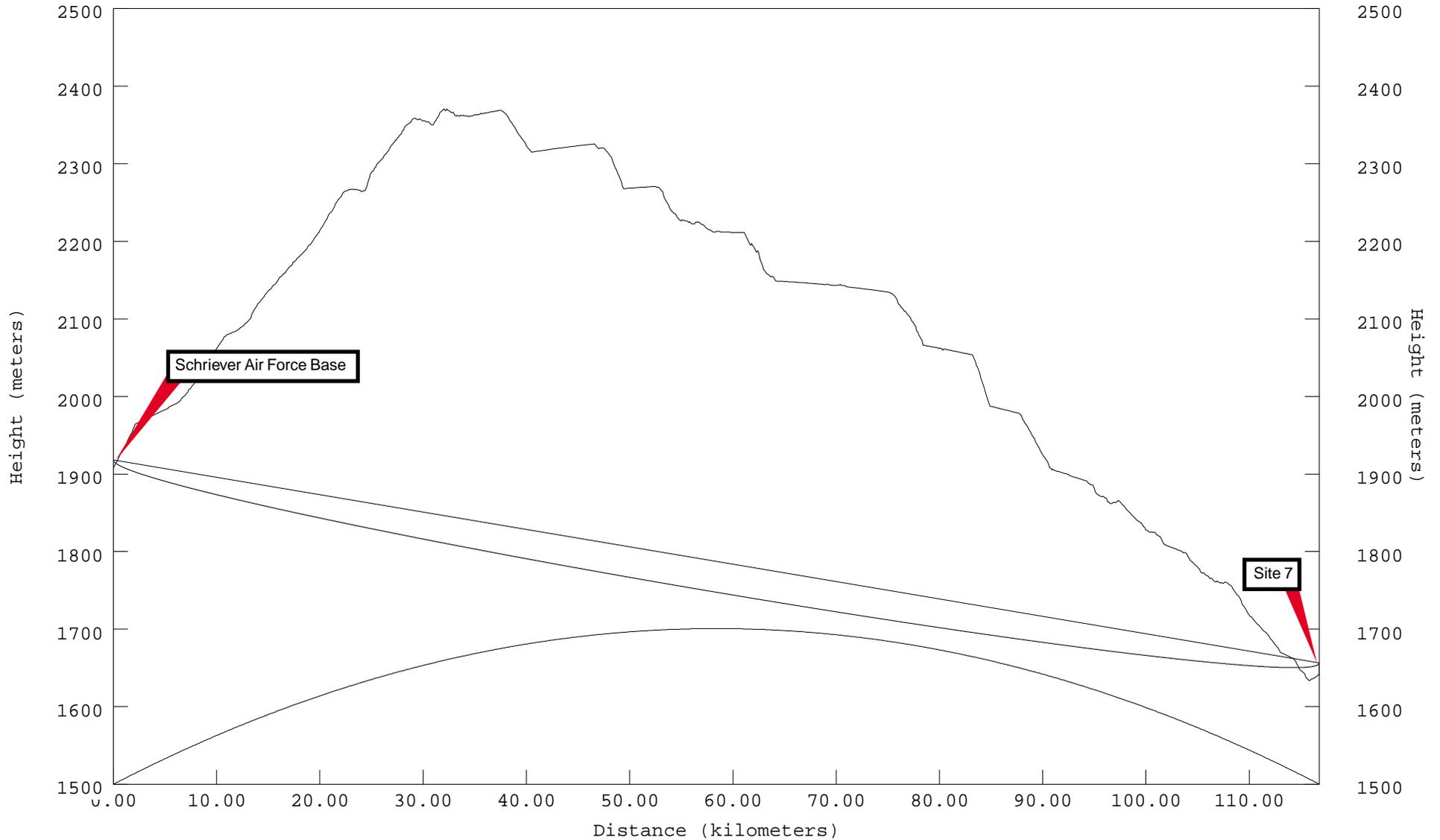
TX Latitude: N38-48-21.00  
TX Longitude: W104-31-43.00  
RX Latitude: N39-51-07.00  
RX Longitude: W104-40-27.00

Study: Schriever to KUSA7

TX Site: Schriever AFB

RX Site: KUSA 7

TX --> RX: 116.77 km, 353.9 degrees



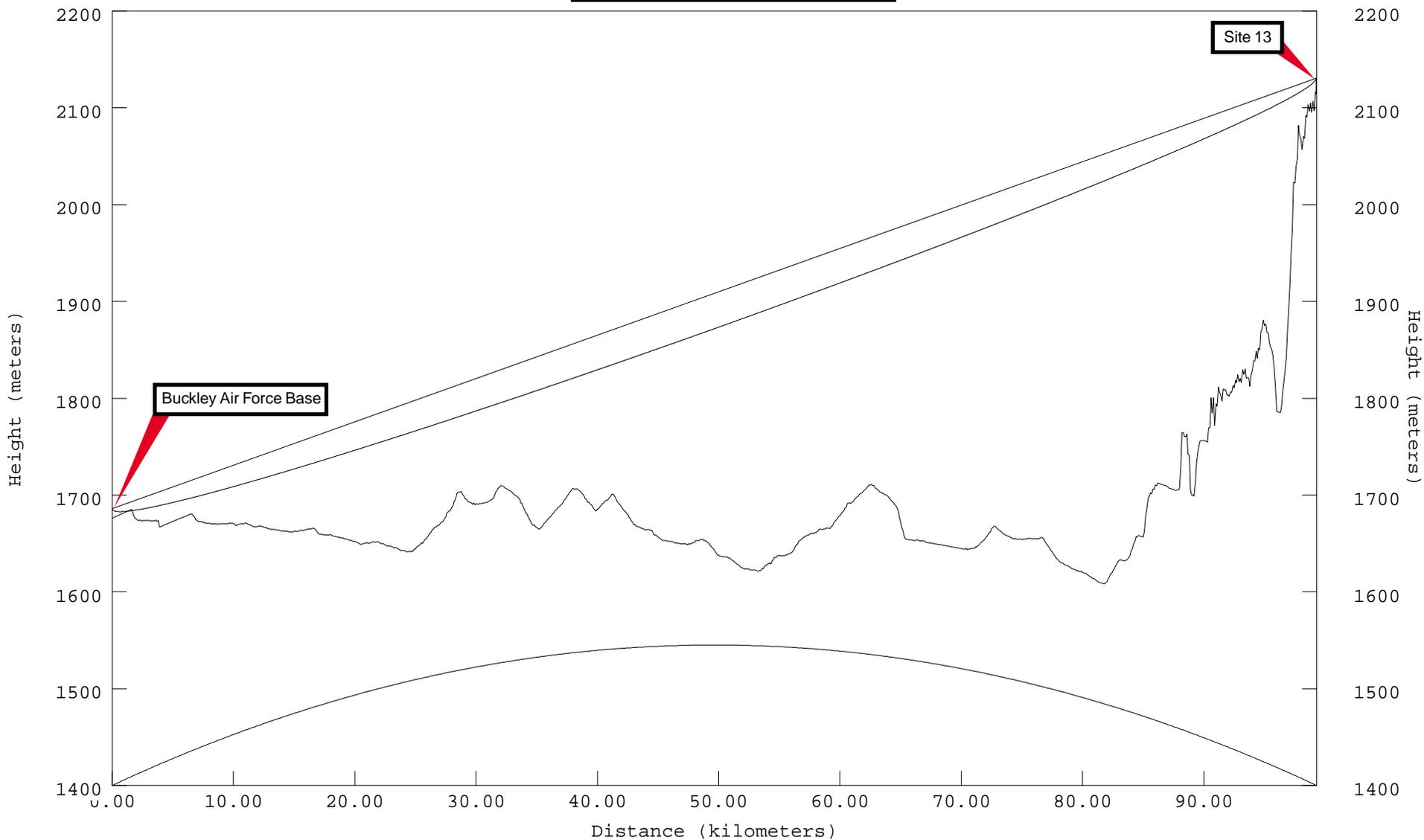
**FIGURE 9A  
TERRAIN PROFILE  
FROM BUCKLEY AIR FORCE BASE  
TO SITE 13**

