

## Concealed Suicide Bomb Technology: Three Recent Devices

*By Rick Hahn*

For years, bombs aboard aircraft were, like most improvised explosive devices, comprised of an explosive main charge, a detonator, usually commercial, and an improvised electrical fusing system that included wires, batteries, and switches. The bomb that brought down Pan Am 103 over Lockerbie in December 1988 was such a bomb. So too were bombs designed by Palestinian terrorist Mohammed Rashid that exploded onboard an aircraft on approach to Honolulu in 1983 and over Rome a few years later. But as airport security grew more sophisticated, hiding the batteries, wires, and other components became more and more difficult. This was particularly true because many of the fusing mechanisms were specifically designed to be just that, fusing mechanisms, and would not readily be confused with a cell phone or an iPod going through security screening. Hence, the race for new technology began. Seemingly, the goal was to build a bomb that a person could carry on board, but which had no electrical components.

It seems the terrorists turned to history for answers. For many years before batteries were the common things they are today, miners and quarry operators used burning fuses to initiate explosives. This seems to be where the terrorists first turned. The December 2001 case of Richard Reid, the famous airline passenger “shoe bomber,” represented this tactical adaptation by terrorists. Reid, a resident of Britain and self-proclaimed al-Qaeda member, had a device constructed of pentaerythritol tetranitrate (PETN) and triacetone triperoxide (TATP) hidden in his shoes. The PETN was the intended main charge and the TATP was meant to serve as the detonator. PETN is a “high” or high-yield explosive, releasing a large quantity of energy per weight. But PETN requires a sustained shock wave to initiate; it cannot be detonated with a burning fuse or electrical “hot wire” as low explosives can. The believed answer for the terrorists was TATP. TATP is a high explosive that is very sensitive to heat, shock, and friction. A mere spark is enough to initiate not just burning, but detonation, which in turn can initiate other, less sensitive explosives such as PETN. There was no commercial detonator, battery, or wire in the device contained in Reid’s shoes. Rather, Reid’s device was designed to be detonated with a burning fuse. The fire of a burning fuse would initiate the TATP, which in turn would detonate the PETN. Reports at the time indicate that Reid repeatedly struck matches while sitting aboard the aircraft in an apparent effort to light the burning fuse. His efforts failed and before he could detonate his device (after several attempts) his actions drew attention and resulted in his being overpowered and subdued by fellow passengers.

The advantage of Reid’s shoe bomb was that it had no moving parts, no batteries, no wires, none of the things that security screeners have traditionally been trained to look for. Excepting detection by a dog or a “sniffing” technology, the device would not be detected by

screening. Even at that, unless the dog was specifically trained to search for PETN or TATP, or could have detected the small amount of black powder contained in most burning fuses, (which presumably this was), it is unlikely that even a dog would alert on Reid. Indeed, despite secondary screening by French officials on the first day he tried to board a commercial aircraft, December 21, none of the components of the device were detected. It is a direct result of the design of Reid's device that in the United States (and many other places around the world) passengers are required to pass their shoes through the screening device as part of the security regimen.

Still, Reid's device failed to meet the objective: to bring down a commercial aircraft in an act of martyrdom. Evidently, other terrorists evolved another adaptation for concealed suicide bomb technology.

In December 2009 Umar Farouk Abdulmutallab, a Nigerian man allegedly linked to al-Qaeda, also tried to initiate an explosive device onboard a commercial jet. Like Reid's shoe bomb, there were no wires or batteries in Abdulmutallab's improvised explosive device (IED). But unlike Reid's bomb, hidden in his shoes and reliant on lighting a fuse to initiate it, Abdulmutallab's bomb was contained in separate chemical components hidden in his clothing and relied on spontaneous combustion to function.

The indictment against Abdulmutallab provides a description of the device. The document states: "The bomb consisted of a device containing . . . PETN . . . TATP . . . and other ingredients. The bomb was concealed inside defendant[']s . . . clothing. The bomb was designed to allow defendant . . . to detonate it at the time of his choosing."<sup>i</sup> Prior reports indicated that the device, or components of it, were sewn into Abdulmutallab's underwear, a place where even technical screening and pat-down searches would be less likely to detect the materials.

