

Scientist and his terrorist lover rescue world from nuclear devastation.

Global Countdown

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CHAPTER 1

The late April sun slides upward across the Hudson River and the nuclear power plant emerges from darkness, gleaming under its coat of early morning dew. Michael Adams can just make out the reactor containment building, the electricity generation facilities, and the central offices which are his immediate destination. The peaceful scene belies the crisis surrounding nuclear power installations everywhere, and does not portend the wrenching events about to envelop Adams and the world.

Adams' job is training nuclear power plant personnel to prevent and handle emergency situations arising during daily operations. The Three Mile Island near-disaster had set activities such as his in motion, and the Chernobyl disaster had raised them to a feverish pitch. After decades of disaster-free operations, however, the federal safety program is being cut back and Adams must fight for funding. He wonders if his current training session will be his last, whether new funding will materialize.

Lately, the fight for safety training funds is not Adams' main concern. Rather, it is the vulnerability of nuclear plants to terrorist attack. In the year 2007 the United States is in the Fortress America stage of its war against terrorism: a wall of defensive systems around the nation attempts to keep out all threats against the homeland. The U.S. continues to spend billions on this counter-terrorism moat, including anti-ballistic missile systems versus rogue nation rudimentary ballistic threats. Central to this strategy is use of the Patriot Act to identify and defeat internal threats proactively, so that active defense of specific targets such as nuclear power plants is unnecessary. Adams fears this strategy may not succeed against terrorist cells of non-Middle Eastern origin. And it is in non-Middle Eastern areas that environmental, economic and social conditions are approaching the boiling point.

These deteriorating conditions are exacerbated by certain

policies of the Group of Eight, the so-called G-8 nations comprised of the U.S., Britain, France, Germany, Italy, the Russian Federation, Canada and Japan. In particular, the United States has continued its unilateral, preemptive strike, maximum globalization foreign policies. The political gap between America and most of the world has widened, in parallel with the growing gap between the have and have-not nations. Most of the world now lives in palpable fear of the economic and military might of the United States. Although the Middle-Eastern terrorist threat has ebbed, the pressure in the rest of the world for anti-U.S. actions is critical.

It is in this context that Adams worries about terrorist attacks on both old and new nuclear power plants in the U.S. and elsewhere. But just last year, the tiny Green Beret program testing the vulnerability of U.S. nuclear power plants to attack had been terminated. The irrationality of this move irritates Adams each time he approaches a nuclear facility, as he is doing now.

Even this early in the morning crowds of protesters mill about the plant gate. They carry placards demanding plant closure because of environmental dangers and the risk of terrorist capture and meltdown. Such demonstrations have increased since the federal government renewed its support for six new nuclear facilities. The crowds close in around Adams' car as he slowly approaches the guard's kiosk, and hand him protest fliers and harangue him with their message of doom. He accepts their offerings and moves his car alongside the guard standing in front of the closed gate.

"Good morning," he says to the guard, "Michael Adams to see Plant Manager Frank Auger. I head the scheduled nuclear safety training team, so I'll be in and out for about two weeks."

The security officer leans into the car window and asks for identification, which he then examines carefully. When satisfied, the guard says, "Aah yes, Doctor Adams, the visitor log shows you're expected by Mr. Auger," and motions Adams to enter the fenced grounds. The gate slowly swings open, and Adams maneuvers his car through the entrance and onto the access road leading to the main facility.

Adams cannot fault this part of the security system, insofar as it

checks the alleged identity and business of every entrant to the site. But Adams worries about plant security in general, and during the winding quarter-mile to the main office continues to contemplate the terrorist threat. His earlier experience at a federal defense think-tank convinces Adams that the most meager firepower would overcome the perimeter guards before they could warn the main building. The property line fence, although wired for electronic detection of tampering, could be penetrated without warning using modern technology. Worst of all, Adams is certain terrorists could infiltrate nuclear power facilities, given the minimal safeguards regarding temporary hires. “Damn it,” he muses, “security should be modernized and expanded, and the Green Beret testing program should be reinstated. At least the Beret operation focused attention on plant defense, revealing weaknesses alert managers could then work to reduce.”