prepared November 2003 for  
**Gannett Co., Inc.**

**Cavell, Mertz & Davis, Inc.**  
Manassas, Virginia

TX Latitude: N39-42-55.00  
TX Longitude: W104-46-29.00  
RX Latitude: N40-32-56.00  
RX Longitude: W105-11-47.00

Study: Buckley to KUSA13  
TX Site: Buckley AFB  
RX Site: KUSA 13  
TX --> RX: 99.25 km, 339.0 degrees



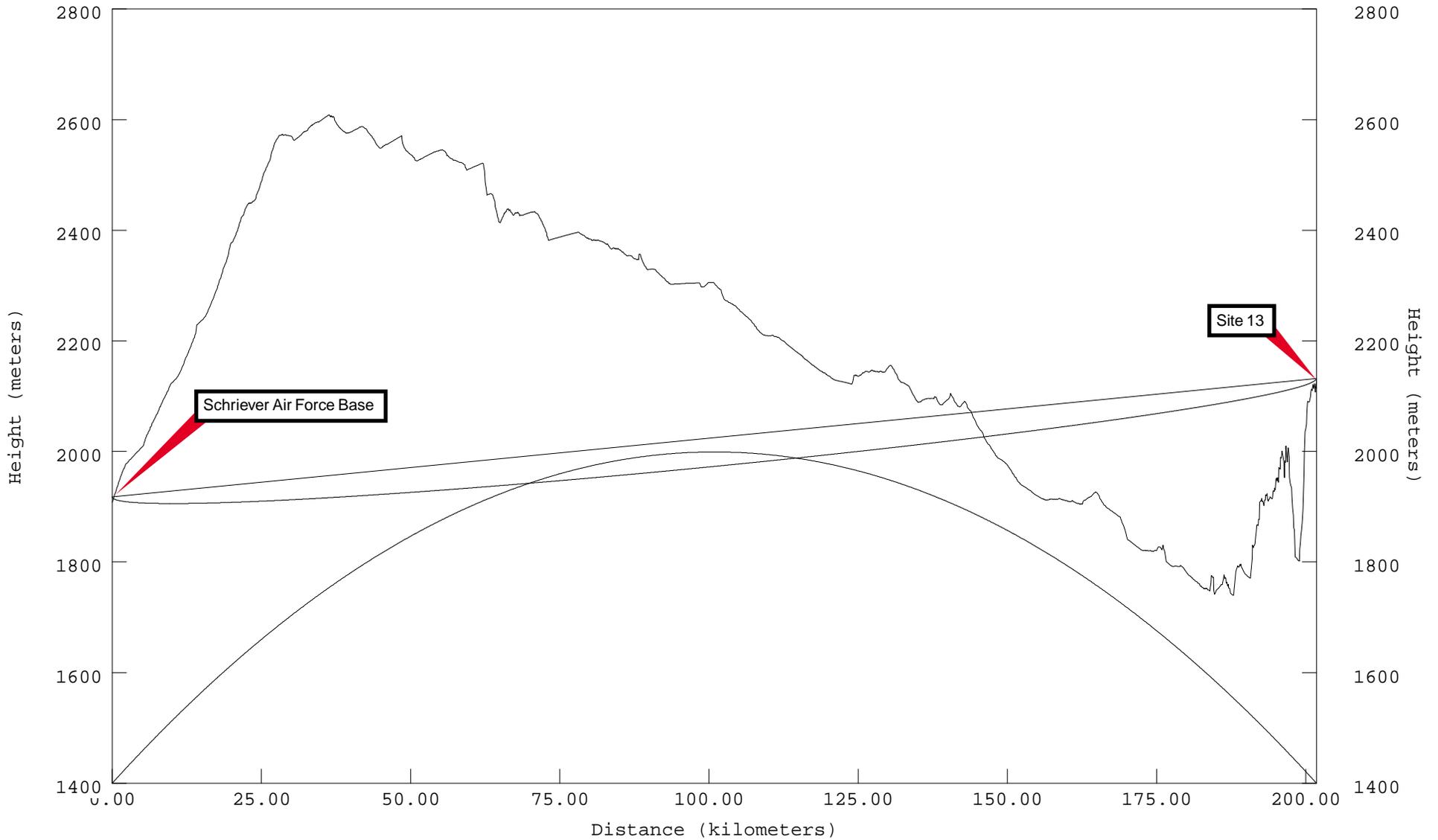
**FIGURE 9B**  
**TERRAIN PROFILE**  
**FROM SCHRIEVER AIR FORCE BASE**  
**TO SITE 13**

