Chapter 11

Field Production

An increasing amount of daily television fare currently originates from nonstudio locations, including news and sports programs as well as segments for sitcoms, dramas, reality shows, commercials, and variety programs. Increases in *field production,* as it is called, are largely due to breakthroughs in technology in two areas. First, because of the smaller size and weight of television equipment and improvements in technical performance, you can now collect video content under conditions that were once inaccessible to television. Second, once collected, you can now instantly transmit programs globally from any location through a variety of means. In short, advances have increased television's accessibility and transmission capability.

State-of-the-art field equipment is more portable, reliable, durable, efficient, and higher quality than ever before. Digital cameras use charge-coupled devices (CCDs), making field units lighter and smaller than their tube predecessors and therefore easier to pack and transport (see Photo 11.1). In addition, solid-state technology makes field cameras more durable; they are not subject to registration problems from getting knocked around.

Field cameras are also more light sensitive than ever, so they can work in lower light than was once possible. This means they can use denser lens systems, affording them greater focal range under more varied conditions. They also operate with lower energy demands for longer periods of time on batteries. Moreover, because of their greater light sensitivity, lights, if they are used at all, can now be used at lower power and illumination levels, making light kits smaller and lighter. The move toward lower power also means less intrusion and distraction for on-camera personnel—thus a more naturalistic atmosphere can be achieved.

Microphones have also become smaller while increasing in sensitivity and directionality. In addition, wireless systems have largely been perfected and now are quite reliable over longer distances in both studio and field settings.

Photo 11.1 This portable three-chip digital camcorder is less than 9 inches wide, less than 9 inches in height, and under 20 inches long (with the lens). Its total weight is under 8 pounds.

Once cameras, mics, and lights have been deployed in the field, the producer has the option of either transmitting to a home base from virtually anywhere on Earth for immediate live broadcast or recording material either on tape or disk or solid-state flash memory cards for later editing and/or broadcast. For delivering a signal to a home base, the methods include traditional coaxial cable and terrestrial (land-based) microwave relay links, newer fiber-optic lines, or even satellite *transponders* (radio devices aboard satellites that receive and then retransmit video signals originating on the ground).

This chapter explains how field production works and offers advice for executing successful field shoots. All the aesthetic and technical principles covered in earlier chapters remain important in field production, and you should review them when necessary. The topics covered in this chapter include the following:

Television war coverage: a case study in field production

Three basic concepts

Electronic news gathering

- The ENG mobile unit and equipment
- Signal transmission and relay facilities
- The ENG preproduction stage

- The ENG production stage
- The ENG postproduction stage

Electronic field production

- The EFP mobile unit and equipment
- The EFP preproduction stage
- The EFP production stage
- The EFP postproduction stage

Multicamera remote production

- The MCR mobile unit and equipment
- The MCR preproduction stage
- The MCR production stage
- The MCR postproduction stage

TELEVISION WAR COVERAGE: A CASE STUDY IN FIELD PRODUCTION

Perhaps no event in recent history more dramatically illustrates television's current robust field capability in terms of both immediacy and pervasiveness than the coverage of the war in Iraq. In addition to conventional broadcasting technology, television journalists rely on cellular telephones, satellites, computers, microwave relays, and fiber-optic technologies to cover global conflicts.

Through various configurations of these technologies, television news (however sanitized by the sources) is broadcast worldwide. News organizations such as CNN can now provide daily coverage of events *as they happen,* often using embedded reporters live on the scene. Television news may be viewed not just by audiences worldwide but by intelligence officers and military personnel on both sides of the battle.

What makes this possible is not just the technical capability of a single device, or several devices, but the *convergence,* or linking, of several media technologies with one another. Among the more advanced devices used is the **fly-away video satellite uplink,** a device that can be packed into a suitcase and then flown anywhere on a small commercial airplane. Upon arrival at a field location, fly-aways can be loaded on a truck and moved to anyplace the truck can go to provide global, live television coverage.

Laptop computers provide e-mail capability for field reporters, as well as access to the Internet and various databases, enabling reporters to file, read, and watch stories from around the world within moments of their creation. Laptops can also ingest, edit, and transmit the video shot by field reporters. Laptops and

cameras that interface directly with computers are capable of replacing entire news vans as well as serving as a word processor for scripts.[1] News agencies can also share historical and archival data with field reporters. In addition, home base television stations and news agencies frequently forward news items from competitors to reporters for editing their own stories. Hence, the convergence of new media technologies makes global journalism more pervasive and immediate, even contributing to its content.

It is unlikely that you will be thrust into a field setting as an embedded reporter covering a war; more likely, you will have to cover an election campaign or a live sporting event for a local television station. Or you may work a live multicamera remote of some special event, such as a parade or a government official's inauguration. However, regardless of what you cover, the field production principles you use will be the same, and you may confront a similar variety of conditions. Some field reports may be broadcast live, and some may be taped, edited, and broadcast later. Some may be shot at night, some in the daytime. Some may be shot outdoors and some indoors. Some may be done under clear skies and bright sun and some under heavy clouds or in stormy weather. Some may feature professional talent and some the greenest amateurs. Some may have huge budgets, and some may be done on a shoestring. Many will have tight deadlines, and a few will have a luxury of time. Some will use radio energy (such as microwave links, satellites, and cell phones) to deliver live feeds from the field to the home base, while others will use fiber lines or some other physical connection. Finally, some hosts, subjects, or jurisdictions will impose few restrictions (legal or otherwise) on the use of the materials you shoot, while others will impose such severe limits that you may wonder whether it was worth shooting anything at all. *In all cases, you will be expected to act ethically and professionally with a finite supply of space, time, materials, and personnel.*

THREE BASIC CONCEPTS

To understand the media infrastructures relevant to field production, three general concepts are useful: **reach, range,**[2] and **interactivity.** The following sections describe these concepts and give examples of their application.

Reach. The term *reach* refers to the proportion of all relevant parties that can be connected to one another quickly and automatically by a communication technology. Ideally, maximum reach is attained when any relevant party anywhere can communicate with any other, as might be possible in a perfectly operating worldwide telephone or postal system. Reach relates to communication capabilities among production team members as well as communication with the audience.

For example, in producing a multicamera remote of a golf tournament, one group of relevant parties is the field crew, including the commentators, who may be deployed at some distance from one another and from the greens they must cover but who must be instantly informed about which player's shot will be taken next and when others must be recorded for later broadcast. To keep informed, the camera operators and other production personnel, many beyond earshot and out of sight of one another, need access to the director's voice. If voice contact is lost, the operation can grind to a halt. Hence, reach, at least in terms of voice contact, is critical.

Range. The concept of *range* refers to the different *types* of information (data, voice, live-action video, taped replays, etc.) that are handled by a given system. For example, the telegraph has great reach; however, since it uses Morse code but no voice or video, it has limited range. Likewise, the conventional telephone system has great reach, now made even greater by cell phones, and it also enjoys greater range than the telegraph since it can handle data transmissions such as e-mail and faxes in addition to voice communication. However, when the phone system becomes capable of transmitting live, real-time video—say, through the addition of handsets with video screens—we will then say that its range has increased.

The golf tournament example shows how the concept of range helps in understanding field production. Imagine a commentator having to describe different golfers' shots from distant locales. The commentator may be cued by a director's audio feed that it is time to describe actions at the ninth tee or the twelfth green, but audio alone would not be enough to show the commentator the action—that is, the audio feed can *reach* the relevant party, but it lacks the *range* to provide the necessary information, namely, the video feed the commentator needs to report intelligently. By adding a line monitor with the video feed, we increase the range of this communication system enough to make it fully functional.

Current growth in the range aspect of communication networks may be seen in the adoption of systems with digital platforms. By reducing all forms of messages (data, voice, and video) to series of 0s and 1s, digitalization makes them potentially universally compatible with one another. In theory, digitalization of information enables messages to be integrated and shared in all formats.

Interactivity. Finally, *interactivity* refers to the ability of a communication system to permit users to encode and decode messages simultaneously in real time. The telephone is an obvious example of interactivity, but how does the concept apply to video? Consider *The Larry King Show* on CNN, an interview show in which the host and guest take phone calls from viewers. This program has impressive reach (it is broadcast to dozens of countries) and some range (because it includes the viewers' telephone calls, though it does not carry video of the callers). It also has

a limited amount of interactivity: It broadcasts calls in real time, providing live communication between host and caller, but only for one caller at a time. In the golf tournament example, interactivity in voice communication is provided by headset or phone connections for all relevant parties who must speak to and hear one another during a broadcast, including the field crew, commentators, the director, and other personnel at the home base.

These three concepts can help you plan and execute your live and taped field shoots. The proper configuration of communication systems linking relevant parties to one another in the field makes it essential for producing coherent field productions.

In the rest of this chapter, we will examine the major categories of field productions: the multicamera remote type of field production alluded to in the golf tournament example; electronic news gathering, as in daily coverage of a war; and electronic field production, such as might be used for a corporate video or a documentary featuring a series of location interviews with government figures offering solutions to some long-term problems (i.e., how to fix the health care system or revamp Social Security). These categories differ in emphasis, but they should not be viewed as entirely distinct from one another. Many principles apply to all of them, though each has unique qualities that make it appropriate to use different production strategies.

ELECTRONIC NEWS GATHERING

Roughly speaking, **electronic news gathering (ENG)** refers to that type of field production used for on-the-spot daily news coverage. Since news events happen in different locations without prior warning, ENG production is often marked by rapid response to fluid situations and by tight deadlines. In the news business, it is essential to be poised for mobility, to get the scoop, and to be first with the late-breaking story. As a result of severe time constraints, ENG production often has relatively rough (though still air-quality) production values, including handheld camera shots; imperfect lighting; simple, often unplanned blocking; and less-than-optimal audio. These imperfections are overlooked when the story is dramatic enough: For instance, when a war reporter describes bombs exploding outside his or her window, no one expects the audio to be flawless. On the other hand, difficult conditions are no excuse for sloppy work, and the quality expected in today's news operations is generally very high.

The ENG Mobile Unit and Equipment

The purpose of the ENG mobile unit is to enable crews to move and deploy video equipment quickly and efficiently to the site of a fast-breaking news story. At the

Table 11.1 Typical Contents of an ENG Mobile Unit

Cameras: at least one, preferably two
Camera tripods, body mounts, and/or shoulder braces
Lenses and lens shades
Flags and reflector boards
White balance cards and test equipment to set up and adjust transmission signals
Complete light kit (two-instrument minimum; three are better) with extra bulbs
Microphones: several wire and wireless lavs and handhelds, as well as a shotgun mic for more distant pickup, all with windscreens
Portable audio mixer and headset for monitoring audio levels
Batteries
An additional power source, such as a generator powered by the vehicle's engine
Two-way radio for communication with the home base
Walkie-talkies for on-site crew members
Microwave transmitter
Satellite dish for live transmissions (optional)

simplest level, the ENG mobile vehicle may be nothing more than a car into which a camcorder and microphone have been loaded, with a reporter, either alone or with an assistant who doubles (or triples) as driver and audio/video operator. Under more ideal conditions, the ENG crew will have two or three members (including an engineer who can be stationed inside the vehicle for operation functions and security needs); the vehicle will be a van or minibus equipped with all of the equipment needed to cover a story either live or on tape from the field under varied conditions (see Photo 11.2). The van or minibus is a good choice because it has enough room to carry what is needed for almost any situation while remaining small enough to park and maneuver with relative ease. Table 11.1 lists the typical contents of a fully loaded mobile unit.

In a well-outfitted vehicle, needed items are arranged in an orderly manner to make the setups and strikes efficient, including cables and miscellaneous items (gaffer's tape, clamps, extension cords, fishing line, etc.). Custom-made containers with safety straps for securing cameras and other major items may also be attached to specific locations in the van. In the glove compartment, it is a good idea to keep a flashlight and road map, as well as any police permits that the crew may need to gain access to restricted areas.

(a)

(b)

Photo 11.2 An ENG van with a transmitter on top (a) and ample video equipment stored safely inside (b).