Adams finds another crowd at the office entrance, this time temporary workers waiting to be processed by the personnel section. He parks and makes his way through the dense pack of men and women, whose conversations reveal they are part-time hires of the kind known as ‘jumpers.’ Many routine tasks in low-level radiation areas are performed by temporary workers wearing protective suits with self-contained breathing systems. To keep lifetime radiation exposure below acceptable levels these workers can accumulate only a limited amount of time in visits to radioactive areas. So the workers tend to move quickly when in radiation areas, rapidly jumping up to and down from their various working levels. The cumbersome bulk of the protective suit and breathing apparatus restricts their field of view and movement, invoking an odd side to side peering and exaggerated clumsiness. Together, these characteristics result in the ‘jumper’ moniker.

Adams misses a step, colliding with one of the jumpers while making his way through the throng. “Excuse me, I stumbled,” Adams volunteers. Without replying the man quickly turns away, but not before Adams catches a brief glimpse of his face. Then the man is gone, and Adams continues on to the plant manager’s office.

Frank Auger is ambitious, competent and ‘by the book.’ He

recently moved to nuclear from fossil-fueled power plants, when he became convinced the renewed emphasis on nuclear energy made it a good career move. Although not a nuclear engineer, he's a good mechanical engineer with a reputation as a capable manager of gas, oil and coal-fired power plants. As a new manager of a large nuclear plant, however, he's no longer schooled in all the engineering and scientific principles upon which his plant's design and operation depend. Auger therefore feels slightly defensive about the impending emergency preparedness exercise, which is his first. His mood is heightened by the reputation of the investigative team captain, Doctor Michael Adams: a real cowboy on nuclear safety and environmental protection.

The plant manager studies Adams while they shake hands. Although he's wearing jeans and boots, he doesn't look like a cowboy. Instead, Auger sees a slim, middle-aged athlete with placid green eyes, slightly graying hair, and an easy and open smile; his voice and manner project intellect and purpose. Adams quickly gets down to the purpose of his visit, describing the various phases of the next two weeks' activities.

"I'll spend the first two days reacquainting myself with the design and operation of the plant," says Adams, "which will require that I talk with the operating personnel. I also have to examine first hand the equipment necessary to respond to emergency episodes. For those components located inside the radioactive areas, I'll need to borrow protective clothing, including breathing gear."

Auger responds, "All that can be arranged. However, while the main contingent of jumpers is here, I can't provide an escort into the restricted area. You'll have to delay that for at least two days, until most of them are gone."

"I'd prefer to do that alone, anyway," says Adams. "If you're worried about my safety, the jumpers are around. And someone in the control room can monitor the time I'm in the radioactive zone. Then you can come after me if I'm overdue."

Taking Auger's silence as agreement, Adams continues. "On the third day, the other members of the team will arrive, and we'll start the training exercises. Your operating shifts will be exposed to pre-

programmed problems using the backup computer hooked in parallel to the control consoles. Following a week of training, your control staff will take both written tests and computer-simulated exercises for scoring. This approach usually improves the performance of even the best control sections.”

Auger is intimately aware of the decreased emphasis on operational safety training, and associated cuts in funding. He is irritated by Adams’ remarks and reddens as he retorts, “Doctor Adams, my control staff is top notch, and before I took over scored at the top in the Nuclear Regulatory Commission tests. I don’t think there’s much room to improve.”

Adams smiles again, although his eyes take on a hard glint. He says forcefully, “I’m aware of those test results, and I wasn’t disparaging your people. I’m here because someone feels there’s a need for independent tests, and for simulated training on a wider range of emergency scenarios than your crews have experienced.” Auger reddens even further at the intimation that the NRC-administered tests might have been neither realistic enough nor objectively applied and scored. He chooses to hide his anger, believing that an opportunity to respond will arise later in the two-week period. The plant manager speaks in what he hopes is a friendly manner, “Okay, let’s proceed. We look forward to a productive two weeks.”

Adams leaves Auger’s office to begin his unescorted tour of the installation. He starts by talking with key personnel and looking over the unrestricted areas; later in the afternoon he’ll examine part of the radioactive zone.