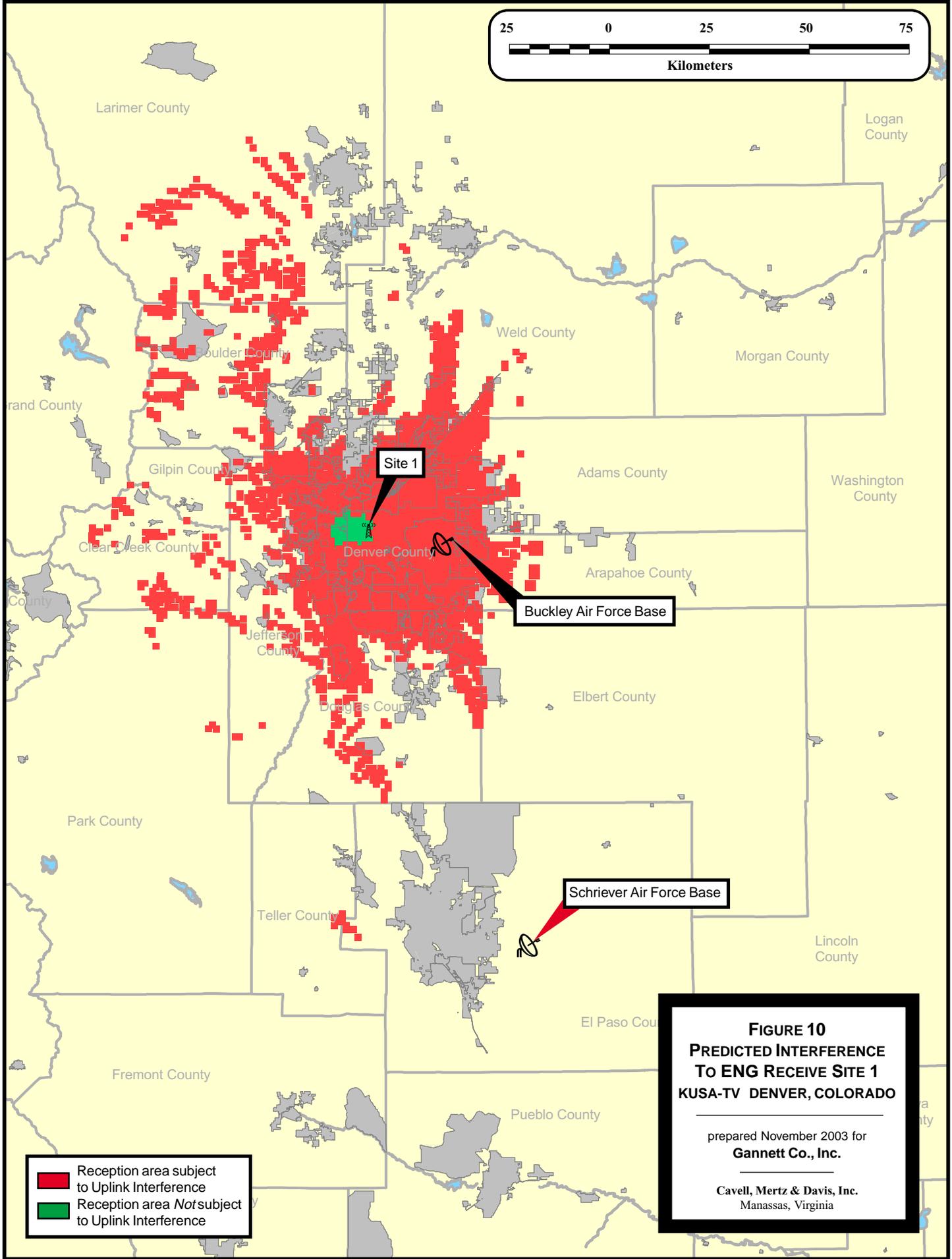
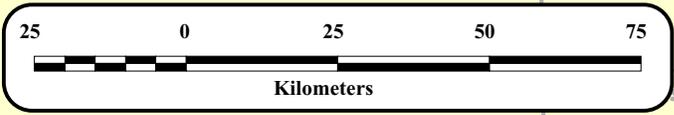
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Manassas, Virginia

TX Latitude: N38-48-21.00  
TX Longitude: W104-31-43.00  
RX Latitude: N40-32-56.00  
RX Longitude: W105-11-47.00

Study: Schriever to KUSA13  
TX Site: Schriever AFB  
RX Site: KUSA 13  
TX --> RX: 201.77 km, 343.8 degrees





■ Reception area subject to Uplink Interference  
■ Reception area *Not* subject to Uplink Interference

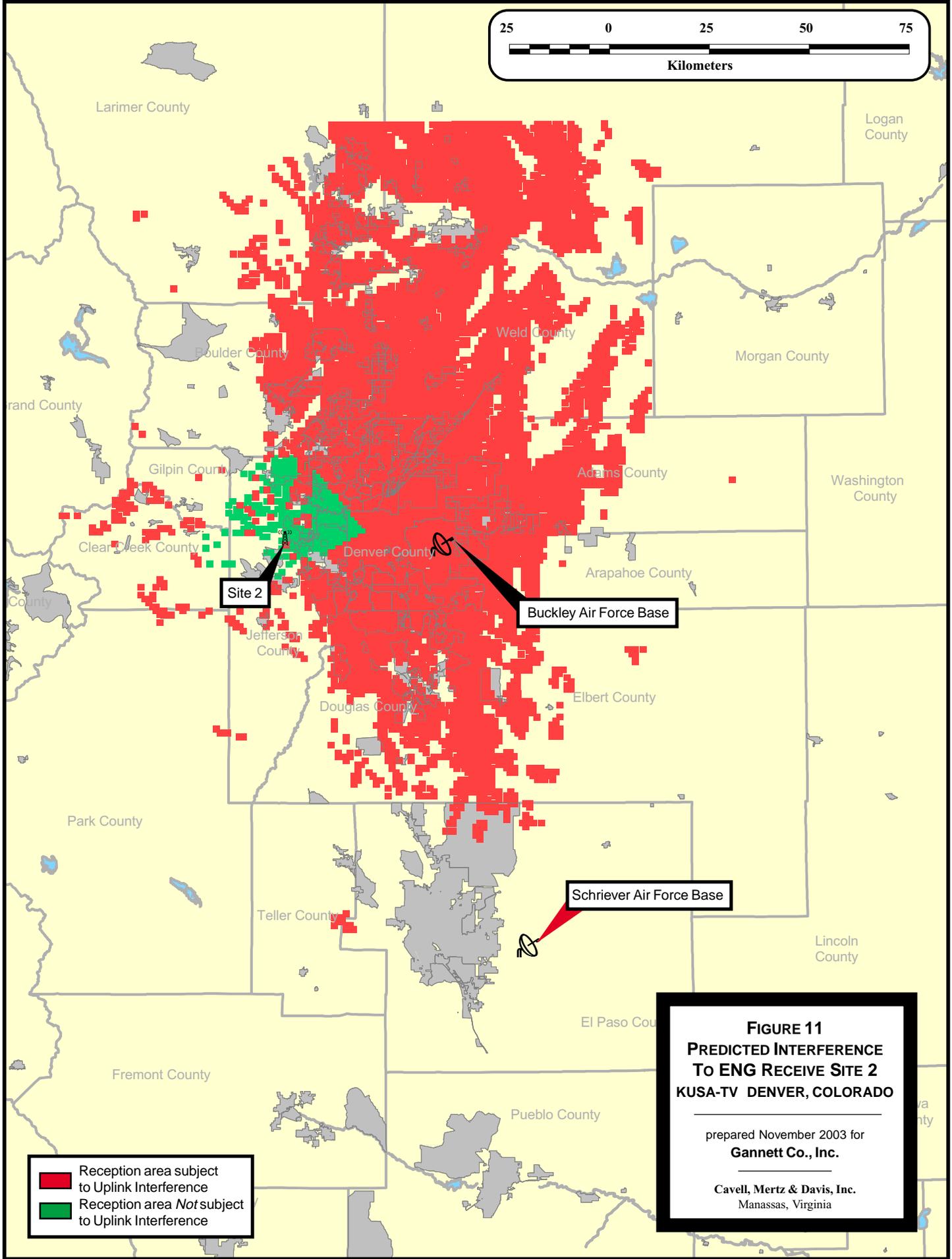
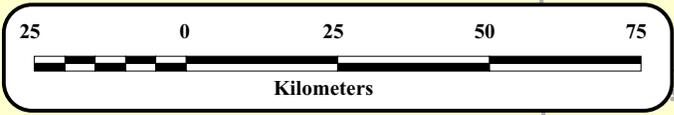
**FIGURE 10**  
**PREDICTED INTERFERENCE**  
**TO ENG RECEIVE SITE 1**  
**KUSA-TV DENVER, COLORADO**