Signal Transmission and Relay Facilities

A common method of delivering video signals (either live or on videotape) from a field location to a home base is through the use of microwave radio energy, which provides line-of-sight transmission from an antenna mounted atop the ENG van (see Figure 11.1).[3] The effective distance for microwave relay signals is roughly from 30 to a hundred miles, depending on signal power and terrain conditions. Once this distance is exceeded, a **repeater station** is used to boost the signal for another trip. With a series of about 30 repeater stations, television signals may be transmitted from coast to coast.

To link an ENG camera with a home base, two connections are needed: first, a connection between the camera and the antenna atop the mobile van; second, a link from the mobile van to the home base (see Figure 11.1). A physical cable can be used to link the camera with the van. In cases where this is not possible, a battery-powered microwave transmitter with about a one-mile range is connected to the camera. For reliable operation of this microwave transmitter, a clear path must be maintained from the camera to the van's antenna.

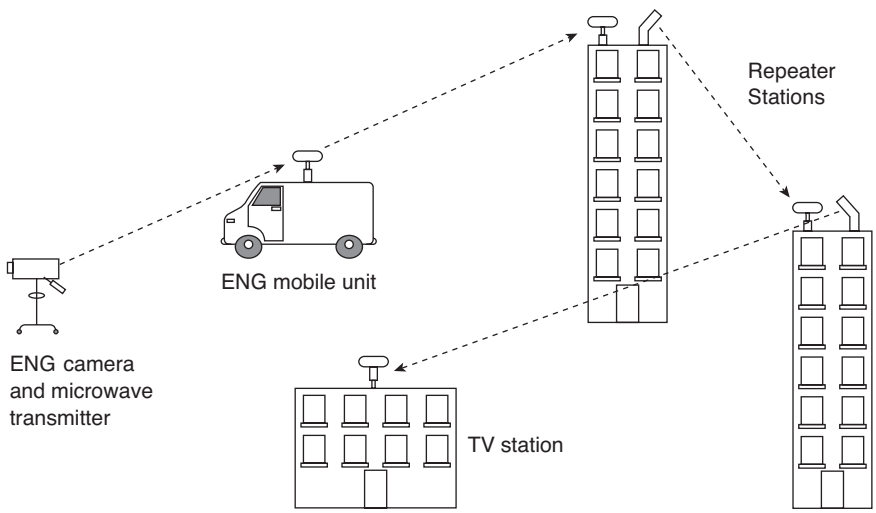

Figure 11.1 Typical microwave links in an ENG operation.

The link from van to home base is provided by the van's microwave transmitter. Sometimes, either the distance is too great or line of sight is too obstructed to permit successful transmission from the van directly to the home base. In such cases, repeaters are used to get the signal back to the home base for storage or

broadcast. In most cities, repeaters are conveniently located at several geographical high points, atop tall buildings or hilltop towers. To get the best transmission, experienced crews carry a list of locations that have worked well in the past. Sometimes helicopters or tethered blimps, equipped with portable towers, can hover over news or sports locations to serve as repeater stations. A cheaper, though perhaps less reliable, way to get signals to receiving antennas is simply to bounce them off a nearby building.

When microwave delivery is not feasible because of distance, power, terrain, or other limitations, ENG transmissions can be sent using a satellite uplink (see Figure 11.2). Since the mid-1980s, **satellite news gathering (SNG),** as it is called, has extended the reach of ENG operations by using satellite **transponders,** which are orbiting microwave receiving/transmitting stations. A satellite uplink aboard an ENG van is aimed at a preassigned transponder aboard a satellite traveling in a geosynchronous orbit 22,300 miles above the Earth. (A satellite's orbit is geosynchronous when the satellite stays above the same spot on the Earth's surface throughout its orbit.) Aboard the satellite, microwave radio signals received by the transponder are converted to another frequency to avoid interference or jamming problems and then sent back to Earth. Since signals from orbiting satellites come from over 22,000 miles away, the coverage pattern, or **footprint,** blankets about a third of the Earth's surface. And because the coverage pattern from a satellite is so great, satellite communication is termed *distance insensitive.*

After determining the best position for the satellite uplink (through the use of a compass and an *inclinometer*), an engineer in the field immediately begins sending test and tone signals (usually video color bars and a 1,000-Hz audio tone) so that the home base can establish and adjust its connection. In addition to

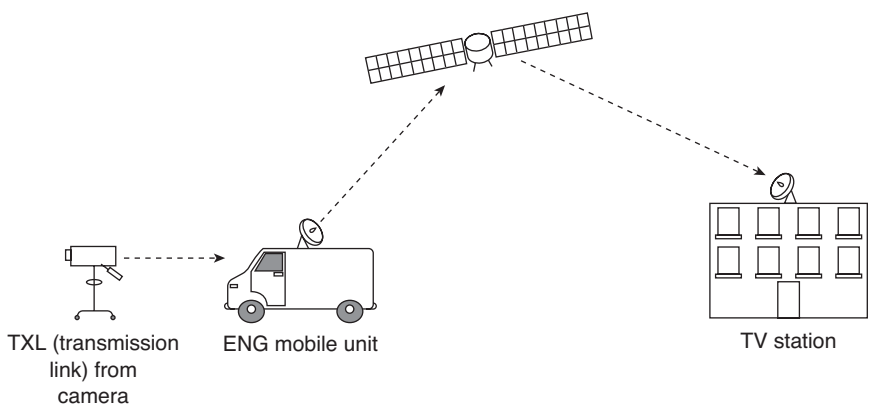

Figure 11.2 ENG connections using a satellite uplink.

providing a live television feed to the home base, satellite transponders are used to set up voice communication between field crews and selected personnel at the home base. This connection includes both telephone links and an **interruptible foldback (IFB)** circuit, a voice channel enabling the director to break into a program's audio feed to talk directly to the field reporter through the reporter's earpiece. IFBs also permit news anchors and other personnel to talk to field reporters without their conversation going out over the air about upcoming segments. In this way, satellites help establish the interactivity needed for a successful production. However, the time delay in these satellite-transmitted conversations is about a half second, a lag that can sometimes be irksome to the participants.

The ENG Preproduction Stage

Before leaving on a field assignment, the ENG crew should be thoroughly prepared. To paraphrase an old adage, *it is better to have gear and not need it than to need it and not have it.* In line with this advice, most serious ENG operations have a checklist of the most needed items to make preparation routine. In addition, it is useful for crew members each to have a press pass to enable them to cross police lines.

An *information log* listing the addresses and locations of valued conveniences is also handy. The log might include the locations of bathrooms and working phones, as well as names and numbers of key field contacts (the mayor's secretary, the police commissioner). It also helps to know key locations for getting the clearest line-of-sight microwave relay for the mobile van. In many ways, the information log serves the same purpose as the production book kept by the competent producer.

Cameras and Tape. Before and during the trip to the shooting location, you should consider the assignment objectives. Upon arrival, unpack and set up the equipment you intend to use. As far as the camera is concerned, if time and the nature of the job permit, use a tripod if at all possible to steady your shots. Remember to white balance the camera even if you have just done so at a previous location. The most popular cameras and tape formats for ENG operations currently tend to be Betacam or DVC-Pro 3-chip digital cameras with digital tape, although in some cases, other equipment may be in service. Depending on what you have, be sure to bring enough batteries and tapes or disks in the proper format to carry the day.

Before shooting begins, always record about 10 seconds of tape before cueing talent to ensure that you have tape up to speed and to provide enough control track for later editing. Shoot an additional 10 seconds of tape after each segment to give the editor enough control track to edit. When a tape cassette is finished, immediately label it. Identify each tape (and tape box) by date, time, and the event

covered to reduce confusion. Bring a marking pen and stick-on labels for this simple accounting task. If you don't want to record anything else on a cassette, remove or adjust the "record" tab on the back panel to eliminate the risk of taping over crucial footage.

Lighting. If the shoot is to take place outdoors in daytime using available light, take note of the location of the sun and, if possible, place the camera so that the sun is behind you. If that is not possible, use lens shades to offset less-than-optimal angles of the sun. If the sun is extremely bright, use flags to reduce or eliminate contrast-ratio problems. Reflector boards can help fill in dark shadows. If it is windy, stabilize flags and reflector boards with clamps or with the assistance of utility crew to eliminate accidents and flickering effects. Better yet, try to use an area sheltered from wind and direct sunlight, such as the lee side of a building.

Rain may require the use of raincoats for cameras and other major equipment that needs protection. **Raincoats** are waterproof covers custom-fitted to cameras, recorders, and other key equipment. In the absence of custom-fitted raincoats, plastic garbage bags are a good substitute. With all electrical equipment, exercise extreme caution when operating in the rain, especially with lighting equipment—that means keeping things dry and not placing flammable rain protection gear so close to lights that you start a fire.

For night and/or indoor shoots where available light is not enough, artificial lights will be needed. The main goal is to provide adequate light for air-quality video. This can often be achieved using three portable instruments either on stands or clamped to available surfaces. The lights should be tunable so they can be used in spot or flood positions.

Most portable light kits feature lensless tungsten halogen lamps with barn doors, scrims, and gels for controlling spill and intensity. Wooden clothespins (the two-piece wire-loaded variety) are ideal for pinning filters and scrims to barn doors. Pack a pair of heat-resistant gloves for safe handling. Bring lights that run on batteries in case AC power is not available. In some cases, you may have to settle for a **speed light**, a single light mounted on top of the camera. While this alternative is not the best, it is sometimes all you have.

If possible, set lights according to the principles of good lighting design discussed in Chapter 5. Remember to light to create texture, depth, and acceptable contrast ratios. Lighting from above rather than below avoids unnatural, unflattering shadows. Use key, back, and fill light to achieve proper lighting effects.

If you can power only one or two instruments, you may be able to stretch your resources by using **bounce light**—that is, light reflected or bounced off a white wall, ceiling, or other reflective surface. Bounce light increases the amount of fill and even backlight on a subject and reduces contrast range. To use bounce light,

position the subject near a white-colored wall or other such surface. If a wall is available but it is not white, you can tape white paper to it.

For outdoor night shoots, it is often desirable to find settings with illuminated backdrops. In reporting about the federal government, the White House and Capitol buildings are frequently used as backdrops, not only because they are important but because they are mostly white and are already lit. In the absence of prelit backgrounds, place the subject close enough to some background so that your lights spill light onto it. If none of these choices is available, expect the subject to look cameo lit (not necessarily bad).

If you shoot indoors in the daytime using tungsten halogen lights, they will be incompatible with natural light in terms of color temperatures, and you will need to decide how to deal with the natural light streaming in from windows. Draw the drapes, pull the shades, cover the windows with opaque paper, or coat the windows with filters that color-correct the natural light.

Finally, for daytime outdoor shoots, it is sometimes desirable to augment natural light with artificial lights: for example, to boost flat light conditions caused by cloudiness or to offset the light variations when a shoot takes place over several days. Under such conditions, if available, use hydrargyrum medium-arc iodide (HMI) lights to match the color temperature range of natural light. Alternatively, you can gel the lights to match the outdoor color temperature. A recent technical breakthrough in lighting is the introduction of high-efficiency HMI lights with much lower power requirements. There are even units that operate off the camera's battery.

Audio. Take audio levels as soon as possible, and shoot some test tape to make sure all systems are go. Use simple audio design—perhaps a single handheld mic for the reporter's speeches. For two-person interviews, the latest production approach uses a wireless lav for the reporter and a wireless handheld (held by the reporter) for the interviewee, but you can still do an adequate job sharing a single conventional handheld mic. For longer interviews, another approach is to have reporter and interviewee each wear a lav.

A shotgun mic can also be mounted on the head-end of the camera, and all audio can be recorded from there, but sound recorded in that way often lacks presence, and ambient noise can be distracting. Use this method only as a last resort, when crew or equipment is not available for other configurations.

