5. Lessons from the Toolbox ~ Using Vessel Monitoring System Data in Enforcement Proceedings

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Introduction

In the monitoring, control and surveillance (MCS) world, we talk a lot about tools. It is about taking what is often intangible and applying discrete, tangible and useful tools in order to make enforcement more approachable. They are not gadgets but mechanisms whereby enforcement capacity is enhanced. Satellite-based vessel monitoring systems (VMS) are tools. In the fisheries MCS world, VMS, while perhaps not revolutionary, has indeed forever changed our ability to combat illegal, unregulated and unreported (IUU) fishing. Confronted with vast swaths of ocean, domestic and international laws to enforce, unruly fish with no regard for boundaries, and perpetually insufficient MCS assets and resources, domestic and regional fishery management organisations (RFMOs) have embraced the potential of VMS.

The challenge for prosecutors is to use the evidence from new and untested tools to successfully prosecute violations. There is little more frustrating for a prosecutor than the inability to use good evidence to prosecute violations. A prosecutor never wants to let the enforcement team down by not adequately educating and persuading the court\(^1\) of the utility and reliability of what may be perceived as a technically complicated enforcement tool. In the United States (US), we are fortunate that there is a small group of about seven judges that hear the vast majority of our fisheries enforcement cases. As a result, we were able to quickly introduce VMS to these judges and educate them as to its capabilities; as such, we are now typically able to strip down our presentations to the court about VMS and rely on the court’s prior understanding of its basic elements and functions. However, in other jurisdictions, prosecutors may not be so fortunate and must constantly educate and inform new judges on the utility and reliability of VMS data for fishery enforcement purposes.

This chapter is intended to convey some of the “lessons learned” in the use of VMS data in enforcement proceedings. Initially, it touches briefly on what VMS

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\(^1\) For the purposes of this chapter, the term “court” will apply generically to civil and criminal, administrative and judicial, proceedings. Every legal system has its own standards of proof, rules of procedures, rules of evidence, and evidentiary burdens, which among other things may significantly alter the ability or method to present VMS evidence in court. The information provided herein is intended to be used generally and adapted as necessary to individual legal systems.

is, how it is used and its introduction into US fisheries management. From there, it focuses with some detail on the first US court case to rely solely on VMS data. The following section outlines the use of VMS data in practical terms of how we present the evidence to the court. Finally, it concludes with some thoughts on the limits of VMS and the need for more, not less, enforcement resources as a result of its use.

Background

There are few people in the fisheries management or enforcement world currently who are unfamiliar with satellite-based VMS. 2 Despite this, many references to VMS still describe it as new or emerging technology. In the US, the genesis of our VMS program occurred almost twenty years ago. 3 It began with a pilot program in the Hawaii-based pelagic longline fishery to support enforcement of newly-created management areas closed to longline fishing. 4 Before the government began to require the use of such technology, it first needed to test how and whether it worked and to evaluate it as a technique that would withstand judicial review. After some initial encouraging trials, the National Oceanic and Atmospheric Administration’s (NOAA) National Marine Fisheries Service funded a three year pilot project beginning in January 1995. 5

The pilot project proved to be “an effective surveillance and enforcement tool, providing a level of monitoring that would not be possible with traditional methods.” 6 VMS immediately opened a window into the ocean for management and enforcement by allowing authorities to conveniently track the location and monitor the activity of vessels in management areas of particular interest. At around the same time, there were successful trials conducted in other fisheries around the globe and the system was quickly adopted by many enforcement authorities. 7 Satellite-based VMS systems are described by the Food and Agriculture Organisation (FAO) as:

- comprised of several components. Each participating vessel must carry a VMS unit. This shipboard electronic equipment is installed permanently on board a fishing vessel and assigned a unique identifier. Most shipboard

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2 For the purposes of this chapter all references to VMS will be to satellite-based vessel monitoring systems.
4 Ibid at 1-2.
5 Ibid at 3.
6 Ibid at 6.
VMS equipment types use satellite communication systems that have an integrated Global Positioning System (GPS). The system calculates the unit’s position and sends a data report to shoreside users. The standard data report includes the VMS unit’s unique identifier, date, time and position in latitude and longitude.\footnote{Food and Agriculture Organisation of the United Nations, Fishing Vessel Monitoring Systems, \textit{Introduction to VMS fact sheet}, \url{http://www.fao.org/fishery/vms/2/en}}

