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Flying Underground: The Trade in Bootleg Aircraft Parts

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* Since this Article was written, certain key players in this controversy regarding bootleg aircraft parts, most notably Inspector General A. Mary Schiavo and the FAA's Anthony Broderick, have left the positions they held. The effect of these changes is uncertain, but the author of this Article is certain that the controversy which is the subject material of this Article will undoubtedly continue.—Ed.

** The author is a journeyman aircraft mechanic and quality assurance inspector of 15 year's experience who is also a graduate of Drake University Law School in Des Moines, Iowa, a member of the Iowa Bar, and an LL.M. candidate (Agricultural Law) at the University of Arkansas—Fayetteville. He is currently furloughed from his last assignment as a second shift flight ramp quality assurance inspector for the McDonnell Douglas Corporation's Long Beach, California plant, and he is a past member of UAW Local 148. The opinions and conclusions in this work are his own. The descriptive material and technical digressions in the footnotes and text are included because it was suggested by Professor Robert Hunter in the early stages of this project that a general audience will better understand the issues when it has a good grasp of the technology under discussion.
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Mr. Med hitches up his grease-stained trousers, cocks his leather cap. “Greenie,” he says, “either a law is a good law, or it is a bad law. What makes a good law?”

Greenie laughs good-naturedly and says, “Hell, Med, I ain’t but a grease-monkey like you. How would I know?”

Med takes his cap off, looks at it disdainfully, and slaps it back on again. “Was I to be your age, Greenie, and not know more than you, I’d hide away under a bulkhead somewheres and have them bring me my meals. Listen. A law comes out says you can’t use a pot no more, it ain’t sanitary, and it’s a discouragement to the plumbing business. Is that a good law?”

“For Christ’s sake, Med,” Greenie says, and he has a big smile on his face. “Of course it ain’t. No sense to it. But the game law does have sense to it: it says four duck and two geese a day as a limit per man. And it says you can’t put corn around the blind, nor use live decoys.”

“I’ll tell you,” says Greenie, “we could have a higher bag.”

“Some years it’s big, some small, depends on how many birds there are. But the law itself, now, never mind details, is it a good law?”

“You know the same as I do, Med, without some kind of a limit, you wouldn’t see or hear a wing the whole season long. I guess it’s a good law, but two things can spoil it: bad enforcement and bad hunters. You might say good enforcement will take care of the bad hunters. I don’t know, though, when I think of some of those hunters. Talk about hogs, why a hog’s a dainty feeder compared to some hunters I can think of.”

I. INTRODUCTION

THE FIRST PART of this Article examines what may be the most egregious example of an air disaster where the proximate cause of the accident can fairly be attributed to failure of counterfeit parts. This part also briefly surveys some of my own personal experiences in the aviation repair business with regard to the subject material. It then examines the current regulatory scheme which, it is alleged, controls the certification and manufacture of legitimately produced aircraft parts. It examines the phenomenon of underground parts, with particular emphasis on internal, high value engine parts. Last, it presents a survey of relevant legal and other material which was culled from various sources and which, it is hoped, will convey to the reader the

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1 Varley Lang, Follow the Water 136-37 (1961). This dialog on the nature of law takes place in a boatyard between two mechanics.
serious nature of the subject material and some of the controversy surrounding the viewpoints of various actors involved.

The second part of this Article examines control strategies which are currently being used or promoted by various parties to the issue, with attention to evolving legal approaches to the overall issue of product counterfeiting. This part also suggests that the world view of some in the Federal Aviation Administration (FAA) is a sort of homegrown risk assessment which has an insufficient statistical justification and a basis in personality.

The third part of this Article argues that a series of simple control measures could be implemented relatively rapidly, which could do much to promote better accountability from all parties in the chain of aircraft parts distribution and thereby improve air safety.

II. THE LOSS OF AN AIRCRAFT

Sometime in the afternoon of September 8, 1989, a chartered Convair 580 operated by Partnair and bearing the Norwegian registry number LN-PAA departed from Oslo, Norway on a trip to Hamburg, Germany with fifty passengers and five crew members aboard. The passengers were employees of a shipping company who had been selected by lottery to attend the christening of a ship. Late in the afternoon, all contact was lost with the Convair as it approached the coast of Denmark,


3 See THE ILLUSTRATED ENCYCLOPEDIA OF PROPELLER AIRLINERS 220 (Bill Gunston ed., 1980). In 1987, Northwest Airlines operated several of these battle-scarred warriors on milk runs in the upper midwest, and I saw them regularly at the Kalamazoo, Michigan airport. The Convair 580 was the product of a modification program which originated in my home state of California. Id. The idea was simple—remove the piston engines from existing Convairs and replace them with the more powerful and reliable turbine engines then being produced by the Allison Engine division of General Motors. Id. This hybrid design—a marriage made in heaven—produced an aircraft which (some suggest) had reduced levels of controllability, but enormous reserves of power and reliability. Other re-engining projects utilizing the Convair airframe and engines such as the Rolls Royce Dart and the Napier Eland were less successful because of lower power output in the case of the Dart and cancellation of the Eland program by Napier. Id.