For outdoor shoots, always use windscreens. Before or after taping, record room noise or nat sound for 20 or 30 seconds so that you have some for editing purposes if needed. Nat sound can also provide nice background for audio sweetening, which will often include postproduction voice-overs from studio announcers or news anchors.

Finally, monitor audio through a headset, and ride the gain throughout the taping to capture the best possible sound.

The ENG Production Stage

Of course, no matter how sophisticated telecommunications technologies are on land or in space, nothing can replace the intelligent use of facilities. At the site of a newsworthy event, the reporter and crew's journalistic experience, production and writing ability, editing knowledge, values, ethics, people skills, and even the organization's policies all influence the finished product. What principles and techniques can guide you in gathering air-quality footage? This section briefly outlines some key practices for single-camera field production to help you capture your story with the most professional results.

Sequential Thinking. Shot sequencing and visual continuity are natural by-products of standard multicamera studio production. The same action is viewed simultaneously by several cameras from different angles with different shot compositions, enabling you to cut from shot to shot without losing the normal flow of action. By contrast, in single-camera field production, matching action from different camera angles, positions, and compositions is not a natural by-product. Instead, segments must be shot at different times from different vantage points and must later be edited into final form in postproduction to simulate matched action. Simulating matched action is an essential ingredient of **continuity,** which we can define as the smooth flow of uninterrupted action from shot to shot. In single-camera field production, continuity between shots must be fabricated—it is an illusion.

Creating matched action is possible only with careful planning. You must think sequentially, planning the sequence of shots ahead of time.

Jump Cuts. Without sequential thinking, one of the problems you may encounter is a **jump cut,** an unnatural transition showing an abrupt change in the subject's location or appearance. Imagine a sequence beginning with a wide shot of a woman wearing a hat and preparing to sit down in a chair. The shot includes the entire body of the standing talent with a full view of the chair beside her. The next shot shows a close-up of the subject already sitting, no longer wearing the hat (see Figure 11.3). This sequence constitutes a jump cut because the viewer never sees the subject sit down or remove the hat.

Jump cuts are jarring to viewers because they telegraph the message that the viewer has missed part of the action. Jump cuts ruin the sense of continuity and smoothness. On special occasions, that may be just what the director wants, but usually jump cuts should be avoided.

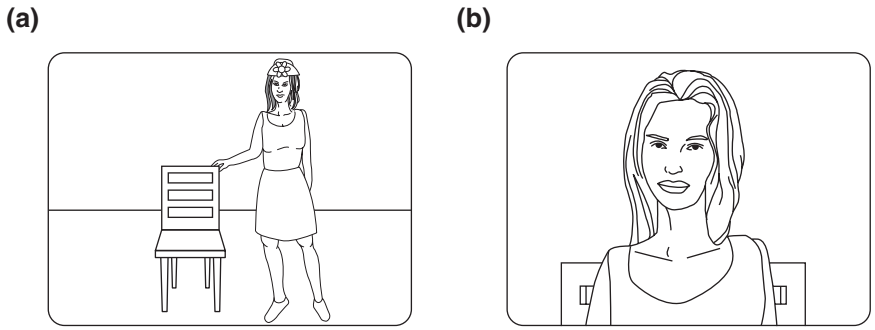

Figure 11.3 A jump cut. The transition from (a) to (b) involves a sudden "jump" because we never see the person sitting down or taking off her hat.

The way to avoid them is to shoot **overlapping action.** This means reshooting the same action again from a new camera position. For example, after shooting the move to the chair while in the wide shot, bring the camera in for the close-up, and then ask the talent to repeat the action of sitting down and removing the hat. Then match action in the editing suite by picking the frames in the medium shot and close-up that are most alike and edit them together.

Of course, in news coverage, it is not always possible to control actions to obtain overlapping footage. Some news groups prohibit **staging,** defined strictly as any act performed specifically for the camera. A more liberal definition permits having subjects repeat actions for the camera as long as those actions would normally have occurred in the absence of the camera. Depending on your news outlet's policy, if a repeating action is the subject of a story you are shooting, and you need several versions of it from different angles, you may have to wait until it comes around again to get overlapping footage. Or, if you are covering a unique event not likely to be repeated, such as a building demolition, and you wish to record it from more than one angle, you will have to shoot it simultaneously with several cameras.

Cutting on Action. To maintain smooth flow of motion, it is also best to **cut on action.** Think again about our example of the woman sitting down on a chair. Just as she is about to settle into the chair, you could cut to the close-up from the new camera position, capturing the subject an instant before she makes contact. Cutting on action results in smoother transitions because the viewer is more involved with following the action than with the edit itself or the camera's new position.

Cut-Ins or Inserts. After using an establishing shot to set the scene, it's a good idea to feature close-ups that carry forward the main action of a story. The **cut-in** or **insert** is a close-up that captures a key moment of visual business to drive home a story's main point.

Code of Broadcast News Ethics

To help deal with issues of staging and other ethical concerns, the Radio-Television News Directors Association has developed a Code of Broadcast News Ethics (see Walters, 1988, pp. 590–591), reproduced below.

The responsibility of radio and television journalists is to gather and report information of importance and interest to the public accurately, honestly, and impartially.

The members of the Radio-Television News Directors Association accept these standards and will:

1) Strive to present the source or nature of broadcast news material in a way that is balanced, accurate and fair.
   a. They will evaluate information solely on its merits as news, rejecting sensationalism or misleading emphasis in any form.
   b. They will guard against using audio or video material in a way that deceives the audience.
   c. They will not mislead the public by presenting as spontaneous news any material which is staged or rehearsed.
   d. They will identify people by race, creed, nationality, or prior status only when it is relevant.
   e. They will clearly label opinion and commentary.
   f. They will promptly acknowledge and correct errors.
2) Strive to conduct themselves in a manner that protects them from conflicts of interest, real or perceived. They will decline gifts or favors which would influence or appear to influence their judgments.
3) Respect the dignity, privacy, and well-being of people with whom they deal.
4) Recognize the need to protect confidential sources. They will promise confidentiality only with the intention of keeping that promise.
5) Respect everyone's right to a fair trial.
6) Broadcast the private transmissions of other broadcasters only with permission.
7) Actively encourage observance of this Code by all journalists, whether members of the Radio-Television News Directors Association or not.

Imagine you are covering an airport reunion of a soldier with his family after a long tour of duty (see Figure 11.4). You may start with a wide shot of the terminal, followed by a medium shot of a specific waiting area. Perhaps the camera then captures a group shot of his anxious family as the arrival is announced, closing on his daughter playing with a rag doll. When he arrives at the gate, you carry a two-shot of the first hug between the soldier and his daughter. At this point, you *insert* (or *cut-in*)

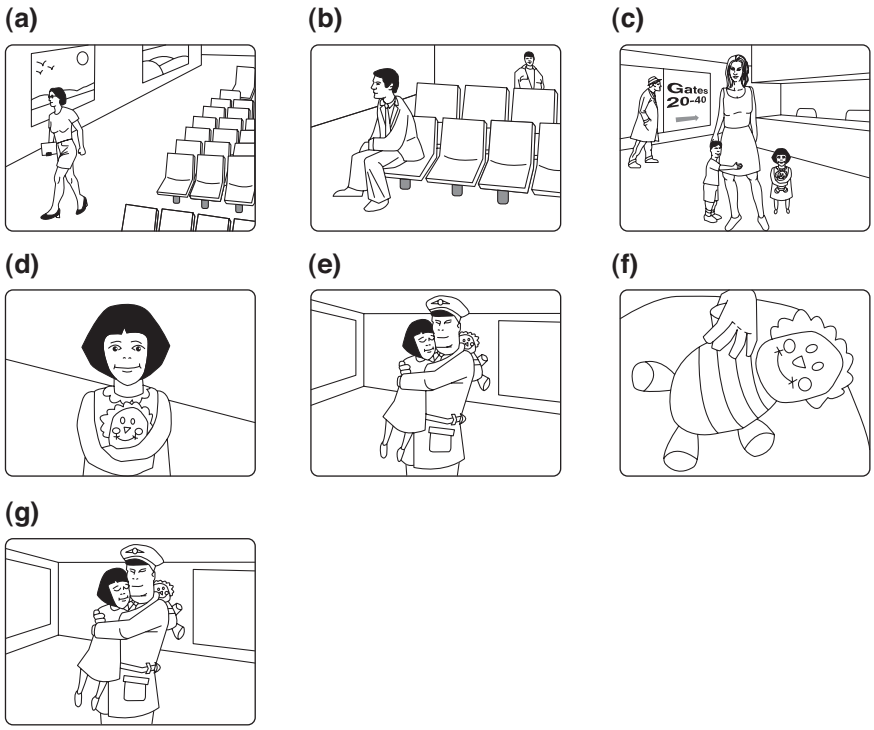

Figure 11.4 A shot sequence illustrating a cut-in or insert. (a) Start with a wide shot of an airline terminal. (b) Trim to a medium shot of a specific waiting area. (c) A family waits in an airport terminal for a soldier returning from duty. (d) Close-up of the daughter playing with a rag doll. (e) As the soldier arrives, a two-shot of the first hug between the soldier and the daughter. (f) Insert of a brief close-up on the doll. (g) Return to the two-shot of the hug.

a brief close-up of the rag doll carelessly slung behind the soldier's back to symbolize the child's joy in reuniting with her father. Then you cut back to the two-shot once again. If the story is carried forward to the next tour of duty, a cut-in of the departing soldier might include a close-up of the soldier's hands snapping a suitcase shut.

Cutaways. Cutaways are shots that lead the viewer's attention away from the main scene, often to related action outside of it. Cutaways provide bridges or transitions to subsequent scenes. For example, after the shot of the soldier and his daughter hugging, a cutaway might be a shot of a smiling flight attendant watching the action from nearby. In the subsequent part of the story, when the subject is getting ready to leave on another tour of duty, after the cut-in of his hands snapping shut the luggage, a cutaway shot might show his wife phoning the neighbor who will drive him to the airport.

Cutaways such as these, which relate closely to the story content, are sometimes called *motivated* cutaways. By contrast, *unmotivated* cutaways feature more neutral content. In general, motivated cutaways are more interesting than unmotivated ones. But even unmotivated cutaways can provide transition to the next scene. A simple example of an unmotivated cutaway used for transition is a wide exterior shot of a building where the next scene is to take place.

In addition to supplying transition, both cut-ins and cutaways do several things: They add pertinent visual information, they drive the story forward, and they compress time. Furthermore, from an editing perspective, cutaways provide a way to hide jump cuts. For example, cutaways can be used to connect interview segments that may have been recorded at different times.

The Reverse-Angle Shot. One of the most common cutaways is the **reverse-angle shot.** In a single-camera shoot of an interview, for example, the camera may be set up to capture a shot of the subject over the shoulder of the interviewer. From this position, the camera can zoom past the interviewer to feature a one-shot close-up of the subject. When the interview is done, for editing purposes, it is often helpful to shoot additional footage of the interviewer from the opposite perspective, or reverse angle—that is, from behind the subject (see Photo 11.3). From this position, you can zoom past the subject's shoulder to get a one-shot close-up of the interviewer, either pretending to listen to the subject's answers or repeating the questions as they were asked during the actual interview. In editing, these reverse-angle shots can be used to provide smooth transitions between different portions of the interview. They give the editor the flexibility to arrange responses in a different sequence, if desired, and to eliminate portions of the interview that may not be wanted. Of course, from an ethical standpoint, you should ensure that the views of the subject are not misrepresented; journalistic accuracy should be a constant concern.

Directional Continuity. Nothing confuses an audience more than watching footage of subject movement that illogically changes direction from shot to shot. The most common examples of this shoddy production practice are in covering horse races or parades. The action moves across the screen in one direction, followed immediately by footage of the same subject inexplicably moving in the opposite direction (see Figure 11.5). To eliminate such *false reversals,* as they are called, follow the axis-of-action rule.