The VMS data are used by MCS personnel by plotting it on a chart to depict the location, or in the case of multiple coordinates, track of a vessel in relation to management areas, zones or boundaries.\footnote{Ibid.}

\textbf{Figure 1: Component Diagram of Hawaii Vessel Monitoring System}\footnote{Harman and Yamashita, at 3.}

With the success of our first VMS pilot program, the use of VMS in fisheries management in the US expanded to other US fisheries around the country.\footnote{Eg 50 C.F.R. § 622.9 (South Atlantic rock shrimp and Gulf reef fish); 50 C.F.R. § 635.69 (Atlantic Highly Migratory Species); 50 C.F.R. §§ 648.9 and 648.10 (Northeastern fisheries); 50 C.F.R. § 660.312 (West Coast groundfish); 50 C.F.R. § 665.25 (Western Pacific Pelagic fisheries).} Similar expansions were taking place in the world’s oceans as interest in the use of
VMS in fisheries management spread quickly.\textsuperscript{12} Sovereign nations and international fishery management organisations, or bodies, quickly came to the same conclusions. It was based on a general recognition of “the limitations of conventional MCS measures …, essentially the prohibitive costs of carrying out such measures, especially observer programmes and naval and aerial surveillance operations throughout extensive exclusive economic zones (EEZs), marine areas which in certain cases exceed several fold the national land area.”\textsuperscript{13}

As a result, VMS has become a mainstay in NOAA’s enforcement case packages. It is regularly used both in conjunction with traditional documents such as logbooks, catch and effort data, observer reports, and boarding reports, and on its own. VMS data was incorporated into the suite of enforcement tools available to investigative agencies to monitor the activities of fishing vessels carrying VMS units. VMS data has been instrumental in increasing NOAA’s ability to protect and manage closed areas, and often plays a decisive role in a prosecutor’s decision to charge a case.

\textbf{Case Study – Lobsters, Inc.}

Although NOAA was regularly using VMS as evidence in its enforcement cases from the mid-90’s onward, it was not until December 2001, that NOAA received its first reported decision involving VMS evidence.\textsuperscript{14} *Lobsters, Inc.* involves the F/V Independence which was charged with unlawfully entering a closed area off the coast of New England. This was the first fisheries prosecution in the United States that relied on VMS evidence as sole proof of entry into a closed area.

In June 2000, the Respondents, Lobsters Inc. and Lawrence Yacubian, were charged with entering a closed area on two occasions in December 1998, as well as making false statements to an authorized officer.\textsuperscript{15} NOAA assessed, jointly and severally, a civil penalty of US$250,000, and sought to revoke the vessel’s Federal fishing vessel permit.\textsuperscript{16} The Respondents contested the charges against them and a civil administrative hearing was held in June 2001 before an Administrative Law Judge (ALJ).

\textsuperscript{12} Cacaud, P., 1999, at 4.
\textsuperscript{13} Ibid at 3.
\textsuperscript{14} In the Matter of Lobsters, Inc. and Lawrence Yacubian, 2001 WL 1632538 (N.O.A.A.).
\textsuperscript{15} Ibid at 1-2.
\textsuperscript{16} Ibid.
For the first count of entering a closed area, NOAA relied solely on VMS evidence.17 In order to prevail on this count, the attorneys18 had to convince the court of the reliability both of the VMS itself and of NOAA’s use of the VMS data. The first step, taken by the NOAA prosecutors prior to charging, was to review the full scope of potential violations shown by the VMS data, and choose the strongest case. The VMS data indicated the vessel had entered the closed area, at various incursion depths, more than 25 times over the course of three days.19 Instead of charging each individual incursion, NOAA chose to focus this first VMS-only case on the deepest incursion.