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**Red** Reception area subject to Uplink Interference  
**Green** Reception area *Not* subject to Uplink Interference

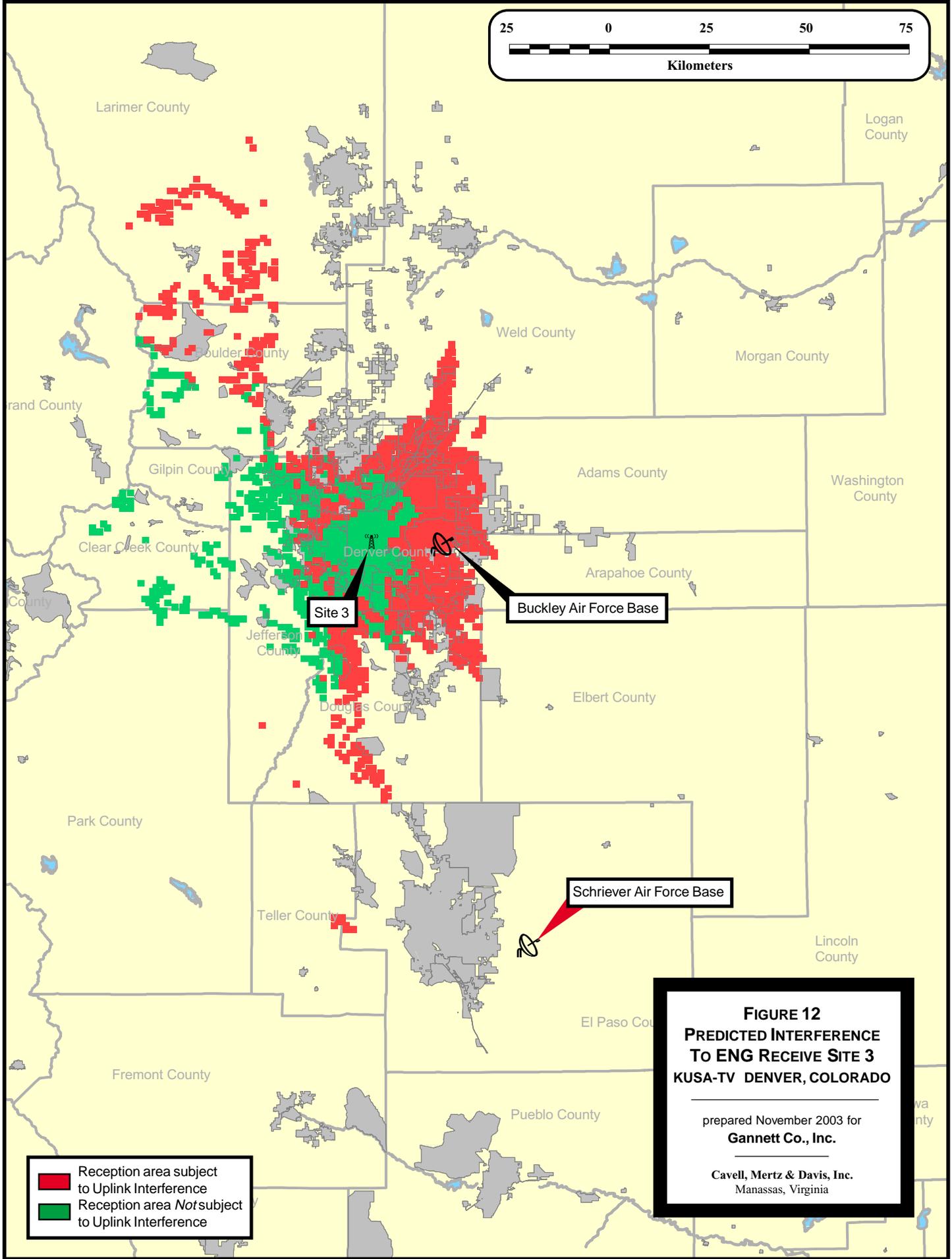
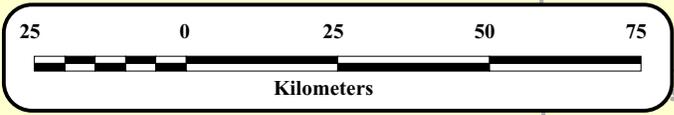
**FIGURE 11**  
**PREDICTED INTERFERENCE**  
**TO ENG RECEIVE SITE 2**  
**KUSA-TV DENVER, COLORADO**

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**FIGURE 12**  
**PREDICTED INTERFERENCE**  
**TO ENG RECEIVE SITE 3**  
**KUSA-TV DENVER, COLORADO**