Just prior to four-thirty in the afternoon, Adams is suited-up and proceeding down the corridor to the containment building access door. He moves awkwardly in his cumbersome garments. To improve his sidewise field of view, he swings his head widely from left to right. Carefully he works his way past a complex of piping and mechanisms of the air conditioning system serving the central control room and surrounding areas. Someone is working on the canister which inserts odor control fluids into the air conditioning ducts. It’s the jumper he collided with earlier outside the main entrance.

LELAND ATTAWAY

Adams is intent on visiting the radioactive zone, and concentrating on his own movements because of the restrictiveness of the protective suit and breathing apparatus. So he only momentarily wonders: why would a temporary jumper be doing such routine maintenance outside the radioactive area? Then he struggles through the heavy access door into the containment building. It has this name because it's built to contain the radioactive gases routinely released from the reactor vessel housed within, and to keep from the outside world any radioactive debris resulting from a possible rupture of that pressure vessel.

As he enters the building, Adams reviews in his mind the operation of the enclosed systems. The Hudson River facility, like most nuclear power plants in the U.S., has a pressurized water reactor, commonly known as a PWR. Fission products within the reactor core, such as neutrons, create heat. Primary coolant water is circulated through the reactor core by massive pumps, carrying away this heat and keeping the core below meltdown temperatures. The primary coolant water travels to a heat exchanger also located inside the containment building. Secondary cooling water also circulating through this heat exchanger is then converted to steam. This steam is pumped outside the containment building to steam turbines which drive the electric generators.

The central event of the fission cycle occurs when atoms such as Uranium 235 split, or fission, and release neutrons. These neutrons cause other atoms to fission, producing more neutrons. This replenishment of neutrons establishes the chain reaction which sustains the process. This chain reaction is controlled using rods which absorb excess neutrons when lowered into the reactor core. This provides long-term control of the process, delivering the power levels the utility network requires.

There are also emergency control rods, designed to quickly shut down the reactor when unexpected events demand it. Such emergency shut-downs are called 'scram' scenarios, and are Adams' primary concern. As he enters the containment building, his mind is reviewing the preceding components and processes, and their possible role in scram incidents. Adams carries with him a radiation monitor.

Radiation is continuously emitted from the reactor vessel into the containment building. Radioactive gases, which can escape the reactor vessel into the containment building, are also continuously produced within the reactor. He must monitor the level of this radioactivity, so he can leave the containment building if it is excessive. This factor also occupies his mind as he enters the containment building at precisely four-thirty in the afternoon.

The containment building is a massive cylindrical structure covered by a circular cap. An inner shell of structural steel is covered by another shell of concrete in which is imbedded a matrix of additional steel. A filtering system within the containment building cleans up radioactive gases escaping the reactor vessel, before that air is vented to the outside. In addition to the primary coolant pumps, there are emergency pumps in case the regular pumps are inoperable. Adams approaches the regular pumps first.

They cast monstrous shadows, dwarfing Adams and surrounding human-scale objects. Both pumps are operating and the noise and vibration mask all sounds of his own movements as he circles round the first unit. Adams spends about twenty minutes exploring these and related components of the cooling system. Then he approaches the room containing the reactor pressure vessel. Before opening the door, he scans around himself with his monitor to make sure the radioactivity is acceptable. As he closes the door behind him, he checks again, and sees that the radioactivity is higher as expected. He moves quickly.

As Adams draws near the reactor vessel, he marvels at the immensity of the device, and wonders at man's ability to control such large and complex machinery. He spends another fifteen minutes examining the reactor vessel exterior and all exiting pipes and attached equipment. He next directs his attention to the platform on top of the reactor vessel, the location for the insertion drives for both the long-term and the emergency control rods. He's startled to see movement of what appears to be a human form among the complex of rods and levers. Being so late in the shift, he's seen no jumpers in the containment building; the current shift should knock-off at four-thirty. It's now five-fifteen, and he has only fifteen minutes scheduled time

left in the radioactive zone. The control room engineer monitoring his time will sound an alarm if Adams does not appear at the appointed time. He starts up the series of steel ladders leading to the top of the reactor, intent on investigating the control rod platform.