Prior to the commencement of the civil administrative hearing on the merits, the Court conducted a preliminary session on the reliability of the VMS technology.20 In the US, such a hearing is known as a Daubert21 hearing based on standards set forth by the US Supreme Court. At the hearing, NOAA presented several expert witnesses to the Court to testify as to the reliability of the VMS used in that case—Boatracs.22 NOAA’s procedural rules governing administrative hearings do not provide guidance to the Court on determining the reliability of evidence presented by expert witnesses.23 Therefore, the Court relied on the Federal Rules of Evidence (FRE) to guide it during the Daubert hearing.24

Based on his reading of the FREs, the Judge qualified three outside experts25 on the subject of reliability of the Boatracs technology.26 The Judge qualified the Chief Operating Officer of Boatracs, Charles J. Drobny, as “an expert on the operation or workings of the Boatracs system,” but did not qualify him to offer an opinion on the reliability of the system.27 In addition, NOAA offered and the Court admitted reports from each of the three experts on the reliability of the

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17 For the purpose of this chapter, the analysis of the Lobsters, Inc. case will focus solely on the first count which involved VMS only as support for the violation. Discussion of the other counts can be found in the court decisions cited throughout.
18 Juliand, C. R. and MacDonald M. J., NOAA Office of General Counsel, Northeast Region.
19 In the Matter of Lobsters Inc. and Lawrence Yacubian, National Oceanic and Administration, Agency’s Initial Brief at 3.
25 Benjamin Peterson, PhD; Peter Dana, PhD; and LCDR Gregory W. Johnson
26 Ibid at 4.
27 Ibid.
system, as well as a report from the United States Coast Guard (Coast Guard), entitled *Eighth District BOATRACS Test and Evaluation Final Report*, which provides a detailed description of the Boatracs system.

After hearing testimony from all of the expert witnesses, the Court found the Coast Guard report most persuasive, basing its decision on the reliability of the VMS solely on the report. The Coast Guard commissioned the study in order “to corroborate or confirm the claims of BOATRACS that the system was reliable enough to report accurately geographic positions 95% of the time within 300 meters of the actual position.” In its review of the study, the Court found it:

- to be an off the shelf study and was not prepared for the purposes of litigation. It was prepared prior to the time that might be in question in this case. Thus, I have concluded that the Coast Guard study … presented … statistically sound and reasonable conclusions regarding the reliability and the accuracy of the system’s ability to identify the position of fishing vessels employing that system on board that vessel.

Ultimately, the Court concluded that “the BOATRACS system is a reliable system reporting positioning data accurately 95% of the time within 300 metres of the actual position … [and] that the system would reliably report positions 98 to 99 percent of the time within 400 to 450 metres of the actual position.”

Although the Court’s conclusion on the reliability of the Boatracs system was positive, the Court’s sole reliance on the Coast Guard study begs the question of what would have happened without it. In a case without an independent outside study, would the expert witnesses have persuaded the Court? It is impossible to know, but it underscores the importance of good evidence, certainly, and of presenting the evidence you have in a compelling and effective manner. The Court’s finding that the Boatracs technology was reliable for determining a fishing vessel’s geographic position enabled NOAA to proceed with prosecution of its case.
NOAA had to prove its case by a preponderance of the evidence; once it had done so, the burden shifted to the Respondents. In presenting its evidence to establish its prima facie case that the F/V Independence was unlawfully inside a closed area, NOAA relied on testimony and evidence from NOAA and the Coast Guard detailing the track of the vessel by VMS, and the interception and subsequent boarding of the vessel. After reviewing the testimony provided by the government and the Respondents, the Court held that “[t]he record demonstrates respondents were within Closed Area II at the time and place shown in the Boatracs data. Moreover, the Boatracs data further demonstrate that this was not an incidental intrusion into the closed area, but between December 6 and December 8 there were numerous such intrusions.”

Although NOAA chose to charge only the most egregious incursion into the closed area, the testimony and evidence of the other less egregious incursions were key elements in the Court’s holding. NOAA successfully used its prosecutorial discretion to focus the Court’s attention on one significant incursion for liability purposes and used the other incursions to bolster its civil penalty assessment and permit sanction recommendation. In its determination of the civil penalty, the Court stated that “[t]he Respondents’ entry into Closed Area II was not incidental, accidental or in the course of transit through the area. It was numerous and to fish for scallops.” The Court further characterised it as “the most serious intrusion into a closed area” and found “Respondents’ claim that they did not intentionally intrude … incredible.” As a result, the Court upheld NOAA’s civil penalty assessment of US$250,000 and permanently revoked the Respondents’ Federal fishing permits.