So while Reid's device and Abdulmutallab's device may have similarities, the difference lies in the method of initiation. In the case of Abdulmutallab, there are no reports of matches or lighters, but rather a report of a syringe with a liquid. While the technique of using a syringe with a liquid had already been demonstrated by demolitions' experts, this was an innovation over Reid's attempt in initiating a bomb. There are a variety of chemicals known to react when combined, bursting into flames within seconds of contact with each other. Hence, the chancy matter of lighting a burning fuse, as Reid attempted, would not be required for Abdulmutallab's device. Rather, Abdulmutallab could merely remove the components from his clothing, arrange them, then using the syringe inject the reactive material that would start spontaneous combustion. The combustion, like the burning fuse in Reid's shoe, would initiate the TATP, and fractions of a second later, the PETN.

Again, there is no way to easily detect these components. They are powders or liquids, required in relatively small quantities, and devoid of metals that are generally the key in security

screening. In short, without a dog trained to detect such materials, the likelihood of detecting them is minimal.

Because Abdulmutallab's device components appear to have been sewn into his underwear, there is a significant call to deploy millimeter wave body scanners that provide a virtual image of the scanned person's body separate from articles of clothing. Indeed, this is a technology that, perhaps, may have detected the components carried by Abdulmutallab. But deployment of these devices would be both expensive and likely take years to implement. Additionally, many will object to this intrusion into private areas, possibly preventing deployment of this technology. However, even if deployed, it would not be a final solution. These devices do not probe the interior of the body, and there is already a report of a bomber carrying an explosive device hidden internally.<sup>ii</sup>

In August 2009 an al-Qaeda fugitive from the Saudi justice system offered to give himself up, provided he could do so personally to Prince Muhammad bin Nayef, the Deputy Interior Minister of Saudi Arabia. This was arranged and the fugitive, Abdullah al-Asiri, was picked up by the prince's security detail in Yemen and flown to a meeting with the prince. In the meeting, an explosive device purportedly hidden inside al-Asiri's rectum detonated, causing minor injuries to the prince. It is believed that the device may have been triggered by a cell phone. In the wake of the Abdulmutallab bombing attempt, the story was revised, as "national security sources" reportedly told ABC news that the bomb carried by al-Asiri was an underwear bomb not unlike that worn by Abdulmutallab.<sup>iii</sup> My own review of photos from the scene where al-Asiri's device detonated leads me to question this. The damage to his body<sup>iv</sup> leads me to believe that the device was, indeed, secreted inside his body as opposed to his underwear.<sup>v</sup>

We have another option being explored by terrorists—concealment of IED components in body cavities. This opens the door to several possibilities, the details of which I will leave to the reader's imagination. It is sufficient to say that reasonable screening procedures will likely not detect all bomb components, particularly those designed to be chemically initiated and carried inside the body.

On February 18, 2010, the Italian news agency Adnkronos ran a story from Sanaa, Yemen, in which it stated that al-Qaeda in the Arabian Peninsula (apparently responsible for training Abdulmutallab) said, "We have dozens of sophisticated explosive devices which are similar to that used by the Nigerian, Umar Farouk Abdulmutallab on the Christmas Day flight . . ."

We are facing a challenging future in commercial air travel. It may soon become apparent that the most intrusive of security screening remains incapable of detecting a committed suicide bomber's explosives. The goal of downing a commercial aircraft seems to be a continuing objective of the terrorists. Therefore, it is necessary to be watchful of fellow passengers. Whatever they may look like or where they come from, male, female, young, old,

black, white, Asian, etc, you should pay attention. If you find them or their actions suspicious, go to the back of the plane and discreetly advise a crew member of any misgivings. Preemption may be the optimum goal, but yet again, we see that the final line of defense is reliant upon the individual citizen's awareness and actions.

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<sup>i</sup> U.S. v Umar Farouk Abdulmutallab, 2: 10-cr-20005, Indictment, January 6, 2010.

<sup>ii</sup> Gardner, Frank, Fears Over 'Internal' Terror Bomb, BBC News, September 26, 2009

<sup>iii</sup> Tapper, Jake, The August Attempt on Prince Mohammed, and the Link to Flight 253, ABC News, January 3, 2010, <http://blogs.abcnews.com/politicalpunch/2010/01/the-august-attempt-on-saudi-prince-mohammed---and-the-link-to-flight-253.html>

<sup>iv</sup> Europol report; The concealment of Improvised Explosive Devices in rectal cavities, The Hague, September 18, 2008.

<sup>v</sup> It's worth noting that both the attack against Prince bin Nayef and the Abdulmutallab attack were orchestrated out of Yemen and credit in both cases was claimed by al-Qaeda in the Arabian Peninsula.