According to the **axis-of-action rule,** you should establish an imaginary line (also called the *180-degree line*) along which the main action flows and *keep the camera on the same side of the line for all shots.* If you are shooting a parade with marchers moving from left to right in your viewfinder, the axis of action is parallel to the plane of your camera lens. You can move the camera to a new position as long as you do not cross that line (see Figure 11.5). Similarly, in an interview,

(a)

(b)

Photo 11.3 Sequence illustrating a reverse-angle shot in an interview. (a) Shot of the subject over the interviewer's shoulder. (b) Reverse-angle shot of the interviewer from behind the subject.

the axis of action may be thought of as the imaginary line connecting the subject and the interviewer's mouths. To avoid awkward pictures when shooting over-the-shoulder shots and reverse-angle shots, keep the camera on the same side of that line.

Of course, sometimes it is not possible to restrict all camera shots to the same side of the axis of action. What happens, in our parade example, if the police make you move to the other side of the street? In such cases, there are several ways to soften transitions between shots that change direction. One is to inject an intermediate shot (a cut-in or cutaway) that distracts the viewer and softens the change in direction. Handy cut-ins are the **head-on shot** and the **tail-away shot,** which, in

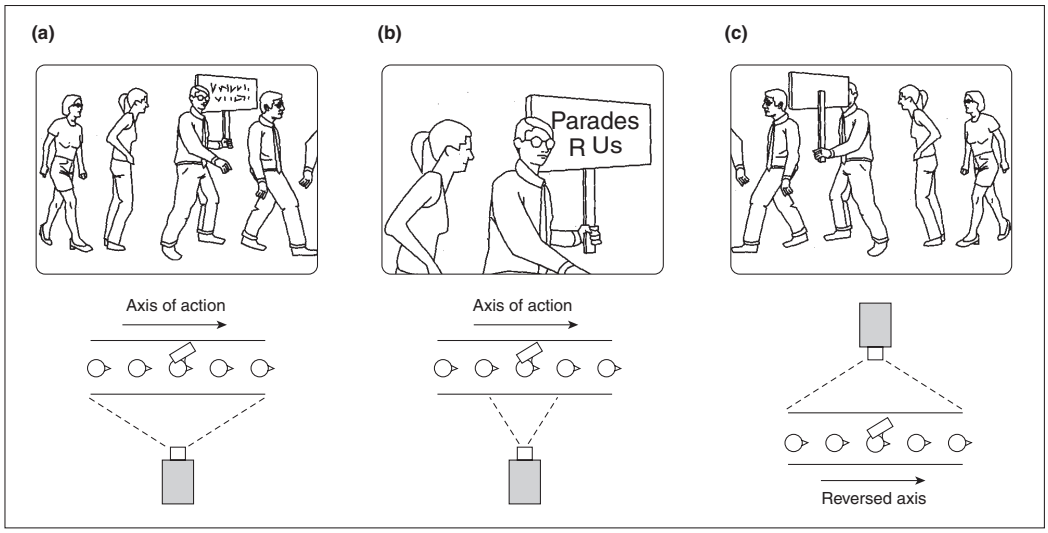

Figure 11.5 Sequence illustrating the axis-of-action rule. To cut from the wide shot in (a) to the close-up in (b) is fine because the axis of action has not been crossed. To cut from (b) to (c), however, would be a false reversal; the subjects would seem to have changed direction when they have not.

the parade example, are shots of the parade group either approaching or moving away from the camera, respectively (see Figure 11.6).

Another remedy is to take the viewer along for the ride. For example, in the case of a horse race, when the horses round the turn (thus changing direction), you may be able to follow them with a high-angle shot so the audience sees the change happen and accepts it readily.

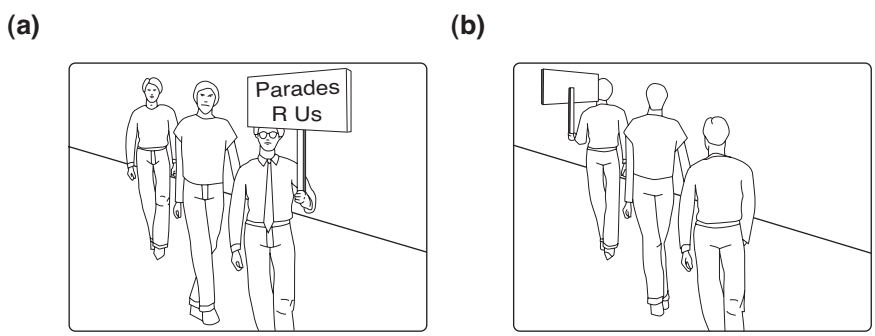

Figure 11.6 Shots that can help smooth out a transition involving a change of direction. (a) A head-on shot. (b) A tail-away shot.

Matching Camera Angles. The ENG camera operator must be sharply aware of the need to match camera angles when shooting segments that will be cut together later. Matching camera angles means following the line of action between two related shots so that when they are edited together, they appear consistent. For example, if you shoot a basketball player being interviewed by a shorter reporter, it is important to match the shot of the player with the reverse-angle shot of the reporter. If the camera angle on the subject is low, making the shot appear as if the interviewer is looking up at the subject, the reverse angle of the interviewer should be high to roughly the same degree, so that the subject appears to be looking down at the interviewer along the same axis (see Figure 11.7). If such consistency is lost, segments cut together can look jarring to viewers.

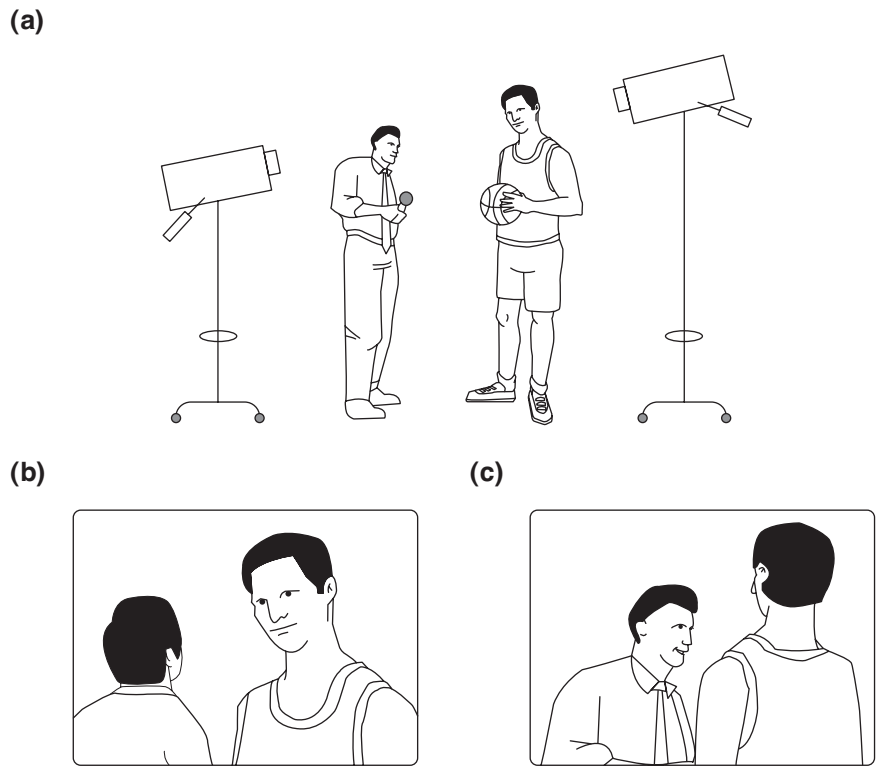

Figure 11.7 Matching camera angles. (a) Positioning of two cameras to capture a standup interview between a reporter and a taller basketball player. Note that one camera is pedded high, the other much lower. (b) The over-the-shoulder (OS) shot of the player being interviewed. (c) The reverse-angle shot of the reporter, which is angled down to the same degree that the player's shot is angled up.

Panning the Camera. Rough and unmotivated camera panning irritates viewers. Excessive panning takes attention away from the focus of your story and leads to dizziness when done in the extreme. In general, the rule is as follows: *Pan the camera to follow movement.* It is rarely justified to pan on a static scene. It is especially annoying to pan back and forth as if you were painting a fence. *Without question, 'tis better not to pan at all than to pan badly.* For more specific guidelines, check the list of Professional Pointers.

Panning the Camera in Field Production

- Avoid shaky, uneven movement. Work with a tripod whenever possible. If the camera is handheld, use your body as if it were a tripod, keeping your elbows tightly at your sides and your feet spread slightly wider than normal for added stability. To smooth out your panning motion, practice!
- Begin your pans by placing your feet in the position your body will be at the end of the pan, and twist your body to bring the camera to the beginning point. Then, when the shot begins, slowly untwist your body along with the action you wish to cover (see Figure 11.8).
- To increase steadiness, lean on a steady object such as a tree or car roof. You can even sit down.
- Slow down. No matter how slowly you think you are panning, it will always appear faster than you thought. Therefore, whenever you can, make the pan even slower than you think you need.
- Work at making the panning motion truly horizontal. If pans of the camera must leave the horizontal (as in following a plane taking off), keep the subject matter oriented in roughly the same portion of the screen space throughout the pan.
- Begin and end panning shots with static footage of the subject. This static footage will give the audience a chance to grasp the subject matter in the frame and to recover from the motion before a new shot or scene begins. It is jarring to the audience to cut from a still shot to a panning shot of different subject matter and vice versa.
- When possible, allow the subject to enter the frame before you pan to follow the action. This is known as anticipation. Likewise, when you finish covering an action, it is perfectly acceptable to steady the camera and let the subject exit the frame. Editors love this because it gives them a natural edit point for creating neat transitions between sequences. This approach is possible even when subject motion cannot be controlled, as in an airplane takeoff.
- Build your pans. Let the high point of subject action occur as the subject fills the screen. To do this, for example, you might position the camera at the finish line of a race. Also, begin covering action at a sharp angle to the subject rather than at a right angle. This gives viewers a chance to recognize the subject and orient their attention.

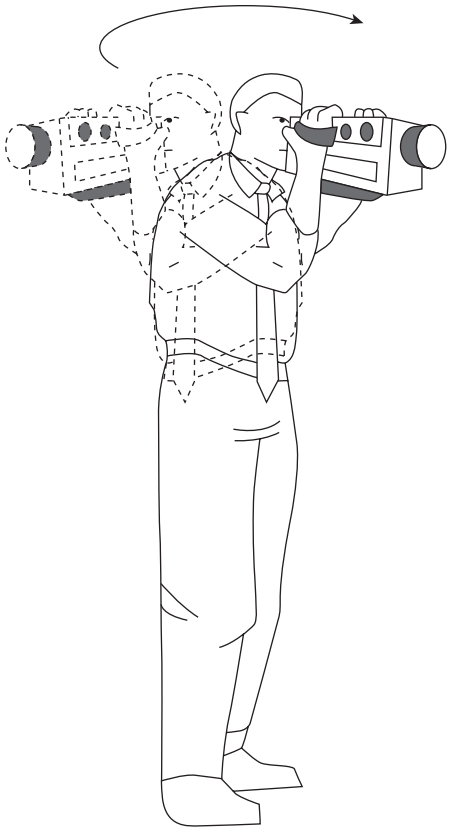

Figure 11.8 To pan a field camera with minimal jerkiness, start with your body straight, feet spread, elbows close to your sides, and the camera in the position it should be at the end of the pan. Then twist your body to move the camera to the starting position. To accomplish the pan, slowly untwist yourself.

Safety First. For all camera work in the field, if you bring the camera close to the action, train yourself to shoot with both eyes open. For example, if you are stationed on the sideline of a football game, use one eye to monitor the viewfinder and the other to watch the area around you. This way you can anticipate where to shoot next, but more important, you will be better able to tell when a 300-pound defensive tackle is about to crash into your camera.

ENG in Extreme Weather. Cold, wet, and windy weather conditions are a challenge to the ENG field crew. Covering major storms, hurricanes, tornadoes, and floods therefore requires special planning. If everyone has evacuated a dangerous weather zone, and you are assigned to cover the impending storm and its aftermath, you will need to adapt to extreme conditions while keeping yourself and your equipment safe. A good first principle is the following: *Use common sense, and don't be a hero.* Walking through a 3-foot-deep puddle in semi-darkness to get a key shot may not be a good idea if your next step is onto a hidden power line.