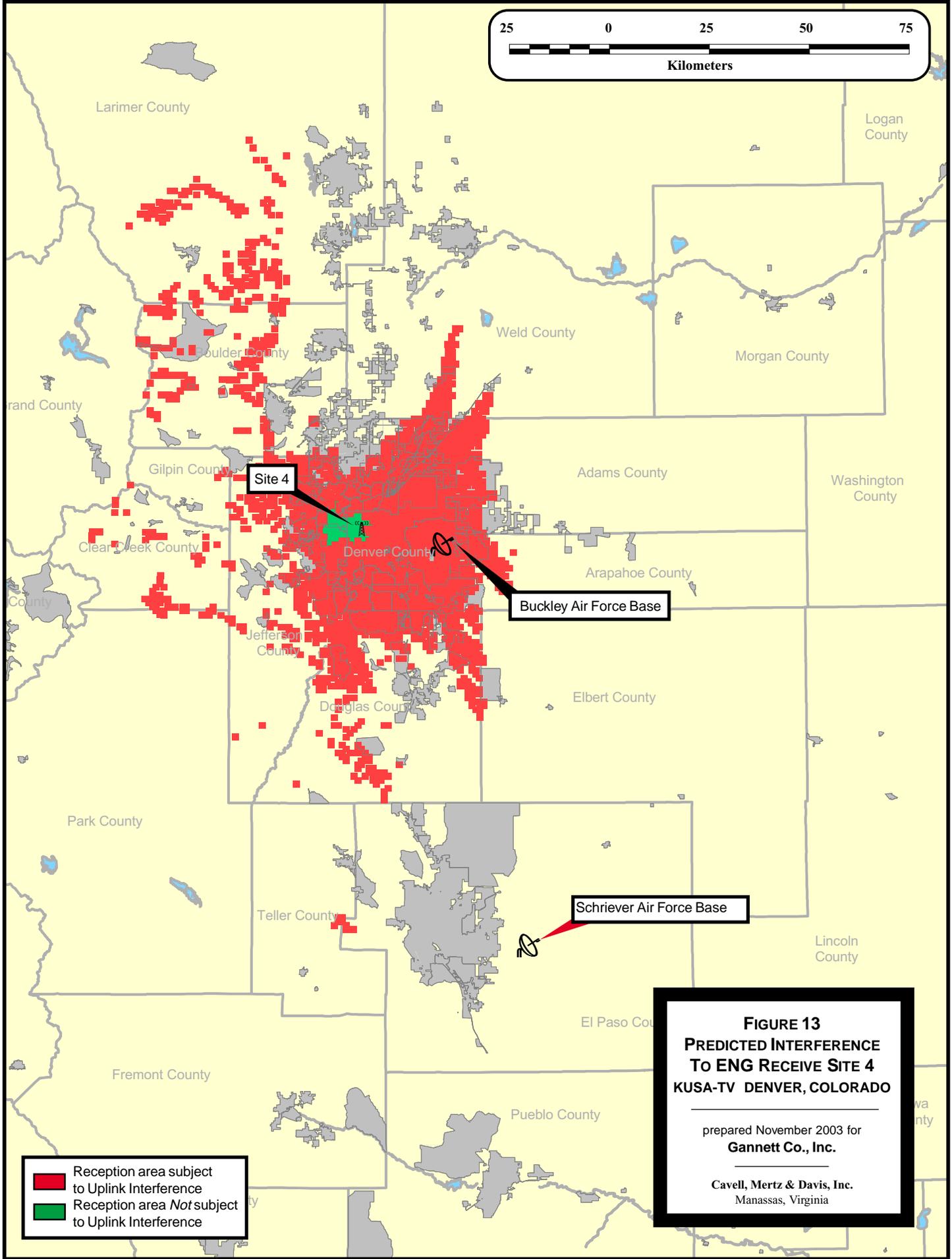
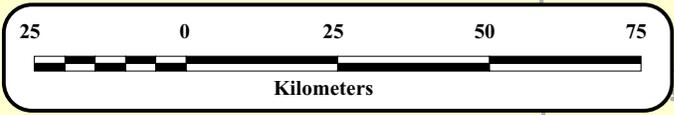
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 Reception area subject to Uplink Interference  
 Reception area Not subject to Uplink Interference



■ Reception area subject to Uplink Interference  
■ Reception area Not subject to Uplink Interference

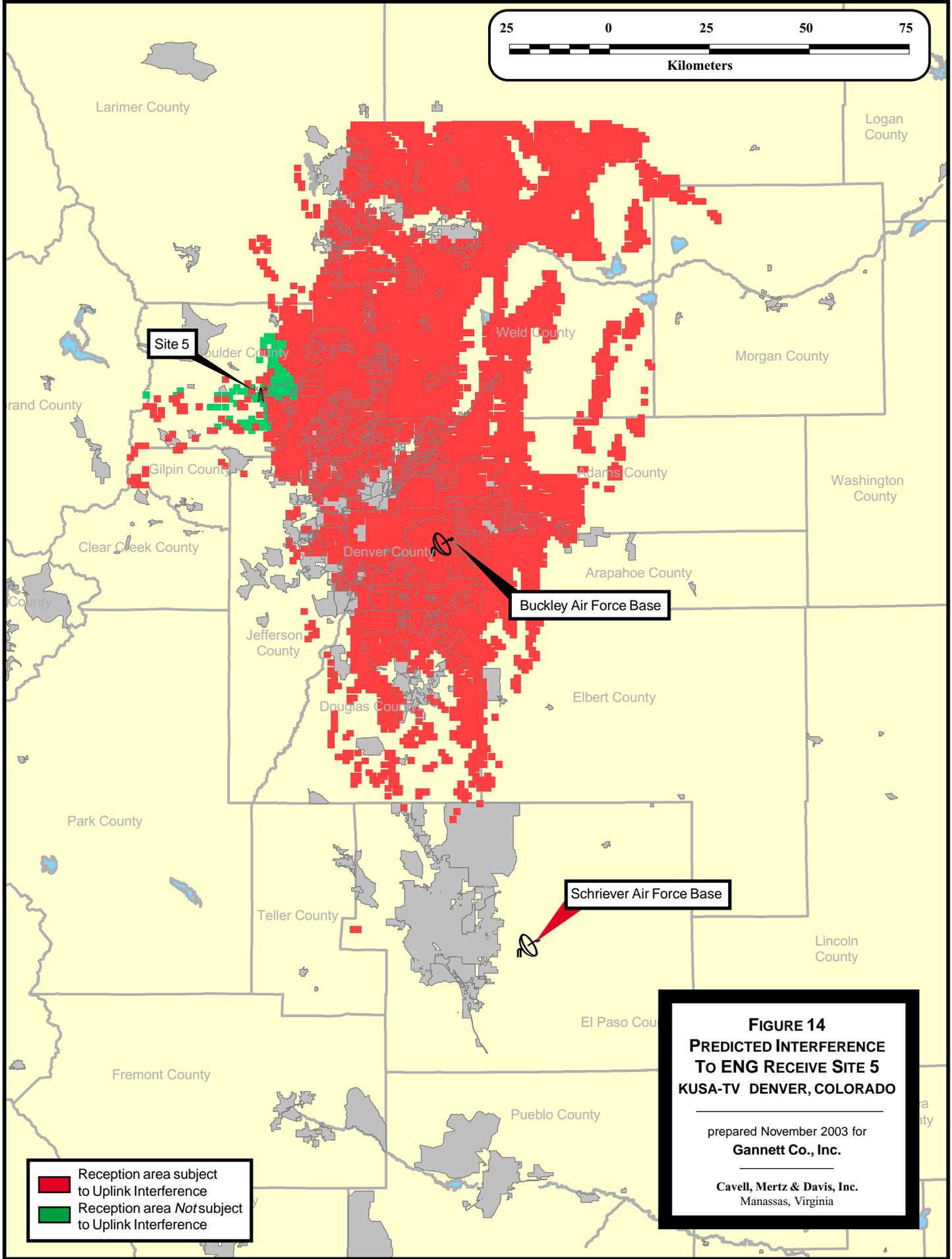
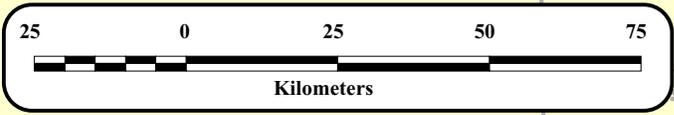
**FIGURE 13**  
**PREDICTED INTERFERENCE**  
**TO ENG RECEIVE SITE 4**  
**KUSA-TV DENVER, COLORADO**