The upper platform is vacant when Adams steps onto it. Upon close examination, however, he notices a small black package resting among the levers and electrical wiring of the control rod insertion machinery. It has two shiny, metallic antennas protruding from one side. It's gloomy and semi-dark on the platform. To get close enough to examine the package, Adams leans precariously out over the machinery.

With the protective hood obstructing his vision and hearing, Adams fails to notice the hooded figure which steps out of the shadows behind him. Its arm raises a heavy metal wrench and swings it in a vicious arc. The weapon strikes Adams a solid blow on the top of his head, and then glances downward between his shoulders and the breathing apparatus, sending him to the floor unconscious. The assailant bends over and reaches into Adams' air supply pack to turn off his supply of oxygen. He discovers that the blow has already disconnected the tubing between the air supply and the hood. "A ready-made accident," mutters the phantom assailant to himself. The apparition drags Adams' limp body to the top of the ladder leading down. Struggling with the weight, the assailant hurls Adams down to the reactor room floor. Without a backward glance, the figure moves the small package outside the view of the TV camera used to observe control rod operations. He again mutters to himself, "Finally! That's where our bomb has to be: out of sight but right in the control rod machinery." The assailant descends the steel ladder to the reactor room floor, and approaches a pipe leading from the pressure vessel. He opens a small relief valve just enough to hear, even through his hood, the faint but high-pitched shrill of escaping radioactive gas.

With no time to lose, the man scurries away from Adams' helpless form. He escapes the deteriorating environment of the containment building, using a remote emergency access door to avoid anyone entering through the main entrance. All this has taken but a few minutes. He leaves the building at precisely five-thirty-five, just

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five minutes after Adams' scheduled departure from the radioactive zone. With his air supply disconnected, Adams has about five minutes of air left inside his suit. When that supply is exhausted, Michael Adams will die of brain damage caused by oxygen deprivation.

CHAPTER 8

After saying goodbye to Santiago, Adams steals down the stairs to the basement of the almost deserted hospital. He moves silently through the darkened corridors toward the hospital's medical research center. Gradually the odor of enclosed animals increases until it becomes a cloying stench, and he observes caged research animals in the glassed-in rooms on each side of the hallway. He is searching for the simian cages, which he discovered earlier during a nurse-prescribed constitutional. Most similar to humans, these animals should give a good indication of the effects of the drug intended for him.

Adams finds the room he seeks, enters, and selects a young monkey. "I'm sorry to do this to you old friend," he whispers apologetically, "but I'm in a bind, a Hell of a bind."

He removes the syringe from the bandanna, pinches up the animal's loose skin, and injects about one-tenth of the full cylinder. The monkey screams. Its small, pitiful frame goes taut, stretches to its full length, and then begins to writhe uncontrollably. Almost simultaneously, the monkey assumes the fetal position and falls quiet in obvious paralysis. In another minute, the monkey stops breathing and is dead.

"Christ Almighty," Adams exclaims out loud, "that was meant for me! Comparing body weights between that monkey and me, all of that syringe would have killed me just as quickly. Any dose at all would have paralyzed me." He's deeply shaken by this close call, and is now starkly aware of the danger. "I've got to get to the bottom of this, and quickly, before I join my little friend here!"

Adams empties the hypodermic into a laboratory basin and rinses it out, first with water, then with alcohol he finds in the laboratory, and then thoroughly again with distilled water. He fills the syringe with distilled water, wraps it in the bandanna, and places the instrument in the pocket of his jacket. He lets himself out an

unalarm ed emergency exit in the rear of the hospital, and makes his way up the alley to the nearest side street. About two blocks away he discerns the busy lights of a major intersection, and hurries in that direction to hail a cab. Inside the taxi, Adams gives his desired destination and requests to be let out a block early.

As he approaches Westberg's address on foot the brownstone is dark, and then the drawn blinds of a front room window glow from an inside light. Westberg has just arrived, having taken a circuitous route home to avoid being tailed. Adams creeps up to the window, and peers through the crack at the edge of the blind. Westberg is dialing the phone. He awaits an answer but there is none, so he hangs up and tries again and again, visibly agitated and breaking into a cold sweat.