If the power is out, you will have to function without conventional electricity. You may also have to do without access to food or water for several days. Under such conditions, the ENG shoot soon begins to resemble a rustic camping trip or even a military operation. Plan accordingly. In addition to food and several changes of warm clothing, pack enough blankets, pillows, towels, and toiletries for several days. Depending on the area you are in, a snakebite kit may be a useful addition to standard first aid supplies. Flashlights and extra batteries are always useful. In addition to your cell phone, a multiband radio (battery powered) that can receive weather channels is also an obvious asset.

As for equipment, the main objective is to *keep it dry.* In addition to the raincoats already mentioned, additional waterproof barriers are invaluable. Plastic waterproof storage containers for tapes and batteries (and food) will keep them dry until you get back to the station.

When shooting in rain and wind, put the wind at your back to keep water off the lens. Keep soft dry towels handy to wipe the lens if necessary. If gale forces get too rough, shoot from inside the van for stability. Again, don't be a hero if the wind starts tossing street signs around as if they were Tinkertoys—at that point, you may have already gotten enough storm footage to permit you to retreat to a safe zone. A shelter is a good place to shoot additional storm footage and an even better place to begin shooting aftermath segments by interviewing people who are waiting out the storm. The human interest segment of the story can begin or continue there.

In extreme cold, keep camera batteries warm to extend their usefulness. Low temperatures can cut battery life to less than half. Store them under your clothes, next to your skin, to keep them warm until right before you use them. If available, use the electrical generator in your van to recharge them.

Going from a cold to a warm environment can promote condensation, which can paralyze mechanical parts of equipment. Some recorders have sensors that shut them off when the moisture level gets too high. If this happens, you simply need to wait until the machine dries out. Moisture can also be murder on flash cards and other digital equipment components.

Your job does not end when the storm ends. You still must shoot dramatic exterior aftermath footage to illustrate the storm's effects. Then you must get the story back to the station. If power is out, or if you are out of range of a microwave link, you will need an alternative method of reaching the station with your story. Some field crews arrange to feed video from local television stations—even competing ones.

Live ENG Communication Systems. As we saw in the earlier examples (i.e., the golf tournament), various communication systems are used to coordinate live field productions. These systems are best understood in terms of how their reach, range, and interactivity aspects connect different groups of relevant parties. The most

obvious receivers of live video from the field are the end-users—namely, audiences, who see broadcast or cable feeds as part of regularly scheduled programming and special reports. However, earlier in the process, various production personnel exchange messages to help them produce and deliver finished programs. These include producers, directors, reporters, and crew members in the field, as well as directors, news anchors, and others at home bases that are often out of direct earshot and line of sight of one another.

Table 11.2 describes some of the communication devices used to connect relevant parties to one another, and Figure 11.9 diagrams the connections they establish. Without these systems, the smooth delivery of field coverage would be impossible. When working, these systems are invisible to the end-user. However, when breakdowns occur during live transmissions, such failures quickly become apparent to viewers in the way the end-product looks—viewers experience dead air, mismatches between audio and video, uncoordinated or missed coverage of key moments, embarrassing cutaways with apologies, and so forth. It is therefore little wonder that good field producers are committed to building redundancy into their communication systems to avoid catastrophe. Though these systems are especially important in live shoots, they are also used in many taped productions.

The double-headed arrows in Figure 11.9 indicate real-time interactive (that is, two-way) communication between relevant parties with a given communication system (voice, video, or data). The single-headed arrows indicate one-way message flow between parties. For example, the cell connecting off-air home base directors with on-camera field reporters contains an IFB entry because directors at the home base use IFBs to talk to on-air talent in the field. This link has a single-headed arrow because field reporters can hear messages from the directors but cannot use the IFBs to talk back to home base personnel. However, field reporters can send voice messages to home base personnel via the audio portion of the video signal. Hence, it is through two separate channels (therefore some redundancy) that interactive voice communication is established between these two relevant parties. If one of the two channels is lost, some communication is still maintained, a comfort to the field producer when Murphy's law kicks in.

Tape Logs. Much ENG-style raw footage is composed of interview segments, cover shots, cutaways and reverse-angle material, event coverage (also called *actuality* footage), and *standups* (direct-to-camera shots of the field reporter talking). Therefore, editing is often required to complete the program. Since time is of the essence in news, it is best to be poised for the postproduction editing from the start. For recorded segments, this means creating an accurate log of each recording as it is being shot, if possible, or shortly thereafter. The log should identify each clip in order, including its length in minutes and seconds, with SMPTE time

Table 11.2 Communication Devices for Field Production

Walkie-talkies	Establish voice contact among crew members who are out of earshot and/or line of sight with one another
Scanners	Permit news crews in the field to monitor police and fire department activities
Cell phones, two-way radios	Connect members of field crews and home bases with one another
Headset intercoms	Link field director and crew members
IFBs (interruptible foldback circuits)	Allow directors and other personnel to talk to on-air talent through an earpiece worn by the talent during a live telecast. The IFB system is commonly called a program interrupt (PI).
Video line monitors	Enable field personnel (both on and off camera) to see and hear a live feed of the program being transmitted from the home base
Battery-powered televisions	Serve the same function as line monitors
Camera-cable and wireless private lines (PLs)	Allow remote truck personnel and production crews to communicate with one another, as well as with other remote control rooms and home bases during all production phases
Pagers (beepers)	Provide data communications via radio transmission to alert personnel to contact someone
Megaphones	Enable field directors to communicate with nearby crew in the field during preproduction phases

code information if available. These accounting procedures are an invaluable aid to the postproduction process.

The ENG Postproduction Stage

Once production is complete, you will need to strike all of the equipment quickly, efficiently, and safely before moving on to the next location. You may wish to hold a postproduction meeting (a *debriefing*) to discover ways of doing better the next time. Usually the producer, director, technical manager, and assistant director meet to discuss any problems that were encountered. Sometimes, the technical manager's job includes feeding a daily "trouble report" to the home base. Besides helping to solve problems, the debriefing should build morale among the crew.

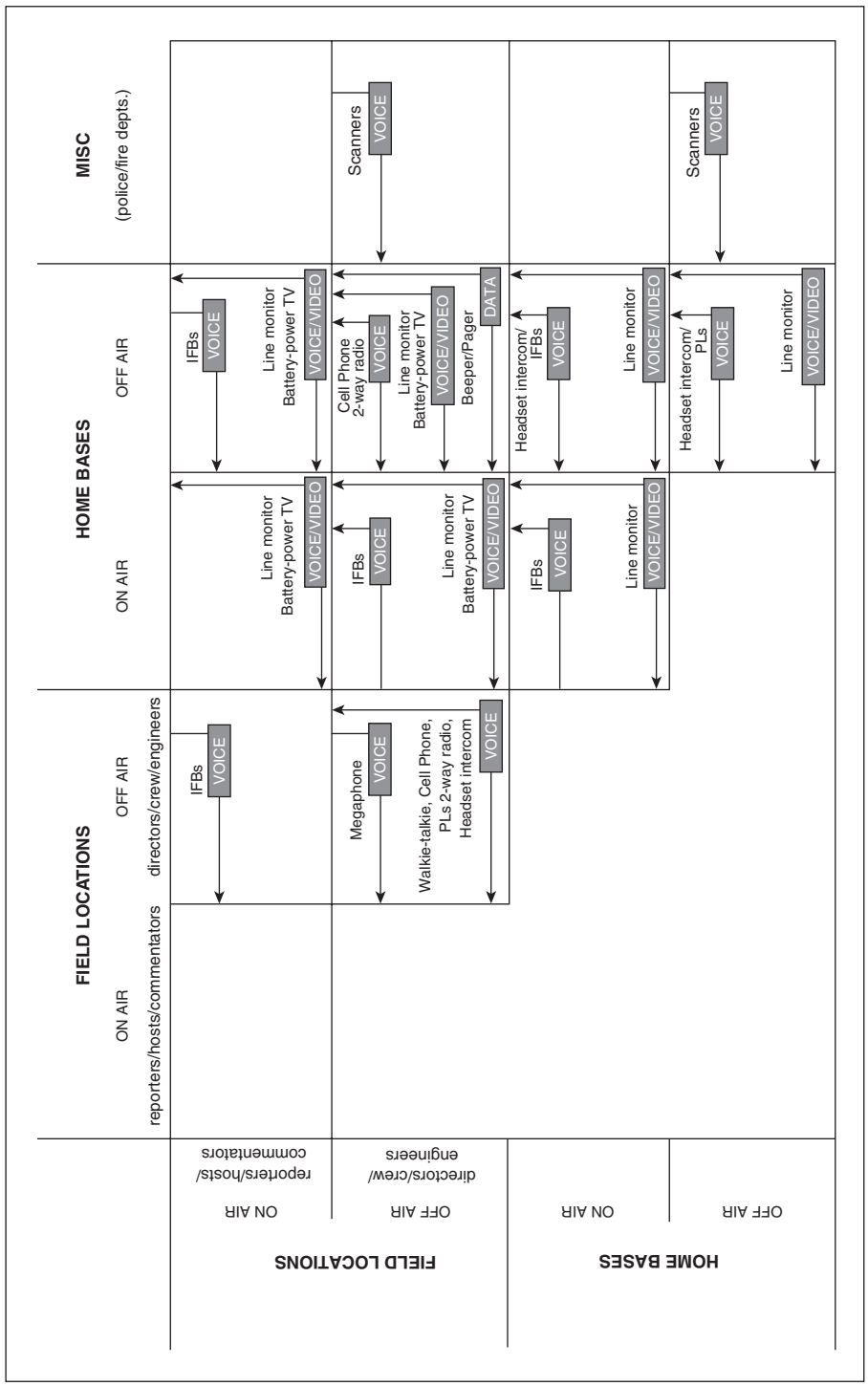

Figure 11.9 ENG communication systems. The diagram shows how selected communication devices establish links, either one-way (single-headed arrows) or two-way (double-headed arrows), between field locations and home bases.

Other postproduction chores include thanking all of the personnel in the field. In addition to the crew, others deserving of thanks (either in person, by phone, or by letter) include all support personnel and contacts that helped you set up and execute the shoot. It is not only the polite thing to do but wise also because the people you have just worked with may work with you again in the future.

Finally, for recorded material, the editing can begin, a process that we discuss in detail in the next chapter. If you have created an accurate log of each clip, the editing process will be greatly simplified.

ELECTRONIC FIELD PRODUCTION

Even stories that begin as breaking news can evolve into a different kind of field production. On the morning of the 9/11 attacks, viewers worldwide saw many shaky pictures of the Twin Towers' collapse and destruction of surrounding buildings shot from traffic helicopters. Later, however, much of the aftermath coverage was not nearly so spontaneous or rough in terms of production values. News crews camped for weeks, filing daily stories from lower Manhattan and Washington, D.C., locations. In the following months, reporters presented more carefully crafted feature stories for later broadcast. For example, later stories integrated retrospectives of events leading up to the attacks with interviews of friends and family members of the victims, as well as formal coverage of memorial services led by the mayor, and police and fire department officials.

For such stories, a more filmic approach is often taken, using a single camera with multiple setups. In particular, greater care may given to such production values as talent rehearsals, camera and subject placement, blocking, lighting, sound, continuity, scriptwriting, and editing. Roughly speaking, the shift away from spontaneity and rough production values to more planning and higher production values distinguishes ENG from what has come to be known as **electronic field production (EFP).**

Because of the advance-planning aspect of EFP, shoots can be better designed and more leisurely in their execution than ENG shoots. More sophisticated equipment is used. All in all, EFP aesthetics often match or exceed what is done in the studio. In this chapter, EFP refers to recorded single-camera production done in nonstudio locales. The multicamera remote (MCR), both live and on tape, is discussed later.