Respondents appealed for discretionary review by the NOAA Administrator in January 2002. The NOAA Administrator declined discretionary review and therefore the Court’s decision became the final agency decision in July 2003. 

35 Steadman v. S.E.C., 450 U.S. 91, 100-03 (1981); see also Herman & MacClean v. Huddleston, 459 U.S. 375, 390 (1983)(holding that the preponderance of the evidence standard has been interpreted to mean that NOAA must show that it is more likely than not that the Respondents committed the violations as charged); Dept. of Labor v. Greenwich Collieries, 512 U.S. 267 (1994) (defining further the burden of proof under the APA to equate to a “burden of persuasion,” in which NOAA has the obligation to persuade the trier of fact of the truth of a proposition); In the Matter of Roque, 1999 NOAA LEXIS 8 at 69, aff’d Roque v. Evans, 2003 U.S. Dist. LEXIS 541 (D. Mass)(citing Steadman, 450 U.S. at 101) (finding that once the Agency “has established the allegations … by a preponderance of the evidence, the burden of producing evidence then shifts to the Respondents to rebut or discredit the Agency’s evidence.”).

36 Ibid at 8.
37 Ibid at 13.
38 Ibid at 14.
39 Ibid at 15.
August 2003, Respondents appealed the decision to the US District Court for the District of Massachusetts.\textsuperscript{41}

The District Court first addressed the limited scope of its review of administrative proceedings, recognising that its review is “limited to the administrative record that was before the agency at the time the decisions were made.”\textsuperscript{42} The Agency’s decision can only be set aside “if not supported by substantial evidence,”\textsuperscript{43} otherwise it is “the prerogative of the ALJ to draw inferences and make credibility assessments, and [courts] may not disturb his judgment and the [agency’s] endorsement of it so long as the findings are adequately anchored in the record.”\textsuperscript{44} With this in mind, the District Court, as did the administrative Court, began its analysis with \textit{Daubert}.

The District Court found that although “strictly speaking … \textit{Daubert} does not apply, … ‘the spirit of \textit{Daubert}’ does apply to administrative proceedings because ‘[j]unk science’ has no more place in administrative proceedings than in judicial ones.”\textsuperscript{45} In analyzing the administrative court’s \textit{Daubert} analysis of the Boatracs evidence, the District Court found that there was substantial evidence to support the ALJ’s conclusion that Boatracs was reliable.\textsuperscript{46} As a result, the District Court held that “[t]he record as a whole, including the Boatracs evidence, … contains substantial evidence from which the ALJ and Agency could have determined, by a preponderance of the evidence, that the Independence did enter Closed Area II on December 8 and 11, 1998.”\textsuperscript{47} Although the District Court upheld the ALJ’s finding of liability regarding the closed area incursions, it vacated the civil penalty assessed and permit sanction imposed, and remanded the case back “to NOAA for \textit{de novo} reconsideration of civil penalties and permit sanctions.”\textsuperscript{48,49} Issues relating to the civil penalty and permit sanction were ultimately resolved through a settlement agreement between the parties.

\textsuperscript{43} Ibid (citing 16 U.S.C. § 1858(b); 5 U.S.C. 706(2)).
\textsuperscript{44} Ibid (citing Bath Iron Works Corp. v. United States Dep’t of Labor, 336 F.3d 51 (1st Cir. 2003)).
\textsuperscript{45} Ibid at 344 (citing Niam v. Ashcroft, 354 F.3d 652, 660 (7th Cir. 2004)).
\textsuperscript{46} Ibid at 345.
\textsuperscript{47} Ibid.
\textsuperscript{48} Ibid at 349.
\textsuperscript{49} The District Court’s decision regarding the civil penalty amount focused on whether NOAA followed its own policies regarding the consideration of prior offenses in the setting of a civil penalty. However, the District Court’s decision also included an inscrutable footnote stating that “[i]n any event, considering the nature of the offenses and all other relevant circumstances, the severity of the monetary penalty and the \textit{permanent} revocation of plaintiffs’ fishing permits are deemed excessive in this particular case.” \textit{Ibid} (emphasis in original). Such a comment without further discussion or analysis provides little guidance as to the District Court’s thinking on this point.