Charters had instructed Westberg to call as soon as his hospital assignment is completed, and it's uncharacteristic of the Council Chairman to miss such an important call-in. This makes Westberg suspect the Council already knows of his second failure to dispatch Adams, and he dreads their reaction.

Adams recognizes that Westberg is in a state of panic. "That'll help me with my little surprise," Adams says to himself as he moves away from the window. He hurries to the alley in the rear of the row house, finds a window and pries it open. He enters and finds himself in a back bedroom, which he crosses to a hall leading to the front of the house. Approaching the front room he finds Westberg still dialing the phone. His back is to Adams, and his body is rigid from the intensity with which he dials for the tenth time. Westberg fails to notice Adams as he creeps up behind him.

As he springs upon Westberg, Adams has the hypodermic in his raised hand for instant use. With Westberg securely beneath him and the syringe pressed against his neck, Adams snaps, "Don't move a muscle, Westberg! This is the syringe you tried to use on me, and I'm itching to use it on you." Adams then injects about a third of the hypodermic into Westberg and leans back to watch his reaction. He is not disappointed. Since Westberg believes he has been given a paralytic dose, he immediately falls forward clutching his throat and writhing face-down on the floor.

Adams follows him to the floor with the needle still pressed

against his neck, and shouts in his ear, "I've given you a paralyzing dose, but not enough to kill you...yet! Tell me why you attacked me at Hudson River and the hospital. Now! Or do you want the rest?"

Max Westberg, confused by his inability to reach Charters and now convinced the Council will destroy him because of his second failure to kill Adams, struggles to turn over. He begins to babble: "I work for the Council. They plan to capture nuclear power plants here in the U.S. which will be used to..." Westberg's voice is whispered and indistinct, so Adams must lean forward and listen intently to hear.

So absorbed is Adams that he fails to notice the movement of a heavy-set figure stealing up behind him. It's Alvin Charters, who signals over Adams' shoulder to Westberg not to give him away. He then proceeds to strike Adams over the head with the butt of his revolver, stunning him for the moment. Without a pause in his movements Charters whips out another syringe, shoves the needle into Westberg's neck, and pushes the plunger nearly all the way in. Max Westberg shrieks and his face lights up with terror and disbelief. His pupils dilate, his hands tear at his throat, and he collapses in violent convulsions on the floor. He has just received a massive, lethal overdose of heroin.

Charters turns quickly to Adams and injects his forearm with the remainder of the hypodermic. He snarls matter-of-factly, "Just enough of a dose to advertise to the police that you're a user." He proceeds to place Adams' fingerprints on the heroin syringe, as well as upon various mobile objects from around the room. Finally, Charters substitutes his hypodermic for Adams' non-lethal one, leaving the deadly version on the floor beside him.

Charters picks up the phone and dials 911, saying, "Help! I'm being attacked by Michael Adams! He's trying to kill me! Hurry!" He then gives Westberg's address, moans as if in extreme pain, and hurls the phone to the floor with a great clatter. Unknown to Charters, Adams has begun to stir during this drama, awakening enough to groggily witness Charters' 911 call. However, he's still in a semi-conscious state from the blow to his head, and from the heroin shot, when Charters hurries from the house.

CHAPTER 12

The huge jet rumbles through the thin, cold air on the non-stop morning flight from Cincinnati to Moscow. The headwinds on southerly routes have been fierce because of a high pressure system situated east of Greenland, and the airliner has adjusted its route toward the pole to take advantage of the clockwise flow of weather. This course also skirts just north of Finland and Norway, entering Russian air space above the Kola Peninsula, thereby simplifying en route air-rights questions.

Michael Adams awakes to the darkened interior of the sleeping cabin. They are approaching Russian air space at thirty thousand feet and four hundred knots, and will soon commence the identification maneuvers and electronic transponder communications necessary for the Russian air defenses to recognize them as an expected friendly aircraft. All these procedures had been abandoned soon after the end of the Cold War, but have been reinstated following the terrorist attacks on New York City and Washington, D.C. using large commercial aircraft as flying bombs. It is still dark outside even at this altitude. Crystals of water have formed on the pane of the window through which Adams views the dark cloud cover below and the brilliant stars above.