4 55 Killed in Crash of Norwegian Plane None Aboard Survive as Craft Plunges into Sea Near Denmark, L.A. TIMES, Sept. 9, 1989, at 4 [hereinafter TIMES].

5 Id.
and the aircraft went down in the Skagerrak. The Skagerrak Strait is the waterway which connects the Baltic and North Seas. Id.

Air and sea rescue workers had been alerted, and they discovered bodies littering the area near LN-PAA’s last known position. Of the fifty-five persons on board LN-PAA that day, none survived the crash into the cold and unfriendly waters where the Baltic meets the North Sea. The aircraft apparently had experienced sudden deceleration while the accident victims were belted in their seats. The first officer’s body had an unbroken toothpick in his stomach, which investigators assumed was indicative of “reflexive action caused by sudden shock or surprise.” The loss of LN-PAA was Norway’s worst air disaster.

LN-PAA was a veteran of hard service in an unglamorous trade, having had at least ten previous owners before Partnair. The aircraft had a total time in service on September 8, 1989, of 36,943 hours, and substantial parts of the maintenance records and flight logs were missing or in Spanish. Flight manual revisions and other documentation related to the various modifications that had been made to LN-PAA during its life were deficient or missing. Thus, potentially unsafe conditions might not have been understood by flight crew and maintenance personnel, and unsafe operation, loading, and flight might have gone unrecognized.

LN-PAA had undergone a series of major modifications (including re-engining) under its several owners. In 1986, LN-PAA had received an overhaul including new floors, new interior appointments, new heating and ventilation systems, major avionics and radio upgrades, and other major system modifications and repairs performed by Kelowna Flightcraft, a Canadian aircraft repair and modification facility. During the course of these repairs, Kelowna had occasion to install four new shear bolts and sleeves in the vertical stabilizer attach points. At that time, Kelowna Flightcraft allegedly did not have an accounting system

6 Id. The Skagerrak Strait is the waterway which connects the Baltic and North Seas. Id.
7 Id.
8 Id.
9 See Convair, supra note 2, at 18.
10 Id. at 19.
11 TIMES, supra note 4, at 4.
12 Convair, supra note 2, at 21.
13 Id. at 20-23.
14 Id. at 23.
15 Id. at 22-23.
16 Id.
in place which allowed it to trace the origin of parts that it had installed.\textsuperscript{17} Further, the auxiliary power unit front support had been replaced at some unknown date with a shoddy substitute of unknown origin which failed some time before the 1989 accident.\textsuperscript{18}

The three-year accident investigation conducted by the Norwegian civil aviation authorities recovered ninety percent of the wreckage of LN-PAA from the floor of the Skagerrak.\textsuperscript{19} The investigation disclosed that the recovered shear bolts and sleeves from the vertical stabilizer did not comply with material specifications because of inadequate heat treatment after fabrication and were well under the required strength for such parts.\textsuperscript{20} Excessive wear of these parts would have been undetectable without a targeted inspection.\textsuperscript{21} The investigation also revealed that a decision had been made to use the auxiliary power unit throughout the flight to Hamburg, contrary to procedures in the existing aircraft flight manual.\textsuperscript{22}