133
Practicalities of Using VMS Evidence in Court

There are, without doubt, legal hurdles associated with the use of VMS data in enforcement proceedings. As discussed above, in the US, we must contend with the standards established under *Daubert* and its progeny to effectively introduce new scientific or technological evidence to a court. Prosecutors in other countries must contend with their own evidentiary burdens. It is commonly recognized that “[t]he question of whether or not VMS data can be used as evidence in legal proceedings relating to fisheries offences and, if it can, the weight to be accorded to it, will ultimately depend on the applicable rules of evidence in the jurisdiction concerned.”\(^{50}\) However, the practicalities and mechanics of using VMS in court have commonalities that transcend jurisdictional requirements.

Discussed below are some of the fundamentals of presenting VMS evidence to a court. This discussion assumes the successful establishment of the reliability of the VMS data, or, better yet, that the reliability of the data went unchallenged. The reality is, however, “until such time as there is either a ruling from a higher court on its admissibility or its use becomes so routine that it is not questioned prosecutors will generally need to be aware of the need for expert testimony.”\(^{51}\)

Establishing the Credibility of the VMS Program

It is not the VMS data alone which must be credible. In order for a case to succeed on the basis of, in part or in whole, VMS data, you must also establish the credibility and veracity of the entire program created to monitor, review, safeguard and track the VMS. A VMS program:

- must be implemented and operated by people with an understanding of surveillance, computers and communications. In addition to the technical skills, however, the VMS staff must also have a comprehensive knowledge of the regulated fishing industry, including operations and activities. This knowledge is required to reliably interpret the information provided by the VMS, and also to plan and implement changes to the VMS and responses to provided information.\(^{52}\)

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\(^{50}\) *Evidential Value of VMS Position Reports*, (FISH/2002/11), Final Report, Marine Resources Assessment Group Ltd, April 1 2004, (MRAG Report). The MRAG Report documents a study intended “to assess the extent to which VMS data has successfully been used as evidence in legal proceedings relating to fisheries offences.” The report was submitted in April of 2004 to the European Commission.

\(^{51}\) Ibid at 51.

In presenting VMS evidence to the court, the program is as much on trial as the VMS data. In other words, you must be prepared to answer the who, what, where, when and how of the response to the violation detected using VMS.

VMS is not a problem-free enforcement tool. This alone does not defeat its efficacy as evidence, but it means that potential problems must be addressed and disposed of directly and up front. What possible scenarios could have occurred that might compromise or affect the VMS data? Did your VMS program check or conduct any recent reviews or audits to ensure that they did not occur? If they occurred, what corrective steps were taken to ascertain whether they affected the data in this case? Frequently, the best preparation for such questions in court is to have created a standard checklist or procedure that is used in every case.53 By regularising the process, you signal to the court your awareness that there can be problems, but minimise their likely significance to the specific case by showing such ground-truthing is a routine activity.

If you can demonstrate in a robust fashion that the actions taken in this case were the same as are taken in every case, the courts will place greater weight on the overall credibility of the program. Witnesses from the VMS program should be prepared to detail their role in the process from initial suspicion of illegal activity through to the recommendation for prosecution. In particularly complex cases, VMS program personnel should prepare a memorandum for the case file outlining all of their actions on the case. More routinely, at least in the US, VMS personnel will prepare a memorandum that will accompany the VMS raw data, along with any graphical depictions, that outlines the known reliability of the VMS system, any anomalies in the given case, and, depending on the person’s expertise, an analysis of the VMS track vis-à-vis a violation. These memoranda can be comprised essentially of boilerplate language that is adapted to the facts of a specific case.

Another potential area of questioning by both courts and defendants relates to the VMS program’s data security and integrity. “To a certain extent the evidential value of VMS position reports could depend on the verifiability (authentication and integrity) of the data and the level of confidence in the accuracy of the system, data and its traceability.”54 According to a 2004 Marine Resources Assessment Group (MRAG) Report, this aspect of VMS had not yet been subject to a legal

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53 For example, the MRAG Report noted that “in Scotland sightings of fishing vessels that are subject to VMS from a variety of sources including fisheries patrol vessels, the coastguard, the Royal Navy and the Royal Air Force are systematically gathered and cross checked against VMS reports.” MRAG Report at 52. Similarly, “[i]n Spain, Navy and Guardia Civile officers have standing instructions to press the transmit button on the transponder of every fishing vessel they inspect, again so that the accuracy of the VMS position data can be compared with that of the inspection report.” Ibid.
54 MRAG Report at 38.
challenge,\textsuperscript{55} it is, however, an area ripe for contention. Approaching such issues internally in a proactive manner will likely reap benefits in the long term.