This is not Adams' first flight to Russia. His earlier flights had been as director of the United States-Soviet Union environmental exchange program, which had flourished even during the closing years of the Cold War. As a representative of the U.S. Environmental Protection Agency in this area of bilateral cooperation, he had made many good friends among the Soviet environmental bureaucrats and the general population. More recently he had visited Russia as a principal in the international effort to improve the safety of nuclear power plants worldwide. As a result, Adams speaks and writes Russian fluently. He has also come to know intimately the steps required to gain permission from the air defense system to enter Russian air space. He anticipates the precise maneuvers as the aircraft

shifts course, altitude and entry point in a flight configuration unique to its previously-filed, and later amended, flight plan.

Adams dons the earphones supplied earlier by the stewardess. He tunes them to the air-to-ground radio channel on which he can hear the cockpit crew conversing with the civilian air traffic controllers. “Air traffic control to unknown flight approaching on course one six zero and altitude of ten thousand meters, please show transponder identity,” crackles the message over the headset.

“Transcontinental Flight One Ten to air traffic control. Our identification transponder is on, and has been for the last ten minutes. Do you read it on your radar scope?” This reply by the cockpit crew is clear and free of the noise accompanying the ground controller’s message.

“Unknown flight on heading one six zero and ten thousand meters altitude, please turn on your identification transponder,” crackles the repeated request.

“Air traffic control, this is Transcontinental Flight One Ten, and our identification transponder has been turned on for the last ten minutes, over,” the cockpit crew repeats its reply.

“Unknown flight, please make contact on channel 54 immediately, or we will send an air defense flight to intercept you!” an urgent air traffic control voice insists. Evidently the air traffic controller has failed to receive any communication from the penetrating aircraft. Adams’ attention is riveted on this interchange, for he knows full well the dangers of an air-to-air intercept, especially during hours of darkness.

After several such attempts at contacting air traffic control, the cockpit crew is desperately searching for options to escape their predicament. There were powerful storms and headwinds on a southern route, so they have spent much of their fuel reserve pursuing a more polar path, and cannot divert very far if it proves necessary. Suddenly, Adams sees in the bright moonlight two shadowy shapes off the port wing, only fifty yards away. They look like Russian Migs, probably armed with air-to-air missiles. He’s concerned about the suddenness of their appearance, as if this whole sequence had been rehearsed in advance. And he begins to wonder if he is again the

target of a murder attempt, as the international terrorists struggle to bar him from Russia and if need be, eliminate him.

The door to the cockpit is flung open and the co-pilot emerges and begins a secretive discussion with the head stewardess. After a moment the co-pilot turns to reenter the cockpit. Adams immediately sheds his safety belt, leaps up, and struggles toward the cockpit through the dark cabin. Another stewardess orders him back to his seat, but he ignores her and bulls his way to the cockpit door before it closes completely. Without as much as a knock he pushes his way into the cockpit and addresses the command pilot, "We don't have much time! I'm on my way to Russia to head off a terrorist plot. I believe those Migs off our port wing are here to keep me from reaching Moscow, and that they'll stop at nothing to accomplish it, including shooting down this aircraft!"

"Who the Hell are you?" demands the co-pilot. He rises to face Adams, his right hand hovering over his holstered revolver. "Get back to your seat!"

"I tell you," yells Adams, "those Migs are after me! They're controlled by terrorists who'll stop at nothing to keep me out of Russia!"

"Just go sit down," the co-pilot demands, and draws his weapon. "If you don't, you're a dead man!"

No sooner has the co-pilot uttered these words than the lead Mig fires a missile at the airliner, a shot crossing immediately in front of the cockpit. This convinces the pilot of the possible truth of Adams' assertion, and he puts the aircraft into a steep turning dive to avoid the missile and if possible escape the Migs. He levels off at five thousand meters, or about fifteen thousand feet. At the same time, the navigator gets on the intercom to the passengers and cabin crew, instructing them to fasten their safety belts and stay in their seats.

"Our only chance to get out of this alive is to take evasive action," says Adams, "maneuvers to avoid the Migs and get us safely into Russian air space. At this altitude, their air defense radars can see both us and the Migs, allowing them to vector the interceptors against us. We have to go down to the deck, below the radar cover if possible, so the ground-based interceptor controllers can't see us. With any

luck, the interceptor radars won't lock onto us either, then they can't fire any more of their damn radar-controlled missiles."