\begin{itemize}
  \item \textsuperscript{17} Id. at 24.
  \item \textsuperscript{18} Id. at 19. The auxiliary power unit is a small turbine engine which is installed in the tail of the Convair 580. It is used as a source of electric power and compressed air for starting the main engines and operating aircraft electrical, heating, and cooling systems while on the ground. This feature enables the aircraft to operate with less need for ground services.
  \item \textsuperscript{19} Id. at 19.
  \item \textsuperscript{20} Id. at 23.
  \item \textsuperscript{21} Id. at 28. These bolts were to have been removed so that the surrounding structure could be inspected for cracks in 1989, but Kelowna Flightcraft had decided, contrary to relevant maintenance instructions, to use a procedure for crack detection which could not reveal the excessive wear then occurring in the pins because it did not involve disassembly. Id. As a result, Partnair's maintenance representatives refused to approve the alternate procedure and postponed the inspection of the pins. Id. No other inspection of the attachments was made. Id. However, at this time Kelowna did replace one pin and sleeve because of its external appearance and used an erroneous and inferior repair procedure in so doing. Id. It appears that at this point Kelowna should have been cognizant of the deterioration then taking place in the structure. Id.
  \item \textsuperscript{22} Id. at 25. The number one, or left-hand, engine generator was inoperative at the time. Id. The flight crew determined that it would be safe to operate with the auxiliary power unit and its generator in continuous operation, despite the fact that the minimum equipment list, or MEL, did not allow such operation. Id. The MEL had not been updated to reflect installation of the third generator, and the dispatch decision was made based on a review of an MEL for a comparable aircraft. Id. It is thought that the ultimate decision stemmed from the fact that the emergency checklist allows this sort of operation when an in-flight main generator failure occurs. Id. However, the emergency checklist is intended for use only with in-flight emergencies and not for dealing with routine equipment failures which would otherwise prevent dispatch of the aircraft in revenue service. Id.
\end{itemize}
It appeared likely from the recovered wreckage and reconstruction of the last moments of LN-PAA, based on air traffic control plots, flight data recorder tapes, and forensic evidence, that the immediate cause of the destruction of LN-PAA and the death of the occupants was structural failure brought about by sudden and violent flutter in the control surfaces of the rudder and elevators.\textsuperscript{25} Flutter is an uncontrollable, destructive oscillation of control surfaces which can be initiated where conditions of vibration and excessive wear exist.\textsuperscript{24}

The investigation revealed that the flutter in the tail control surfaces of LN-PAA was precipitated by four factors which together led to the loss of the aircraft. Those factors were as follows: (1) improper airborne use of an inadequately restrained auxiliary power unit which could have induced a high level of vibration in the tail structure;\textsuperscript{26} (2) inferior maintenance which could not and did not discover progressive deterioration in the shear bolts and sleeves securing the vertical stabilizer;\textsuperscript{27} (3) the shear bolts and sleeves themselves, which were of undeterminable origin and quite evidently defective in manufacture;\textsuperscript{28} and (4) the auxiliary power unit support, which was of suspicious origin.\textsuperscript{29}

This recounting of the last hours of LN-PAA highlights for the lay reader the extremely serious consequences of mechanical failure in aircraft that may be directly attributed to parts of suspicious origin. Moreover, it shows that this particular event and the deaths that resulted need never have happened if proper maintenance procedures had been observed and if a system for verification of part traceability and provenance had been in place.\textsuperscript{30}

\textsuperscript{23} Id. at 19.
\textsuperscript{24} Id. (citing JANE'S AEROSPACE DICTIONARY (Bill Gunston ed., 1988)).
\textsuperscript{25} Id. at 26.
\textsuperscript{26} Id. at 28-29.
\textsuperscript{27} Id. at 23.
\textsuperscript{28} Id. at 19.
\textsuperscript{29} Id. at 19.
\textsuperscript{30} One hesitates to call events of this type “accidents,” when they clearly were caused by aggravated negligence, if not reckless indifference of the worst sort. For an account of another preventable disaster, see David Young, Aviation History on Two Planes, Chi. Trib., Sept. 18, 1994, at Transportation 5. Young describes how Knute Rockne, the celebrated Notre Dame football wizard, lost his life. \textit{Id.} (Rockne was the only coach who ever had a car named after him, even if it was only a warmed over Studebaker). The proximate cause of the event was undetected dry rot and failed glue joints in the wing spars of the Fokker Trimotor in which Rockne was a passenger. \textit{Id.} The decay had gone undetected because the wing’s plywood skin could not be easily removed for inspections which would
An important factor to remember, when considering arguments on both sides of the underground parts issue, is that the reason for the loss of LN-PAA was as clearly established as such events are likely to be. Often the issue is less than obvious, and the accident investigator must attempt to make sense of small and unidentifiable fragments of burned debris scattered over a large area or attempt to divine the cause of an accident where the aircraft is never recovered, partially recovered, or only recovered with great difficulty and expense.\(^3\)

The reader may also reflect on the cost incurred in compensating victims of such terrible tragedies, as well as the expense associated with the loss of a productive aircraft asset and the cost of accident investigation, when evaluating so-called "economic" arguments that have been advanced against regulation in the field.\(^3\) In this context, the reader may also consider where the ultimate source of payment to satisfy these demands may be, if such costs continue to be externalized by less responsible sectors of the aircraft parts industry.\(^3\)

Id. These events are a disgrace to the profession and a stain on the reputation of aviation mechanics worldwide, which cannot easily be overlooked.