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■ Reception area subject to Uplink Interference  
■ Reception area *Not* subject to Uplink Interference

**FIGURE 14**  
**PREDICTED INTERFERENCE**  
**TO ENG RECEIVE SITE 5**  
**KUSA-TV DENVER, COLORADO**

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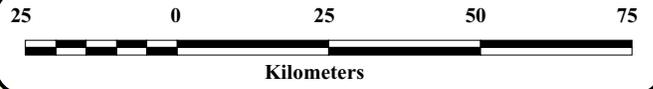
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**Cavell, Mertz & Davis, Inc.**  
 Manassas, Virginia

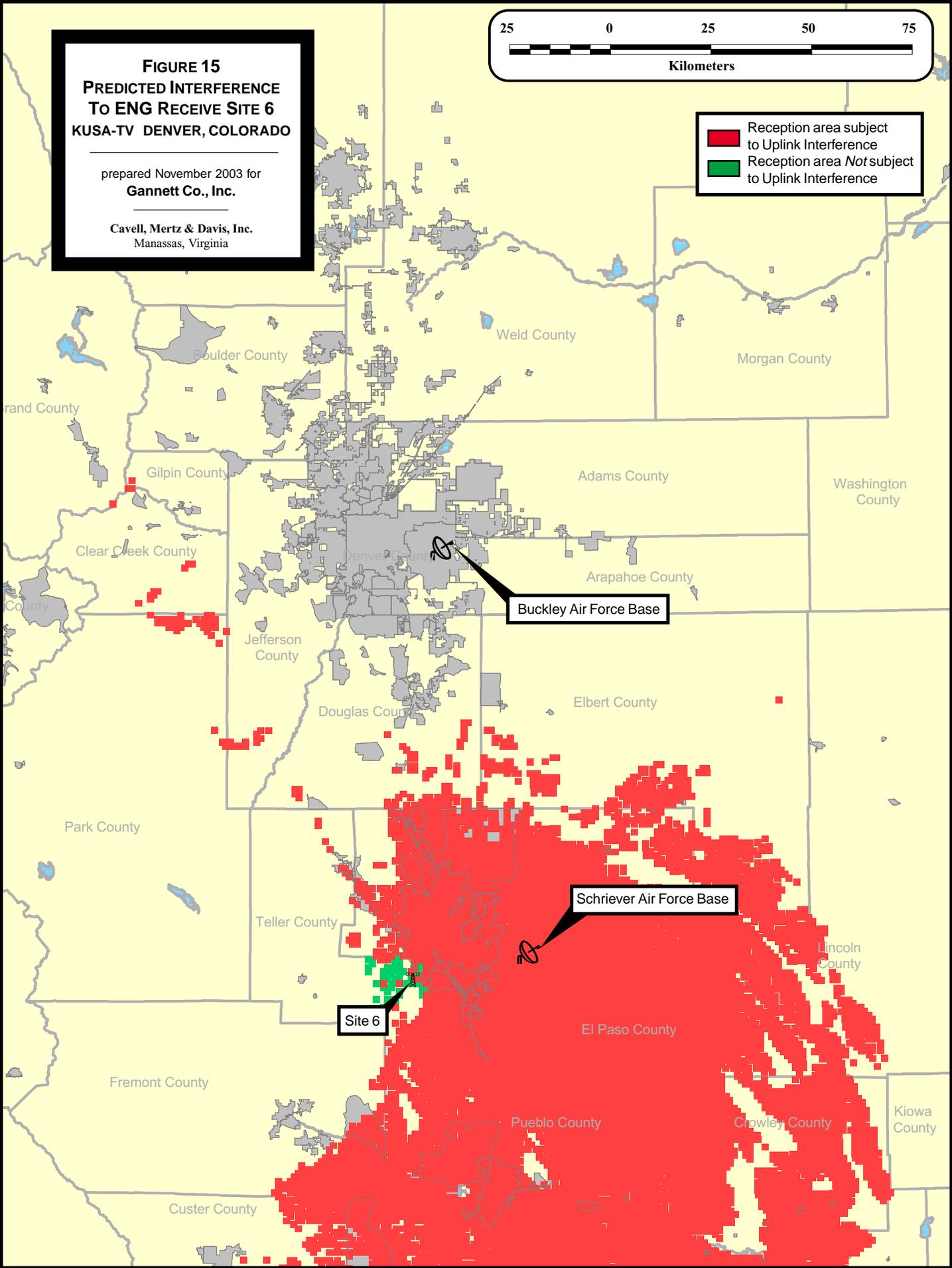
**FIGURE 15**  
**PREDICTED INTERFERENCE**  
**To ENG RECEIVE SITE 6**  
**KUSA-TV DENVER, COLORADO**