The types of programs produced using EFP techniques range from simple interviews done in people's offices to complex presentations shot in numerous locations. Commercials, corporate meetings, magazine programs, videos (instructional, educational, and industrial), promotional and public relations campaigns,

even feature documentaries—all these may employ EFP techniques. They may feature almost no postproduction work, or they may use a wide variety of editing and sweetening techniques.

The EFP Mobile Unit and Equipment

The EFP mobile unit and equipment resemble that of the ENG operation with some notable exceptions. For example, since there is no need for a live feed from the field, the EFP mobile unit dispenses with microwave and satellite transmission hardware. Instead, the surface of the van's roof can be used as a camera platform to get high-angle shots. Without the transmission hardware, more room is available for additional camera, recording, lighting, and audio equipment. Of course, the well-equipped van has customized storage rigs to store and secure all equipment during transport. AC power connections and an electric generator that runs on diesel fuel are added advantages.

Cameras. Cameras for EFP can be higher-end models for added picture quality, with tripods and shoulder-mount accessories to match. Additional equipment can include an array of lenses and filters; a jib for high, sweeping camera movements; a portable dolly; and tracking equipment for sophisticated camera movements on the ground.

Higher-quality EFP productions currently tend to use Betacam cameras, with Betacam SP, Digi-Beta, or DVC-Pro-25 or -50. However, some work is still done using S-VHS, mini-DV, and even Hi-8 technology, though the latter two are often limited to in-house corporate and educational (closed-circuit) settings. The latest technology to gain prominence is the high-definition (HD) format. All these formats can run on batteries. However, it is always better to use AC power when available.

Lighting and Filters. Depending on the nature of the shoot, EFP lighting equipment can be as sophisticated as that found in a fully equipped studio. In fact, if the shoot takes place outdoors, the equipment can go beyond what is needed in the studio environment.

Filters are particularly important for EFP. Video cameras are made to operate without the need for color correcting under lighting with color temperatures in the 3,200 K range (as produced by tungsten-halogen lights). Under all other conditions, some filtering is necessary to maintain proper color. Table 11.3 lists the most common filters used to match color temperatures with lighting conditions you are likely to encounter on field shoots, including camera-mounted filters (mounted either behind or over the camera lens), light-mounted filters (mounted or clamped

Table 11.3 Common EFP Filters

Type of Filter	*Function*
Camera-mounted filters	
Neutral density	To reduce the quantity of light entering the camera. Reduced exposure permits the use of wider lens apertures, thus cutting depth of field.
Fluorescent	Correct for the greenish cast of fluorescent lighting, bringing it to 3,200 K. FLB filters correct for fluorescent lights with color temperatures of 4,500 K. FLD filters correct for "daylight" fluorescent lighting in the 6,500 K range.
Amber	Correct sunlight to 3,200 K. Also correct artificial light in the range of 5,600 K (HMIs) to 3,200 K.
Light-mounted filters	
Dichroic	Correct quartz-halogen light from 3,200 K to the 5,600 K range to make it compatible with sunlight.
Window-mounted filters	
Amber filter sheets	Correct incoming sunlight to 3,200 K range.

in front of the lighting instrument itself), and window-mounted filters (mounted on windows to correct to 3,200 K the color temperature of sunlight entering the production area).

Besides controlling the color temperature, filters also allow you to control the amount of light entering the camera. By controlling the light level, you can vary the aperture size you wish to use, thus making it possible to control depth of field. When filters are used to limit the amount of light entering the lens, a **filter factor** may be used to determine the amount of light lost because of filtering. For example, a filter factor of 2 cuts the amount of light entering the lens in half, which is the same amount that would be cut by reducing the lens aperture by one full f/stop. Using filters with known filter factors, you can control exposure levels and thereby control depth of field, even under extremely bright conditions. For example, using a neutral-density filter with a filter factor of 4, you can shoot at a lens aperture two f/stops wider than would be possible with no filter, resulting in shallower depth of field. For filters used in combination, remember to multiply filter factors to determine how many f/stops you have jumped.

Audio. The audio needs of an EFP production can go beyond the simple arrangements of the typical ENG shoot. In addition to those needs already outlined for ENG, you may need to include booms, wireless mics with RF transmitters, fishpoles, and shotgun mics. It is also common to use audio mixing boards with headsets for riding the gain during EFP productions. Furthermore, if audio foldback or playback is wanted, you will need to bring portable speakers and recorders. Of course, you must also supply enough cable to hook everything up, as well as gaffer's tape for securing cables.

The EFP Preproduction Stage

Perhaps one of the biggest differences between ENG and EFP shoots is the preproduction phase. The EFP crew has the luxury of scouting locations and planning all phases of the production before any shooting begins.

An EFP site survey should answer a wide range of questions, including the following: What is the site like? Can we get a location sketch? Is it indoors or outdoors or both? If outdoors, where is the sun? How will that affect the shots we need to get? How will time of day affect the nature of light during each shooting day? Is it always this quiet? Is the ebb and flow of people through this area uniform? It is always an advantage to do the site survey close to the day the shoot will begin to simulate the conditions as accurately as possible. If the site survey takes place 3 months in advance, much may have changed by the time the shoot occurs.

As for equipment concerns, the following questions are important: Where are our camera locations? What audio and lighting equipment are needed? Is there sufficient electrical power? Do all the outlets actually work? Which cable runs are shortest? Does that door open all the way? How and when can we gain access to the site?

In terms of scheduling, ask the following: What are the shooting dates? Can we get everything we need in the allotted time? What do we do if bad weather (or another problem) throws off our schedule? What kind of cooperation will we get from the jurisdiction or the property owner for additional use of space and facilities?

Practical issues also need to be worked out: Is parking available? Lodging? Food? Bathroom facilities? Telephones? Who pays for all that? Do we have the necessary security and insurance coverage to ensure that our equipment will be properly cared for and protected from damage and theft?

Finally, in terms of legal issues, ask what contracts, permits, clearances, and release forms are needed, and then plan accordingly. These and countless other questions should be answered during the preproduction phase of the EFP shoot.

As for voice communications among the crew, the EFP operation can make good use of cell and car phones for coordinating activities among crew members

who may be arriving in separate vehicles. Once on location, crew members can communicate with one another with walkie-talkies. Battery-powered megaphones are also useful during rehearsals. Pagers, headset intercoms, and private lines may also become important during different phases of the production process.

The EFP Production Stage

An EFP shoot can mix all of the challenges of studio production with all of the unknowns of the field. Because of the varied types of programs that are handled in EFP, it is impossible to specify all the production situations you will encounter. However, it is possible to describe some of the more common production considerations for several leading program genres.

Meetings and News Conferences. Government hearings, news conferences, and similar indoor gatherings present unique problems. The subjects you are there to cover may be quite expert in their professional fields, but they may lack on-air experience and may not appreciate your production needs. On the other hand, if they are poorly covered, their insights may be lost. It is your job to keep this from happening.

More specifically, the subject may wander from a fixed microphone position, causing you to lose key audio. Or the subject may refer to graphic materials that are simply not air quality, such as thinly lettered charts on white reflective cards. Speakers may sweat profusely under hot lights after refusing to wear makeup. Or they may forget they have promised to stay in the lighted area for proper video coverage. They may turn away from the camera altogether.

As for the area where the coverage is to take place, it may be inadequately lit and lack adequate electrical outlets. The room may be too large to be lit well with the instruments you have. There may be room set aside for chairs to accommodate audience members but little or no space for cameras and lights. The room's decor—busy backgrounds, for example—may present extra problems for video coverage. The room may be echoey and boomy because of hard wall surfaces. The audience may be noisy. Other sounds from plumbing and nearby traffic may present additional audio problems.

Furthermore, audience participation in, say, a question-and-answer period during or after speakers' presentations may require lighting in two directions, presenting the possibility of glare problems. To solve such problems, it may be necessary to find alternate camera positions. Moreover, you will need to decide how speeches by audience members will be captured. You can hang an area mic over the group if it is small, but if that is not feasible, you may need to use a fish-pole mic carried by a production assistant. Another alternative is to use a mic stand

for audience members to step up to when they ask questions. Or you can have someone at the speaker's podium field questions and then repeat them to obtain adequate audio coverage.

For all of these potential problems, preproduction planning is critical, but you will also need to arrive early at the site to begin working on problems that crop up at the last minute. If graphics are going to be used, try to prepare air-quality versions of them in advance. To integrate materials into the program, get a sequence of the events or discussion topics in advance and ask the on-air presenters to inform you of any significant changes.

Documentary and Magazine Features. Feature stories for television are infinitely varied in terms of content. Material can range from an exposé on police corruption to a soft piece concerning the latest grooming trends at a dog show. Length can also vary, from a 1-minute segment designed to fit into a larger show to an hour-long format. Regardless of the topic or length, here are some things to keep in mind to make the production run smoothly:

- Conduct a site survey and preinterview with all key personnel—clients, on-air talent, production staff, field contacts—before the first day of shooting.

- Finalize the script to reflect the approach you will be taking. Get it approved in advance by the client. Make sure it is understood by both talent and crew.

- Note the running time for each segment, and be careful to log each one for later editing. Label boxes, tapes, and disks so as not to confuse them with others you may be using. As with ENG operations, adjust the "record" tab from the back of finished tapes so they don't accidentally get recorded over at later shoots.

- Make a quick on-site review of each segment to be sure you have air-quality program material for each. This means reviewing a bit of every segment to ensure you have in fact gotten the clips you think you have gotten. Monitor the audio also to confirm that sound was successfully recorded.

- If you need to reshoot segments, be careful not to "burn out" your talent with too many retakes. There comes a time when you must decide that a certain level of performance is all you are going to get from someone. If possible, show the client the footage at a private meeting and offer your professional opinion. That is in part what you are being paid for.

- Don't forget to shoot transitional material for later editing, including master and establishing shots, close-ups, reverse angles, and cutaways. Record ambient sound also, for later editing.

- Check footage you have collected against a checklist to make certain you have indeed gotten the things you need.
- If you need to return for more shooting at a later date, take snapshots of the sets and costumes, if any, so that these can be replicated the next time. Similarly, if shooting outdoors, note the time of day and the weather conditions so that later shoots can match lighting conditions.

The EFP Postproduction Stage

At the conclusion of the production, your editing task may include additional audio and video sweetening, such as adding titles, credits, graphics, music, narration, and sound effects. However, the editing task is not the only postproduction concern. There may be promotional chores for getting the finished piece exhibited.

As with ENG operations, thank everyone involved. Finally, hold a debriefing meeting with the crew and other staff members to iron out problems that came up so that you can improve your future performance.

MULTICAMERA REMOTE PRODUCTION

Multicamera remote (MCR) production is, as the name implies, a production process done in nonstudio locations that uses more than one camera at the same time, permitting the director to cut between cameras exactly as is done in a conventional studio operation. Everything that can be done in a conventional studio can be done in an MCR operation. A mobile truck serves as the control room. Using ENG-type transmission facilities and intercom systems, the MCR operation delivers coverage to a home base for transmission to virtually any audience, potentially worldwide. Multicamera remote productions include live coverage of the Olympics and other sporting events, such as professional baseball and football and NCAA college basketball. MCR techniques are also used for political conventions, concerts, theatrical events, and major awards ceremonies.

Like EFP productions, MCR operations sometimes cover events staged primarily for television, making it possible to produce supporting material ahead of time. In these cases, event coverage can be integrated with prepared segments, feature stories, biographies, and interviews (*backgrounders*). Coverage is often carefully timed to accommodate cutaways for commercials and promotional announcements.

The MCR Mobile Unit and Equipment

In addition to using all the equipment already described for ENG and EFP operations, the MCR expands its arsenal to include banks of monitors and a production switcher.

In short, at the high end, all of the control room hardware found in the most advanced studio facilities is available. Some high-end units (trailer trucks over 40 feet long) even contain *more* equipment than is found in most studios (see Photo 11.4).