The pilot doesn't respond immediately. The crew's not at all sure Adams is not a hijacker. As he hesitates a different voice, apparently that of an air defense system controller, crackles on the ground-to-air channel: "Interceptor Flight Three, the intruder aircraft has changed altitude and course; come to course one eight five and altitude five thousand meters for air-to-air radar pick-up. Proceed to lock-on and destroy this target!" With this message ringing in his ears, the airliner pilot is convinced he must try to escape, and throws the plane into a violent dive towards the surface, throttling back in order to reduce speed.

They're still about fifty miles out to sea, and approaching a coastline with rugged hills reaching heights of about one thousand feet. Adams coaches the pilot, "We're about seven minutes out, and need to be as low as possible. Take her down and head straight for the hills. As we get nearer to the coast, your navigational radar will detect the hills, and we can climb to barely miss them. Let's pray they don't come after us with heat-seeking missiles, or it's all over." Just then another missile crosses the nose of the airliner, angling down as the interceptor fires on a downward glide-path. "Jesus, that was close," mutters Adams. The pilot fish-tails the airliner, changes course to head directly toward the coast, and levels off at fifty feet on the altimeter. The sea is dangerously close, with white caps surging violently in a storm-swept sea. It looks and feels as if the white caps are reaching up to seize the aircraft as it hurtles landward.

"Ground control to Interceptor Flight Three," says the air defense controller. "We've lost the intruder from our radar. Last position was five hundred meters altitude, and one kilometer range from you at ten o'clock relative to your position. We're scrambling an Airborne Warning And Control System (AWACS) aircraft with radar to supplement our ground radar coverage. It'll help us see at low altitude. The AWACS aircraft will be on station in about five minutes. Start random search for the intruder using the relative coordinates I just gave you."

"Roger that," replies the Mig formation. "We're diving to the

deck and have the intruder's jet flame in sight. We should be able to get him with a heat-seeking missile. We have infra-red lock-on...firing!"

Meanwhile, Adams and the cockpit crew hear this entire Russian exchange. The pilot glances nervously over his shoulder as if expecting to see an approaching missile through the cockpit door. Adams knows that to escape the approaching missile they must abruptly perform a violent direction change. They can't dive because they're already so near the surface; they can't pull-up because the maneuver is too gradual. The only possibility is a sharp turn to the right or left, without losing any altitude. "Pull maximum g's to the left," shouts Adams, "and slow down as much as you can. And for God's sake, maintain your present altitude!"

The pilot hauls the aircraft in a hard turn to the left and shuts the throttles down as low as possible without stalling. Luckily, he performs this maneuver just as the missile approaches to within one hundred feet of the aircraft. As the airliner hurtles to the left, the missile streaks onward past it and plunges into the surging white caps, unable to respond fast enough to the high-g maneuver. At contact with the sea, the missile detonates, momentarily lighting the night sky with a blinding flash. "We may have hit him!" the Mig commander exclaims on the air-to-ground radio. "Shall I break off?"

"Negative," replies the air defense controller's weakening voice, breaking up as his line-of-sight radio contact with the Migs and the airliner fades. The coastal hills are beginning to come between the radio transmitter and the low altitude aircraft. "Try...confirm...kill."

Adams shouts to the pilot, "Stay on this course for a moment, before you head toward the coast again. It should throw the interceptors off." All this has happened within two minutes of their dive to the surface. There are still five minutes of low-level flight before they get to the shelter of the coastal hills. And even if they reach them safely, they must then deal with the AWACS aircraft. For now, however, they must deal with Interceptor Flight Three, a gaggle of Migs intent on knocking them out of the sky!

Adams is turning their predicament over in his mind, trying to discover a way out. Earlier, he had been surprised that the air defense

system controller was using the airliner's radio frequency to also direct Interceptor Flight Three. Perhaps the controller had accidentally selected a common channel. Since the dissolution of the Soviet Union, the Russian military has declined precipitously, and poor training, equipment shortage or inadequate maintenance could cause such a tactical blunder. In any case, Adams could use it to their advantage! He asks the co-pilot for his microphone and headset, and then speaks in fluent Russian over the ground-to-air channel: "Interceptor Flight Three, the intruder has changed altitude to five thousand meters and is heading west. Come to course two seven zero and altitude five thousand meters."