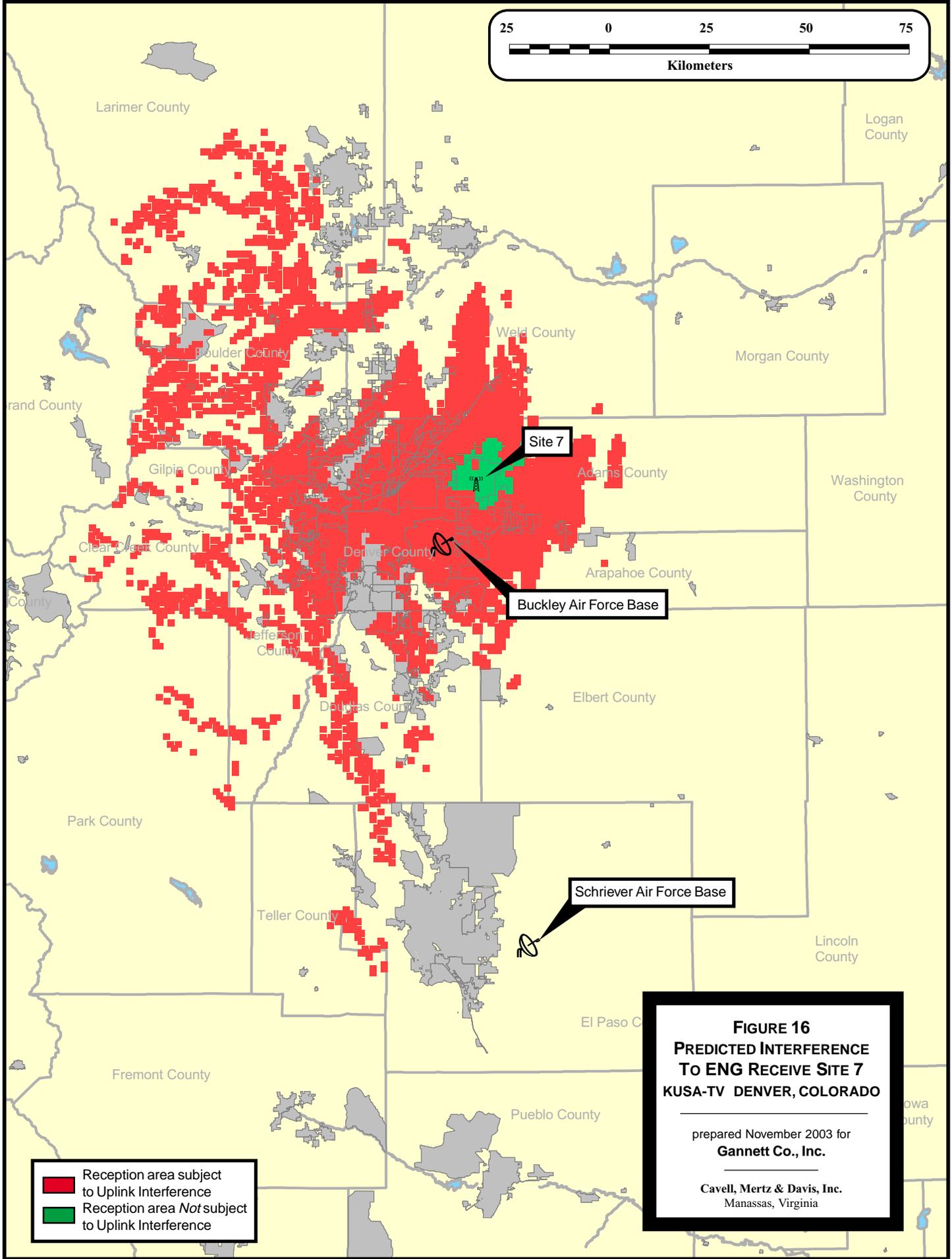
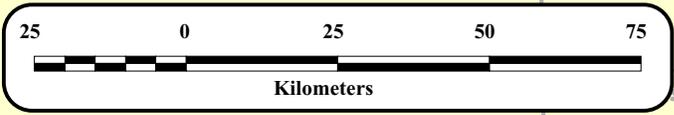
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**Cavell, Mertz & Davis, Inc.**  
Manassas, Virginia



Reception area subject to Uplink Interference  
Reception area *Not* subject to Uplink Interference





■ Reception area subject to Uplink Interference  
■ Reception area *Not* subject to Uplink Interference

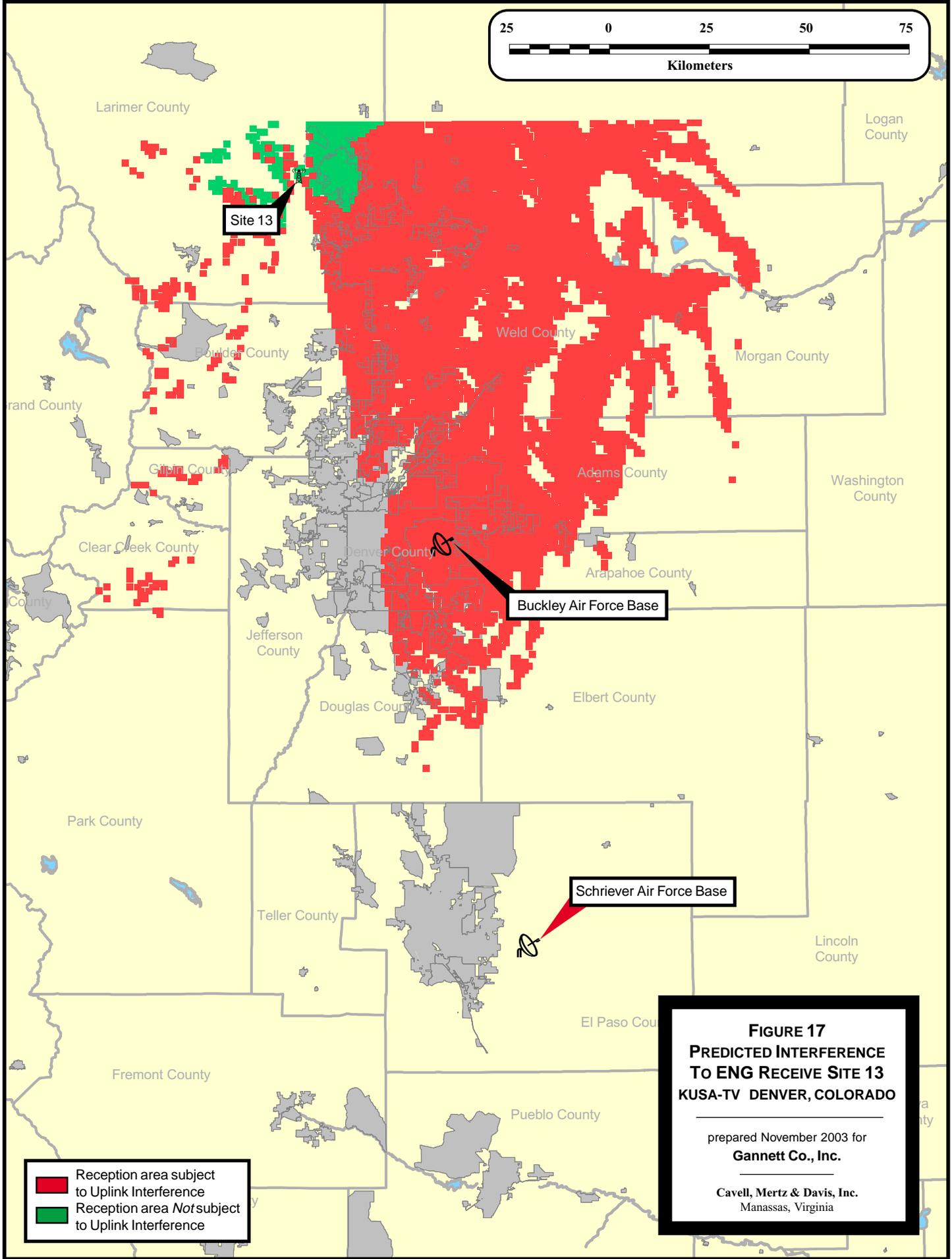
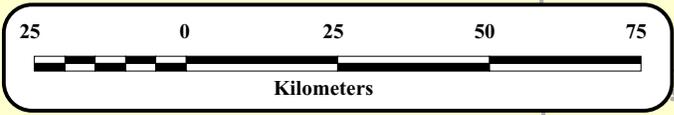
**FIGURE 16**  
**PREDICTED INTERFERENCE**  
**TO ENG RECEIVE SITE 7**  
**KUSA-TV DENVER, COLORADO**