\(^3\) For two cases concerning the standard of proof required to find negligence in a case where the aircraft was never recovered, see Cox v. Northwest Airlines, Inc., 379 F.2d 893 (7th Cir. 1967), \textit{cert. denied}, 389 U.S. 1044 (1968), and Haasman v. Pacific Alaska Air Express, 100 F. Supp. 1 (D. Alaska 1951), \textit{aff'd sub nom.} Des Marais v. Beckman, 198 F.2d 550 (9th Cir. 1952), \textit{cert. denied}, 344 U.S. 922 (1953).

\(^3\) See generally Ed Foster, \textit{Aircraft Parts Firms Rip Proposed Rule}, \textit{Phoenix Gazette}, Oct. 31, 1995, at E1. In this article the president of a firm in Mesa, Arizona says that an unapproved part has never caused an accident, he has never found a part that was proved counterfeit, and proposed regulatory activity is a needless layer of bureaucracy. \textit{Id.}

\(^3\) These arguments are sometimes self-serving and often specious. In the case of LN-PAA, 55 victims and their families no doubt received something in the way of a settlement, insurance costs went up, and someone had to pay off on the value of the aircraft. Partnair and its stockholders were deprived of the productive use of their asset and the revenue it could have produced, and whatever traffic the aircraft had carried had to be spread over the existing pool of available aircraft. Government workers from neighboring countries had to conduct an unsuccessful search and rescue effort. Norway undertook a costly three-year investigation to determine the cause of the accident. The total cost of the bolts and sleeves implicated in the accident was $1212. \textit{See Flight Safety Foundation Editorial Staff Report, Bogus Parts—Detecting the Hidden Threat}, \textit{Flight Safety Dig.}, Jan.-Feb. 1994, at 1.
III. OF SALVAGE AND SCHEMES

When I was running an aircraft engine repair shop, I got the occasional telephone call soliciting the purchase of the shop's worn out parts for "salvage." The shop did not dispose of such parts that it accumulated, not only for reasons of liability in the event of a dispute with the customer but also because manufacturers had ongoing programs of research into new methods of reconditioning formerly unsalvageable parts. Periodically, a new repair scheme was announced, and the shop could obtain reconditioned parts at a substantial savings. Thus, retaining worn out parts could, under some conditions, allow the shop to be more competitive in price without compromising quality. I would always agree to sell the junk engine parts, but the caller was warned that the part would be delivered in four pieces, and any documentation would be sent to the manufacturer with the notation that the particular part had been destroyed. Invariably, that was the end of the conversation.

There are a multitude of ways to trade in aircraft parts, some legitimate and some less so. A mechanic I knew received a visit from FAA inspectors at the shop where we worked. It was his task to explain to authorities why he had installed an alternator belt on an aircraft which was clearly identified as a product of a well-known manufacturer of lawn mowers. Another episode occurred when a customer, against advice, bought several thousand dollars worth of cut-rate turbine blades without documentation and subsequently found that no reputable shop would install the blades or balance his turbine rotor. Further, I was aware of a repair facility in the region which represented its abil-

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54 See generally 17 Aviation Week Group, World Aviation Directory Buyer's Guide (1994). This directory lists over 700 pages of aircraft and aerospace parts suppliers, although some listings are cross-references by category. Also, see generally Trade-A-Plane, Dec. 23, 1993, which devotes a good part of its 200 or so pages every ten days to the aircraft parts and sales trade, but caters more specifically to a general aviation clientele.
55 This true story is meant only to illustrate how legitimately produced parts may be improperly introduced into the aircraft market and is not intended to disparage a fan belt which was perfectly acceptable for the manufacturer's intended use.
56 On many engines, installation of turbine blades requires specialized equipment and subsequent rebalancing, either of the individual component or the entire rotating assembly. On this customer's engine, rebalancing of the individual part had to be done utilizing trim balance information from the engine data plate. Thus, the part had to be rebalanced with reference to the entire rotating
ity to "overhaul" Garrett turbine engines, when in fact the shop
had never been approved by Garrett or anyone else to overhaul
a Garrett product or perform more than minor repairs.\textsuperscript{37}

I first looked at the issue of underground parts in an under-
graduate paper on the subject of international trade and the
aircraft industry.\textsuperscript{38} As part of that project, I became unpleas-
antly aware of the deviousness and ingenuity of those who mar-
ket bootleg aircraft parts. It was recently that I began to
consider the legal aspects of the underground aircraft parts in-
dustry. The following notes detail the results of my
investigation.