VMS data security is often touted as an issue of paramount importance to the commercial fishing industry; however, data integrity is an equally compelling interest for fisheries management and enforcement personnel.

The positions of fishing vessels can be valuable and sensitive commercial information. Thus, monitoring agencies must make efforts to ensure the physical and operational security of shipboard equipment, communications, and fishery monitoring centres. Security is essential to the fishery managers to ensure that the VMS information is authentic and non-repudiated, of high integrity, and private.\textsuperscript{56}

On the international front, with an ever-increasing focus on combating IUU fishing, the potential repercussions of charges of illegal fishing have also increased.\textsuperscript{57} Challenges to the security and integrity of VMS data seem inevitable, yet they should not be fatal to a case or a program. If necessary in the face of a challenge, third party verification or audits can be used to bolster in-house assurances.

The reality is that despite the enforcement community’s growing comfort with VMS, it remains relatively untested in the courtroom.\textsuperscript{58} By 2004, worldwide “VMS data [had] only been considered by the courts on less than three dozen occasions to date.”\textsuperscript{59} While that number has undoubtedly grown in the past five years, we are still in the early years. However, “[p]robably the most significant point that emerges is that, to date, VMS data has been accepted as evidence in all the cases … whether civil or criminal.”\textsuperscript{60} Thus far, VMS continues to prove to be an asset to fisheries enforcement efforts and has enhanced, not hampered, prosecution efforts.

\textit{Graphically Depicting VMS data}

VMS data are only as useful as the ability to effectively convey the information for what may be a non-technically oriented audience. And this is not just to the

\textsuperscript{55} Ibid.
\textsuperscript{57} For example, the proliferation of IUU lists in regional fishery management organisations, domestic IUU lists certifying nations who have failed to curb IUU fishing by vessels flying their flag, and port state measures to address IUU fishing.
\textsuperscript{58} MRAG Report at 46.
\textsuperscript{59} Ibid.
\textsuperscript{60} Ibid.
court. Prosecutors are the first audience for the evidence and must be convinced of the merits of the case before charges will be filed. At NOAA, this has led to an ongoing evolution in how VMS evidence is presented to the prosecutors and thus to the court. What began as simple VMS tracks crossing over a line signifying a closed area boundary has now morphed into ever more sophisticated renderings of VMS data. VMS information can be displayed in many different ways in order to highlight different facts. Depicted in Figures 2 through 4, below, are three examples of VMS plots that convey markedly different information.
Figure 2 is from the *Lobsters, Inc.* case discussed earlier. This plot provides several key pieces of information that should be included on all plots going to the court – the fishing vessel name, the date, a scale, a compass rose, and a legend. What may be obvious to the person creating the plot is often not obvious to an uninformed reviewer. The plot also clearly differentiates the closed area from the EEZ and annotates them as such. For this plot, each number represents a ping on the VMS, meaning VMS data position information was generated for each of those locations.

Importantly, the Figure 2 plot shows two things unmistakably. First, it shows the volume of pings inside the closed area. Second, and more strikingly, it shows that the vessel fished right alongside the closed area boundary for an extended period of time indicating knowledge of the regulatory boundaries. This demonstrates not only knowledge of the boundary, but it tells the story of exactly what happened in terms of the vessel’s operational activity. The vessel fished the boundary line and then darted in and out of the closed area.
Figure 3 is a blown up section of the upper portion of Figure 2 and highlights the VMS signals or pings from inside the closed area. Once again, in terms of presentation, the plot retains the vessel name, date scale, compass rose and legend that are vital to orienting the reviewer. In addition, it adds a text box to focus the reviewer on the key information. This plot depicts not only the extent of the incursion (e.g. point 17), but also presents the substantial number of incursions inside the closed area. Labeling each ping in sequence allows the viewer to see that it was not just one incursion, but a series of repeated incursions into the closed area. Here, the exact location of the plots in the ocean is less important than the volume of plots and evidence of multiple incursions.
Figure 4 is a more recent plot made to demonstrate how the addition of logbook data to the standard VMS plots can enhance the reviewer’s understanding of the case. By plotting logbook (or catch and effort) data alongside VMS data the results can be extremely effective in a couple of ways. For instance, if there is close correlation between the two, then the logbooks, which are typically signed on a daily basis by the vessel master, become the vessel’s own corroboration of the VMS data. And if the logbooks do not correlate with the VMS data, then the VMS data may be used to demonstrate that portions of the logbooks were falsified.