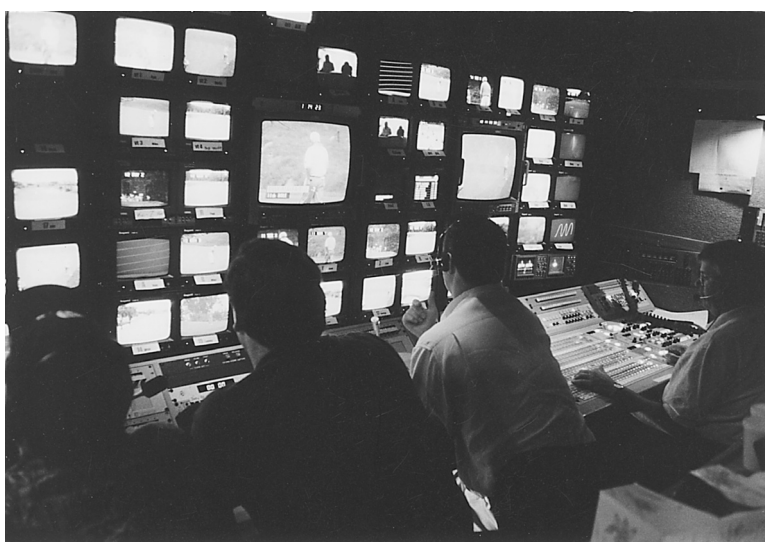

Photo 11.4 MCR facilities used at the Kemper Open golf tournament. These 46-foot MCR trailer trucks contain technical, maintenance, production, and transmission facilities.

For example, for units covering major sports, in addition to sophisticated transmission facilities, camera control hardware, character generators, still store machines, and a separate audio console, there are also a number of slow-motion replay recorders and laser disk machines. Power requirements for such facilities can easily exceed the load limitations of generators. For this reason, power needs may be supplemented with outside connections from local utility companies.

The MCR Preproduction Stage

The same concerns outlined in the preproduction phase of EFP operations are relevant to the MCR operation. In addition, the MCR preproduction phase should also be concerned with the following:

1. Since you will likely not rely solely on your own power and communications lines for service needs, be sure to establish reliable contacts for electricians, telephone company personnel, and any other maintenance services. During the site survey, power needs should be clearly established, and a decision should be made to go with either all generator-supplied power or all land-supplied power to eliminate phasing and grounding problems caused by two different sources.
2. Parking for the mobile vehicle may require special permissions from the local authorities. To ensure access to the remote site, arrange to get permits or reservations for entrance and parking.
3. Review the paperwork generated from the site survey ahead of time to establish the best location(s) for the vehicle(s) and equipment. Work out a plan that requires the shortest cable runs. For many events, such as established sporting events and concert venues, fixed (buried) cables may already be available. Inquire ahead of time to take advantage of them.
4. In addition to noting the location of each camera, be especially aware of the number of cameras you need to deploy, the mobility they are afforded by their locations, and the lens requirements each position demands as a function of the shots you want each camera to get. Select lens focal length ranges accordingly.
5. Audio needs are just as critical as video needs. Arrange to deploy mics near all the sounds you intend to collect. For example, for live coverage of an NCAA championship basketball game, separate microphones may be used to pick up sneaker squeaks, ball swishes through the nets, grunts of players, reactions of spectators, and the speeches of announcers and commentators.

These needs may require the use of headset mics, shotgun mics, parabolic mics, and wireless lavalieres with a variety of pickup patterns. You may also want to accept a direct audio feed from the arena's PA system.

6. In addition to intercom voice links among relevant parties via camera headsets, additional private lines may be added at selected locations for floor managers, assistants, and other production personnel. As with ENG operations, IFBs should be used to send voice cues from control room personnel to on-air talent.
7. Feeds for both program and preview video can be provided wherever needed by running cables from the truck's control room to selected field locations.
8. Establish security measures that protect equipment from theft and destruction.

The MCR Production Stage

Once the preproduction phase is completed, it is time to set up and rehearse. Arrive early. Review the schedule of events with the crew, and make sure that the sequence of tasks is correct. For example, if special platforms are needed to support cameras and other equipment, make sure they are ready when the cameras arrive. Many shops tack a handwritten schedule to the control room door of the remote truck.

Once everything is set up, the rehearsal phase parallels that in a regular studio production. Verify that all systems are up and running. For example, are transmission facilities functioning properly? Do you have reliable intercom connections and adequate video feeds for all crew and on-air personnel? Are all camera control units working properly? Are cameras color-balanced and shaded? Are microphones deployed where you need them? Have levels been taken? A facilities check is done by a broadcast associate and assistants who put on all the headsets and check all the monitors and audio lines.

Once all systems are go, conduct run-throughs. For events that can't be thoroughly staged in advance, such as sporting events, assign responsibilities so that camera and other production personnel know roughly what they will cover for a number of different scenarios. In baseball, for example, the camera located in center field can practice zooming and panning to capture the pitcher and batter, pop-ups behind home plate, and so forth.[4] During rehearsals, the crew should become accustomed to strange or awkward surroundings and any limitations presented by the site.

At show time, if you are broadcasting live, be sure to maintain contact with the studio, especially for time cues for commercial cutaways and other prerecorded inserts. Start times are strictly followed and must be coordinated carefully with the rest of the broadcast day. Promotional announcements and possible schedule changes should be monitored from the remote site. A line monitor in the

remote truck carrying the station's broadcast feed is the best way to coordinate field coverage with the home base.

The MCR Postproduction Stage

The same postproduction chores noted in the ENG and EFP sections apply to MCR. In MCR productions, with their large amounts of expensive equipment, it is especially important to keep a checklist to make certain nothing has been left behind.

If the program is recorded rather than live, the editing tasks are likely to be larger and more complex than in ENG or EFP. In the next chapter, we will focus on the full range of editing processes that can be used for both studio and field productions.

INDUSTRY VOICES

Marc Wiener

On October 13, 2003, and then again in October 2005, I spoke with Marc Wiener, supervisor and assistant to the chief of engineering of WCBS television in New York. Wiener's 33-year career started at CBS-FM radio, where he went from broadcast engineer to production and assistant chief engineer, transferring to CBS television in 1983. Then he progressed from audio engineer to director of electronic news gathering and finally to assistant to the technical operations manager planning for new studio projects, rebuilding studio facilities to accommodate the digital transition, including the installation of video servers to enable television news operations to expand to Internet applications. Wiener talks about news gathering in New York City during 9/11. He also shares his insights concerning the impact of the changeover to digital technology in the television news business.

L: *What happened on 9/11 in terms of news coverage?*

M: *We had another transmitter site—we were the only ones broadcasting over the air for a long time.*

L: *So tell us how that was done initially. It was 8:47 a.m. EST when the first attack occurred, then at 9:02 the second tower was hit. What was CBS transmitting, and how were they doing it?*

M: *Well at that point, we were still transmitting from the World Trade Center because even when the first plane hit, there was no collapse, and when the first plane hit, we weren't sure what it was. We looked up. Our helicopter was doing traffic news. No one actually saw what kind of plane it was. When we saw fire, we thought it was a Cessna or something*

and we said [sarcastically], "Oh, great, this is gonna be a lovely news day," because that was the day of the New York City mayoral primary. I had already given out equipment intended for election coverage that evening, with a plan already in place. We had done site surveys, paid for phone and video lines at various hotels around the city to cover the mayoral primary. I had given instructions of where the crews were to go that night, printed out sheets, and I had piled up equipment for the different crews to take. Then suddenly I'm looking up at the television behind me and saying, "What's that? Oh great, a Cessna or something hit the World Trade Center." And obviously, it is a major story, so now it's going to change everything as far as our coverage for the day. So I went up to the newsroom, across the street from where all the gear and trucks are kept. I saw the second attack on TV, because we had pictures—live pictures from our traffic helicopter.

L: *And was what you were seeing being beamed to the network?*

M: *Well, CBS is unique among the three O and Os in New York, in that only the local station has ENG vans for live microwave pictures. The network did not own any satellite trucks in New York; the network has satellite gear, but until the advent of digital satellite news gathering (DSNG), satellite time was very expensive, so if the network wanted a live picture of New York City, they just hired Channel 2. So they have a history of taking our live shots for whatever they want. And our helicopter coverage is transmitted to our microwave room and can be routed to any division. So, basically, the CBS network can go live with our pictures.*

L: *To 220 stations around the country?*

M: *Right, whoever belongs to CBS network has access. If they want, they can feed our live shots from their C-band or KU-band satellite. They can either take a feed from the guy in the helicopter, or they can voice-over our live pictures with their own news anchors saying, "You're now seeing pictures of the World Trade Center live." When the second tower was attacked live on the air, we knew it was terrorism—our original plans for election coverage were out the window. I knew at that point all regular programming is cancelled, and this is it.*

L: *What did you do?*

M: *I went to the newsroom to talk to the news director about how we were going to cover the attack.*

L: *How many cameras and crews did you talk to that day?*

M: *It was all hands on deck with 12 microwave trucks (two of them combination microwave/digital satellite trucks), and an analog satellite truck, so that's 13, and a bunch of cars with camera crews that hook up with trucks to go live. We called all 26 crew members in who knew they were going to work overtime, and from that moment, we were on the air continuously for weeks. We were the only ones who had a transmitter.*

L: *What was your job title at that point?*

M: *I was director of electronic news gathering. I was overseeing acquisition, purchasing, capital planning, large project and event planning (for example, when the Yankees would win the World Series, I coordinated pooled coverage of the ticker-tape parades with all the other local TV stations). My work included handling everything from processing traffic tickets for our trucks to arranging for vehicle maintenance when they'd break down. I was in charge of press IDs, vehicle permits to go on parkways with trucks that weren't normally allowed on parkways, the whole gamut. It was a large job.*

L: *How did you personally feel that day?*

M: *I was continually adjusting my expectations. There were so many things to think of.*

L: *How were you communicating with all your crews?*

M: *We had Nextel phones with a walkie-talkie feature built in. Cell phone technology failed completely on 9/11, because the landline infrastructure of Verizon's main switching office was right across the street from the World Trade Center. The Nextel system uses both cell phone and land-line infrastructures for cell phone calls, but their direct connect feature uses a technology which is just now becoming known to the public called Voice-Over IP. Nextel's Direct Connect technology bypasses the landline system completely so even though the cell phone part of the system didn't work, the walkie-talkie feature did—flawlessly. CBS has also had its own two-way radio system for over 25 years, which functioned well within distance limitations so we could talk to all the crews with both the Nextel Direct Connect and our own two-way radios.*

L: *What kinds of things were you saying?*

M: *First we were finding out if everyone was safe. We had a truck crew at ground zero. We told them to get the hell out. I said "Leave the truck! Get out!" The truck was covered with rubble. And we lost a car, also. We didn't lose anybody on the ground, but we did lose two of our transmitter engineers when the buildings came down, because they could not get out, due to a fire below them. So we suffered losses on the television side, but not on the ENG side.*

L: *Did you attend any funerals?*

M: *Yes, I attended the funeral of one of the transmitter engineers. Then later, on the first anniversary, when they had the shaft of light installed at ground zero, and the Empire State Building observatory was closed to the public, the victim's family and CBS personnel were permitted access to observe ceremonies from the Empire State Observatory that night. Logistically, at the time of the attacks, we eventually began taking video from crews in New Jersey, as we were telling our New York crews near the attack site to just sit tight. We knew they'd have great pictures, but we still had to coordinate new*

feeds under new circumstances. We also had to decide who'd have the most important and dramatic sound and video.