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**Gannett Co., Inc.**

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 Manassas, Virginia



■ Reception area subject to Uplink Interference  
■ Reception area *Not* subject to Uplink Interference

**FIGURE 17**  
**PREDICTED INTERFERENCE**  
**TO ENG RECEIVE SITE 13**  
**KUSA-TV DENVER, COLORADO**

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 Manassas, Virginia

**KUSA 2 GHz BAS Usage During the Week of October 20-24, 2003<sup>1</sup>**

**October 20, 2003**

<b>9News Newscast</b>	<b>Unit</b>	<b>Coverage Event</b>	<b>Remote Site</b>
5:00 AM	3050	Future O Money	REM 1
6:00 AM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
4:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	3060	Police Shoot	REM 1
5:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	3040	DPD Protest, 14th/Cherokee	REM 2
6:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	3040	DPD Protest, 14th/Cherokee	REM 2
10:00 PM	3060	DPD Protest, 14th/Cherokee	REM 9

**October 21, 2003**

<b>9News Newscast</b>	<b>Unit</b>	<b>Coverage Event</b>	<b>Remote Site</b>
5:00 AM	3070	Police Imprson	REM 2
6:00 AM	3070	Police Imprson, State Capitol	REM 2
	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
12:00 PM	3070	Terrorism Drill, Westminster	REM 2
4:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	3070	Mtn Lion, Boulder	REM 5
	3040	Sex Assault, Arapahoe/Peoria	REM 2
5:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
6:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
10:00 PM	3060	Assault Arrest, Arap Co. Sheriff	REM 9

<sup>1</sup> The following charts show KUSA's 2 GHz BAS usage for the week of October 20-24, 2003, a typical broadcast week.

Live trucks 3040, 3050, 3060, 3070, and 58, as well as helicopter SKY9, all transmit on 2 GHz microwave frequencies.

Please refer to the Figure 1 to the CMD Study (**Exhibit 1**) for locations of the remote sites. REM 9 is collocated with REM 2.

**October 22, 2003**

<b>9News Newscast</b>	<b>Unit</b>	<b>Coverage Event</b>	<b>Remote Site</b>
5:00 AM	3070	4950 Beach Ct.	REM 2
6:00 AM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	3060	4950 Beach Ct.	REM 2
	3050	9797 W. Colfax	REM 2
12:00 PM	3040	Rescue Mission, Pepsi Center	REM 2
	3070	Columbine Tape, Jeffco	REM 9
4:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
5:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	3070	Aurora Shooting, Colfax	REM 2
6:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	3070	Aurora Shooting, 17th PL/Laredo	REM 2
10:00 PM	3070	Police Shooting, Aurora	REM 9

**October 23, 2003**

<b>9News Newscast</b>	<b>Unit</b>	<b>Coverage Event</b>	<b>Remote Site</b>
5:00 AM	3040	Westy Training	REM 2
6:00 AM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	3040	Westy Training	REM 2
12:00 PM	3040	Pepsi Center	REM 1
4:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
5:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	3060	Rented Wheels	REM 3
6:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	3070	DPD Helo, DPD Headquarters	REM 2
10:00 PM	3060	Solar Flare, Observatory Park	REM 2

**October 24, 2003**

<b>9News Newscast</b>	<b>Unit</b>	<b>Coverage Event</b>	<b>Remote Site</b>
5:00 AM	3060	Fiske	REM 5
	3050	Boulder	REM 5
6:00 AM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	3060	Fiske, Planetarium	REM 5
	3050	Boulder	REM 5
4:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	58	Solar Flares, Boulder	REM 5
5:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
	58	Solar Flares, Boulder	REM 5
6:00 PM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
10:00 PM	3060	Broncos QB, Invesco	REM 1

**KUSA 2 GHz BAS Usage on October 29, 2003<sup>1</sup>**

<b>9News Newscast</b>	<b>Unit</b>	<b>Coverage Event</b>	<b>Remote Site</b>
6:00 AM	SKY 9	Traffic Coverage (every 10 minutes, or as necessary)	REM 9
2:00 PM	SKY 9	Up Until Further Notice: Cherokee Fire	REM 9
	3060	Up Until Further Notice: Overland Fire	REM 5
	3040	Up Until Further Notice: Cherokee Fire, Castle Pines North	REM 2
4:00 PM	3060	Up Until Further Notice: Overland Fire	REM 5
	3040	Up Until Further Notice: Cherokee Fire, Castle Pines North	REM 2
5:00 PM	SKY 9	Up Until Further Notice: Cherokee Fire	REM 9
	3060	Up Until Further Notice: Overland Fire	REM 5
	3040	Up Until Further Notice: Cherokee Fire, Castle Pines North	REM 2
	3060	Up Until Further Notice: Overland Fire	REM 5
	3040	Up Until Further Notice: Cherokee Fire, Castle Pines North	REM 2
6:00 PM	SKY 9	Up Until Further Notice: Cherokee Fire	REM 9
	3060	Up Until Further Notice: Overland Fire	REM 5
	3040	Up Until Further Notice: Cherokee Fire, Castle Pines North	REM 2
	3060	Up Until Further Notice: Overland Fire	REM 5
	3040	Up Until Further Notice: Cherokee Fire, Castle Pines North	REM 2
Through Evening	3060	Up Until Further Notice: Overland Fire	REM 5
	3040	Up Until Further Notice: Cherokee Fire, Castle Pines North	REM 2
10:00 PM	3060	Overland Command, Boulder	REM 5
	3040	Cherokee Fire, Douglas Co	REM 2
	WB2	Dougco Evacs, Castle Rock	REM 14

<sup>1</sup> The chart shows KUSA’s 2 GHz BAS usage on October 29, 2003, when large fires burned in the viewing area. This is typical of 2 GHz BAS usage on a day on which an emergency/crisis event, or an event that is otherwise of high importance, occurs.

Live trucks 3040, 3050, 3060, 3070, and 58, as well as helicopter SKY9, all transmit on 2 GHz microwave frequencies. WB2 is associated with KWGN-TV, a WB affiliate with which KUSA has a video sharing agreement.

Please refer to the Figure 1 to the CMD Study (**Exhibit 1**) for locations of the remote sites. REM 9 is collocated with REM 2. REM 14 is a microwave interconnect to a Denver Teleport.