When using logbook data, however, it is important to highlight certain information for the court. As is true with the VMS track lines or plots, the only positions where there is certainty as to the vessels location are those actual points (e.g. Figure 4). The lines connecting the VMS-generated vessel positions are just that – lines connecting two points. They do not necessarily represent the actual path of the vessel. However, VMS tracks with short intervals of time between pings create approximate paths of the vessel that are closer to the true course of the vessel. Sometimes, rather than using a straight line to connect the logbook set and haulback positions, the chart will include a shaded area that covers the entire possible area of the vessel’s course, based on the known variables. This could, for instance, effectively show the court that no matter the path the vessel took between point A and point B, it remained inside a closed area the entire time.
It can also be noticeable that the end points of the set and haulback are not exactly on top of VMS points. Logbook positions may not occur at the exact same time as a VMS poll and therefore will not always correspond exactly to VMS tracks. The longer the polling period of the VMS, for instance four hours versus thirty minutes, the more likely it is that the logbook position may seem like an outlier. This apparent anomaly should be easily explained to the court by comparing the logbook position time with the VMS polling time.

There are a wide variety of ways to effectively display VMS information. The secret is to always remain mindful of your viewer and ensure that the exhibit, to the greatest extent possible, can be understood and recalled in the absence of a verbal explanation. Often, there is a long lag time between the hearing and the time when the judge actually sits down to review the evidence and write a decision. The goal is that your VMS exhibits can withstand that test of time and will still serve to educate and inform the court.

**Using Demonstrative Exhibits**

One of the challenges of introducing “new” technology to a court or a jury is taking a concept that may be technically complex and winnowing it down to the critical elements of the process. When presenting VMS data to a court that has little or no experience with VMS, one should plan to present the evidence orally, in writing and graphically through demonstrative exhibits. MRAG recommends that “in cases where a court is being asked to consider the use of VMS data for the first time, more imaginative approaches be considered.”

By varying the methods of presentation of the information, you increase the likelihood of conveying the information in a manner that will be helpful to the listener and subtly reinforce your message through repetition without seeming duplicative.

The use of graphically appealing and demonstrative exhibits to present VMS information to the court can be extremely helpful for several reasons. Some judges or juries may need a visual display to fully grasp the functioning of VMS generally. When presenting information on actual VMS tracks, visual aids become increasingly necessary. Displaying a vessel’s VMS tracks on a chart can demonstrate many key facts to the court. It can show the extent of an incursion into a closed area or an EEZ. It can show the close correlation between the VMS track and the positions documented in a vessel’s logbook. It can corroborate the eyewitness evidence from a marine or aviation patrol.

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Ibid at 51. The MRAG Report cites the *Lobsters, Inc.* case as an example, highlighting the prosecutors’ use of a powerpoint projector to display the various vessel track records, as well as to demonstrate how the VMS operated.
As shown in Figure 2 above, sometimes, showing a VMS track outside a closed area can be persuasive in proving your case. A vessel, accused of unlawfully entering a closed area, may claim not to have known of the closed area boundary. By reviewing and presenting VMS tracks, by that same vessel, that demonstrates movement in a repeated or continuing parallel fashion along the outside of a closed area, one can compellingly demonstrate knowledge of the boundary. Often historical VMS data from the vessel’s previous activity (i.e. previous fishing trips) can be particularly useful for conveying this point.

Visual aids can also combat the dry nature of technical testimony. Technical testimony, although not always dull, lends itself to detailed, complex explanations that may not always be easily understood. There is a potential risk that an expert technical witness will begin lecturing in an academic manner rather than testifying. Using demonstrative exhibits can help defuse that risk by focusing your witness on explaining an exhibit. In addition, such exhibits will often require that the witness get out of the witness box and onto their feet. This will serve to de-formalise the proceedings somewhat and allow for a more comfortable, less formulaic exchange of technical information.