L: *Was everyone sending back live video, with you assessing what to put on the air?*

M: *Only a limited number of sources could put signals up simultaneously, because the World Trade Center had been one of our main receive sites, and it was gone. So we were left with just the Empire State Building as a receive site, and one in Plainview, and a place in Verona, New Jersey. And we couldn't have three trucks aiming at the same location and up simultaneously. The only way to decide what to carry was to have each source power up, then power down, to avoid interference. To coordinate who was going to feed what and when, was where the Nextel and two-way radio system came in. Two-way phone communication is essential for coordination, and coordination is the hidden component that television audiences don't realize or see. Crew members have IFBs in their ear, to listen to the director in the studio, or to someone in the microwave room receiving the signals. But without two-way phone connections, getting live television on the air is very difficult.*

L: *You said that emergency coverage went on "for weeks."*

M: *Yes.*

L: *Do you remember when there was normalcy again?*

M: *We were on the air continuously, 24 hours a day, for at least three weeks. There were no commercials; we had no regular programming. And we would cut away to Washington at times but we were still on the air continuously, and crews were doing 12-hour shifts for weeks. We would stay in a nearby hotel room, sleep for a couple of hours, and then go back to our posts. I didn't see my family, nor did I go home. I was up without any sleep for almost three days. I didn't go home at all to change clothes or anything for five days. There was no way out, anyway. Everything was shut down and you couldn't do anything. My wife knew—I've been in the business forever, so she knew, that my kids would not be seeing Daddy again until the next time we see him, whenever that is.*

L: *Perhaps nothing is "normal" again.*

M: *Right. We were doing 9/11 weekend newscasts for the next month or two. When there was no network programming, we came back to local news programming again, and we really didn't have any commercials; we had no commercials even past the three weeks. Even being a New Yorker has changed. As a New Yorker, you can't really think about it too much. You can't, you just have to live your life. It's the same as living in Israel, where a bus could blow up at any time. People say, "How do you live with that?" You just do it.*

L: *Changing topics. How in your view has the changeover from analog to digital technologies impacted the television business on your end of the industry?*

M: At this point, although many stations have committed to some of the new formats, tape is still the dominant medium for field acquisition. Sony, Panasonic, and JVC all have new cameras, and some use recordable DVDs and some have solid-state chips while others use hard drives, but they're all expensive technology. The tape format is still in use because it is cheap. You can have workers ride around with 20 to 30 cassettes in their trunk with no more than $500 involved. That's low risk. By contrast, a hard drive may be over $100 for just 20 minutes. How many hard drives are you going to let a guy drive around in his trunk with?

L: With digital linear format tape, after you acquire material, what happens to get it to air? Do you send it digitally through a computer/Internet access?

M: Right now, there is a transition period going on at CBS where all of our new microwave trucks have digital microwave capability. Digital microwave has a waiver from the FCC and is not yet recognized as an official radio-type format, but CBS has digital microwave trucks. They roll the raw footage in the truck, and feed it back via either digital or analog microwave (it makes no difference to the receive site, either the Empire State Building or Plainview), and from there it's relayed, most of the time via microwave to the broadcast center, where it is re-recorded onto a 60- or 90-minute digital tape. Then the microwave room contacts the edit room and says, "The Marsha Kramer feed is coming in on Microwave 2." It can then be recorded or logged in real time in the edit room as it is being fed in or just recorded for later editing. Through this method, you have three or four copies. They'll roll two copies in the microwave room and one in the edit room, so there are three copies in house immediately, and when the crew comes back in to hand in the raw tape, that gets archived. The field tapes get saved on an average from two weeks to forever, depending on what it is. The stuff that comes in microwave is saved for a week and then recycled. All the tapes are dated, and after a year or so, they get thrown out. Eventually tapes get damaged, scratched, dropped, the magnetic oxide gets damaged so the tapes are eventually discarded. There are machines that do take evaluations of tape quality, but assessment is too manpower intensive, which makes it expensive. Because cassettes are only $10, you just toss them into the trash by date, basically.

L: So that's essentially the process in news these days. Thinking more generally, what would you say has been the impact of the digital transition on the television industry in broader terms?

M: In two words, the move to digital has led to media convergence and repurposing, faster than people would have anticipated. Repurposing means that video programs can now be used for both television and Web sites, or even cell phones or i-Pods at this point. As a result, they are produced with that idea in mind—to use the show for release on television, but then to make the program material, either in whole or in part, useful for Web distribution and other outlets. As for convergence, the equipment now used in

television stations is not just video equipment. Because the hardware is computer-based, the same machines can be used in a research firm, a newspaper publisher, or in a video editing suite. That's convergence. At bottom, the information, whether visual, sound, or text, is binary code, and the computers process it the same way no matter what business is being served.

L: *Which system does CBS use?*

M: *At the moment, WCBS uses a dedicated computer by Panasonic, the NewsByte, which features a deck that can do a transfer at four times normal speed. It also has a computer hard drive, and an interface with a Windows NT format, so they can do nonlinear editing. Of course, since it is a computer, it can crash, and when it does, it has to be rebooted, which is a real pain for old-time editors who say, "Why did we go to this? I'm in the middle of a news piece that has to be on the air in five minutes, and the whole computer's locked up. This is not progress." Beta machines never crashed. The worst you got was a head clog or something. So the old-timers are right in a sense. It is a step back, but it's the way the business has gone, and you have to live through these growing pains until it becomes more robust and reliable.*

The Panasonic system WCBS uses is a dedicated video system. But Avid sells a system that is not dedicated—the same computer that does word processing for scripts also stores video, and has editing software built into it, and when you take a piece of video, not only can you put it onto video tape, you can distribute it directly to a Web site, with the script tied directly to the video so that if people click on a story, the video will come up on the Web site automatically. Then the user can see and hear it, and can even fast-forward and rewind. As for the producer-end, Teleprompter material is on there too. Finally, when the producer decides to edit or even kill a story, it can be edited or removed from the broadcast schedule. Scripts can be automatically changed, and in one stroke, so can the rundown, the prompter, the chyron, and hypertext links, all by one person. By contrast, in the past, if the director decided he wanted to change or drop a story, he'd have to tell the prompter operator to make the necessary changes, and operators in the newsroom and master control room would also need to respond. Now, one person does it, and everything changes at once.

L: *The union must love that. Talk to me about the personnel side. What do you think of it?*

M: *These changes are inevitable. The impact on the major networks and affiliates is significant. For one thing, there is less production money available these days. TV and radio used to be a license to print money because there was no place else viewing audiences could go—advertisers had to buy advertising on TV and radio, because there were no other choices among nonprint media. Now, there are many more choices, with cable outlets, video games, DVDs, Internet Web sites, being on cell phones, even watching i-Pods.*

Nowadays, you can watch 600 stations on satellite TV. The odds of a person watching a major network station are less—it's called fragmentation. There are only 24 hours in a day and there are only so many viewers at a given instant in time. So the money is not there as it once was. For all these reasons, there is tremendous pressure to reduce personnel costs, and using technology to enable one person to do more jobs is inevitable.

L: So what does a résumé say when they hire a person to come in and sit at the tower and type?

M: They're still called a newswriter. Right now, it's a transition period; most newsrooms don't have the money to put a fully versatile computer system in with the infrastructure to shuttle video around. But eventually, when it is universally deployed, writers won't have to go into the edit room. They won't have to leave their desks. They will see video in real time on a computer, which will be the same one used for word processing. And the writer will be able to mark in- and out-points on the video, and on the script, and tie it to time-code. Then machines will automatically edit the video, and tie it to words in the script. This is all possible now, but it's just expensive, because you need high-speed Ethernet running through the organization and servers which all store video. In the future, you'll be able to pull up video anywhere in the world with a Google-type search, and this is what is meant by convergence. It is this convergence technology that enables repurposing.

L: I'm fantasizing the possibility of using virtual actors and voice synthesis triggered by someone typing a story . . .

M: Look at the Lara Croft movie, where they had virtual actors, and look at the special effects where they have huge crowds of people that don't exist. It's technology that's definitely being worked on.

L: Do you still have to have a human in the field aiming the camera?

M: At this point, yes. But when ENG first started, it was a three-person crew, and now it's a one-person crew. A single person drives the truck, sets up a microwave signal, shoots the story, edits the piece in the field, then goes live. People used to say, "It'll never happen! They can't do it!" Well, they do it. CBS does it. All the trucks are one-person trucks, except at night. The only argument the union has at this point is personal safety. So you say thank God for lawyers. They won't send out a one-person crew at night, because there's nobody to watch the guy's back. But during the day, if safety is not an issue, it's all one-person crews.

L: What has this done to news judgment, and the quality of the product?

M: I think the combination of reduced crew size and the increasing pressure to go live on the air quickly has changed news judgment. You have much less judgment in terms of both accuracy and ethics, because those values have to take a back seat when the

number one concern is being first, and there are fewer personnel on hand to cover the story adequately.

L: *What about the impact of these changes on other electronic media fields?*

M: *In the movie industry, computer-cameras that record digitally are replacing film cameras, using 24 frames per second just like the film industry standard. A movie shot on video tape may then be edited on a nonlinear computer system. For example, I just saw the new Coen brothers movie (Intolerable Cruelty) with George Clooney, which was edited on Final Cut Pro, Apple's video editing software. It's only a thousand dollars, and major motion pictures are being edited on it using an Apple G5 computer. The last three Star Wars movies were all shot on video and edited in the computer. When created this way, a movie can be transmitted to theaters equipped with video projectors using Internet technology, not film, so it never has to be rendered onto celluloid and distributed in film canisters. Special effects can be handled with a computer, so in the Lord of the Rings movies, there were no sets with huge crowds; instead those shots were created in a computer.*

As of today, there are not too many theaters that have electronic projection. But there will be, because that's what the film industry wants. They want to be able to shoot digitally, edit digitally, not make any prints at all, but rather distribute to movie theaters, digitally. And then they can monitor how many times a film is run, and how many tickets were sold. They can download the file to servers in theaters and show it via an electronic projection system, and when the movie run is over, there are no prints to mail back. The entire system will be run on fiber optic, on a Virtual Private Network, in effect barring illicit piracy.

L: *But it might still be pirated, a la the Napster effect.*

M: *But the risk is worth it to reduce distribution costs, as well as the cost of making prints. If you have the movie showing on thousands of screens, that's thousands of prints not needed! Now, you have one file, you send it out simultaneously to all the theaters with no mailing cost, no print cost, and there are no prints getting lost or breaking or having to be replaced or getting noisy. In addition, movie theaters will have the technical capability of screening live events like concerts. The digital transition changes everything, including the entire economic model of the business, whether it's TV or film.*

KEY TERMS

fly-away video satellite uplink 303
reach 304
range 304
interactivity 304
electronic news gathering (ENG) 306

repeater station 309

satellite news gathering (SNG) 310

transponders 310

footprint 310

interruptible foldback (IFB) 311

raincoats 312

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cut-in (insert) 315

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reverse-angle shot 318

axis-of-action rule 318

head-on shot 319

tail-away shot 319

electronic field production (EFP) 328

filter factor 330

multicamera remote (MCR) production 334

QUESTIONS FOR REVIEW

How do the concepts of reach, range, and interactivity help explain the way communication systems are set up to make field productions run smoothly? Give examples of each concept.

What similarities and differences are there between ENG, EFP, and MCR field productions? How does SNG differ from ENG in terms of the equipment and transmission methods used to cover news?

Why is satellite transmission called distance insensitive?

What preproduction planning might you do to execute a field shoot of a local neighborhood PTA school meeting?

How can continuity be maintained when editing footage from an EFP shoot? What techniques can be used to avoid jump cuts and distracting sound variations from one segment to the next?

What function does shooting inserts and cutaways serve in producing footage for field productions?

Why is the axis-of-action rule important for preserving directional continuity? Give some examples.

What kinds of filters can help maintain proper color temperature when shooting under varied lighting conditions?

NOTES

1. During the 2005 London train bombing, the BBC went live with cell phone video and audio.
2. The terms *reach* and *range,* as they are used here, were first introduced to the author by Calloway in her essay in McCain and Shyles (1994, pp. 56–59).
3. Newer COFDM units (which all microwave transmitters will soon be due to the mandate from the Federal Communications Commission to reassign 2-GHz Channels 1 and 2 to other communication services) no longer require line of sight.
4. Standard camera positions for most major sporting events are described in Catsis (1996).