"Roger that, Interceptor Flight Three changing course to two seven zero and altitude to five thousand meters," replies the Mig leader.

Adams waits apprehensively for the real controller's voice to countermand his order, but no such event occurs. As he had hoped, both he and the interceptor aircraft are at extremely low altitude and behind the coastal hills' shadow. Though Adams can speak to and hear the Migs, the air defense controller hears nothing because of radio line-of-sight limitations. "Okay," says Adams to the pilot, "let's high-tail it for the coast." Immediately, the pilot turns the airliner back to the south on a bee-line for the coastal hills.

Now Adams is pondering another problem: Moscow is about a thousand miles from their planned point of entry into Russian air space. How will they manage to travel that distance through the heart of the Russian air defense system without being shot down? Their only hope can be that this interception is a local event manufactured by the Russian arm of the Council, and that if they survive this local action they'll be home free. "A big if!" Adams says to himself.

If the air defense controller's prediction is correct, the AWACS aircraft will be on station just as the airliner reaches the coast. Soon after reaching station, it will see and hear any aircraft within radar and radio line-of-sight, including both the airliner and interceptors. An interception will be inevitable.

Many years before, Adams had spent many months on the Kola Peninsula coast while doing research on cold weather and tundra

environmental problems. Now he remembers there are several deep, steep, very narrow fjords extending through the coastal hills. They're the last vestiges of glaciers cutting their way to the sea during the last ice age. If they can find their way into one of these deep canyons, and stay at extremely low altitude while hugging the fjord's walls, the AWACS radar should not detect them. But finding one of these fjords will not be easy.

Fortunately, the airliner is equipped with all the latest navigational gadgets: navigation radar; satellite positioning; map generation using the satellite system to continuously calculate and draw the airliner's position on a local map; and Doppler radar for measuring their speed over the ground. The navigation and Doppler radars can also be used as obstacle clearance alarms, detecting obstacles that crop-up ahead. All of these systems operate routinely during the journey, and are immediately at hand as Adams devises the next step in their battle to stay alive.

Adams says, "As I remember, near here are several deep, narrow fjords. They cut through the coastal hills all the way to the interior. If we can find one and follow it at extremely low altitude, then we may avoid the AWACS aircraft. I've been watching the map generated by the on-board computer, and this is beginning to look like the right place. Have any of you flown this route before? Do these fjords ring a bell?"

The navigator exclaims, "They do! I've flown up one or two of them in a small plane!" He then closely studies the map and shouts, "According to the map, one of the fjords is about two miles to port of our present track. But I can't remember if this one goes all the way to the interior."

All this maneuvering has used most of the time of travel to the coast, and the hills are looming up on the navigation radar. "I think I see it on the radar," says the pilot. "Is this the right one?"

"I think so," says the navigator.

"We have to try it," exclaims Adams. "We don't have much choice right now, do we? We're already on the coast and there's no time to divert very far before the AWACS aircraft is on station. And it can see us much more easily out over the ocean than overland. I

say, let's go for it!"

The pilot immediately swerves the airliner to port and lines it up with the gap in the hills, which is beginning to show up on his radar screen. The navigator says, "The fjord we want has water in it all the way through the hills. We'll soon know if we're in the right one."

The airliner is again traveling at around four hundred miles per hour. The co-pilot suggests they throttle back if they are to maneuver past the twisting walls without hitting them. The pilot throttles back to a speed about fifty knots above stalling conditions, and they enter between the precipitous walls of the fjord while it is still dark outside. The flanks of the fjord are about a thousand yards apart at its entrance, and fishing boats are just departing their protection en route to the Barents Sea. The startled fishermen look up in astonishment at the low-flying airplane, actually ducking for fear it will strike their rigging. A boat's skipper reaches for his ship-to-shore radio to report the passing aircraft.

Scientist and his terrorist lover rescue world from nuclear devastation.

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