Well-presented visual exhibits have the added benefit of sometimes lingering in the courtroom after the completion of the witness’s testimony, remaining on an easel as the trial moves on or even being co-opted by the Judge or opposing party. It is not unusual for a chart or large exhibit to remain in place after its use in the trial, passively displaying its information throughout the trial. Out of convenience, such exhibits are frequently used by the Judge or opposing party during the trial. Use of your exhibits by the court or an opposing party can give additional reinforcement of their authenticity and reliability – in essence, they become reference material for the case as a whole rather than the presentation of one side of the argument.

Courts and judges differ greatly in their rules, procedures and styles. The use of demonstrative evidence and some of the techniques described above may not always be appropriate or possible. Effective presentation of technical information can often be the most challenging piece of a trial. It is, in many ways, a balancing act between competing needs and goals. There is the basic goal to provide the court with clear, comprehensive and cogent information that supports your case.

62 One caveat to the use of demonstrative exhibits is that the enthusiasm of creating a visually pleasing exhibit should never overwhelm critical attention to detail. You should ensure that you have confidence in the accuracy of any material you put before the court, even if not being offered for that purpose or only being used for demonstrative purposes. If using a map as an underlay to VMS data, be certain that the map accurately represents the area in question. Demonstrative exhibits have a way of ending up as material exhibits before the court, even if not originally intended for that purpose. Treat them with the same level of care that you would any other exhibit.
However, it is imperative that you do not allow the case to become bogged down in technical minutiae salient to neither the case nor the reliability of the evidence.

The expression “explain it to me as if I am six year old”\textsuperscript{63} is often used to convey to technical experts the appropriate level for their testimony. However, simplifying does not have to lead inexorably to over-simplification. Both the prosecutor and the technical witness must demonstrate command of and comfort with the technical information. One technique for conveying this, and educating the court, is essentially to swap roles. The prosecutor uses the technical terminology, conveying his or her knowledge and understanding of the evidence, in questioning the technical witness. The technical witness translates those technical questions into readily understandable answers. This establishes the technical witness as one who recognises the complexity of the technical issue and can explain it in everyday terms. This allows the witness to become an ally of the Court.

Every trial is different and no one formula will work every time. VMS data will continue to play an increasing role in fisheries enforcement, and thus, fisheries prosecutions. The techniques and strategies discussed above are the lessons we have learned from each other thus far. As we all continue to establish standard practices, both in and out of the courtroom, for the handling and use of VMS data, VMS will quickly become assimilated into our trial routines. With each case, we have the opportunity to add to the growing acceptance of VMS data as evidence in fisheries enforcement proceedings.

**Conclusion**

VMS is often either heralded as the magic elixir of fisheries enforcement or condemned as completely unreliable. VMS is neither fool-proof nor fool-hardy. VMS has effectively increased our ability to combat IUU fishing worldwide. VMS alone, however, is not enough for such a large task. As stated in the FAO International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated, IUU fishing “is of serious and increasing concern. ... IUU fishing can lead to the collapse of a fishery or seriously impair food security and environmental protection.”\textsuperscript{64} Such a result is unacceptable.

VMS cannot, and should not, “replace or eliminate conventional MCS measures such as aerial surveillance, boarding at sea via patrol boat, landing inspections and

\textsuperscript{63} Philipadelphia (TriStar Pictures, 1993), Attorney Joe Miller (Denzel Washington) to client Andrew Beckett (Tom Hanks).

documentary investigations.65 The challenges of fisheries enforcement in the 21st Century are too great to rely passively on VMS to protect our oceans. As discussed above, VMS allows us to see that which was heretofore hidden, but it is what we do with this increased information that makes all the difference.

I am wary, however, of VMS becoming the facile solution to increasing enforcement capacity. Those of us in fisheries enforcement and management must be vigilant in ensuring that VMS complements, but does not replace, other critical elements of an effective enforcement strategy. VMS is but one sturdy, good tool, in a toolbox that must teem with enforcement tools.

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PHILADELPHIA (TriStar Pictures, 1993), Attorney Joe Miller (Denzel Washington) to client Andrew Beckett (Tom Hanks).