IV. AIRCRAFT PARTS FOR BEGINNERS

When a civil aircraft, engine, propeller, or appliance is
designed, and a prototype is tested, the goal of the manufac-
turer is to obtain from the FAA the grant of an approved type
certificate so that the product can be offered to the market.\textsuperscript{39} In
order for the product's airworthiness to continue, parts that are
installed must conform to the previously granted type design ap-
proval, with limited exceptions.\textsuperscript{40} The grant of the approved
type certificate means that the manufacturer has successfully
demonstrated that the aircraft, engine, propeller, or appliance
design conforms with all applicable regulatory and design crite-
ria.\textsuperscript{41} It is, in all respects, an enviable mark of approval.

After obtaining type certification, a type certificate holder
must obtain production certification by demonstrating that each
duplicate aircraft, engine, propeller, or appliance will comply

\textsuperscript{37} See generally \textsc{Federal Aviation Administration Draft Advisory Circular
AC20-62D} (1995) [hereinafter AC20-62D], for a discussion of the misuse of this
and similar terms. Although this document has not yet been formally adopted, it
is a significant improvement on the previous edition, \textit{AC20-62C}, which dates from
1976.

\textsuperscript{38} Robert W. Luedeman, \textit{The Commercial Aircraft Industry: Profiles And
Prospects} 23-25 (Apr. 1992) (unpublished manuscript, on file with the \textit{SMU Law
Review}).


\textsuperscript{40} See \textsc{Federal Aviation Administration Advisory Circular AC21-29A} (1992)
[hereinafter AC21-29A].

\textsuperscript{41} \textit{Unapproved Parts and Aviation Safety: Hearings Before the Subcomm. on Oversight
of Government Management of the Senate Comm. on Governmental Affairs, 104th Cong.,
with the type certificate. The manufacturer must demonstrate a high level of quality assurance to obtain certification. The manufacturer demonstrates the airworthiness of successive products of the same design by demonstrating that they conform to the type certificate.

Among other things, the approval thus granted presumes that all the parts that comprise the finished product have been tested, inspected, and approved and that the manufacturer's quality assurance standards are an integral part of the airworthiness determination for the complete product.

It ought to be readily apparent that variations from this scheme, however minor, infringe upon the type certificate. However, the regulatory scheme has six broad areas of exception which allow some flexibility:

1. Standard parts, such as hardware, extrusions, small fasteners, rivets, wire, bulbs, and the like, manufactured to industry standards such as SAE (Society of Automotive Engineers), MS (Mil. Spec.), AN (Army-Navy), or NAS (National Aircraft Standard) are presumed to conform with the standard identified by their part number and are considered acceptable for installation on certificated aircraft or products.

2. Supplemental Type Certificates (STCs) are granted for modifications to the design of the original product. The applicant for an STC must present test and engineering data which demonstrates that the modification is air worthy. The design modifications are approved by FAA and remain thereafter the property of the designer or developer and can be licensed to

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42 Id.
43 Id.
45 AC20-62D, supra note 37. See generally Fletcher Aircraft Co., Standard Aircraft Workers' Manual §§ 4-1 to 42 (12th ed. 1977), for a concise index and description of some of the more commonly used standard aircraft fasteners; and Fred H. Colvin, Aircraft Handbook 717-76 (5th ed. 1942), for descriptions of some SAE standard parts used in the aircraft industry.
46 G.S. Rasmussen & Associates, Inc. v. Kalitta Flying Service, Inc., 958 F.2d 896, 899 (9th Cir. 1991), cert. denied, 113 S. Ct. 2927 (1993). The Rasmussen court never decided the issue of whether the certification of airworthiness could be valid in view of the irregular manner in which Kalitta obtained it. This issue has significance in determining the validity of insurance policy exclusions based on invalid airworthiness certificates. See infra note 251 and accompanying text.
47 G.S. Rasmussen, 958 F.2d at 899.
48 Id. at 906 (holding that use of an STC to obtain a government privilege is a property right under California law, and one not preempted by federal law).
aircraft owners or operators. The owner or operator of the aircraft may, by incorporation of the STC, thus obtain the benefit of a design modification without needing to recertify the entire aircraft. Parts manufactured in conjunction with an STC may or may not be produced by the original holder of the type certificate, but are legitimate nonetheless and are acceptable for installation on certificated aircraft, providing they conform otherwise with the various regulatory schemes. Parts that are used for a one-only STC are not required to be manufactured subject to Parts Manufacturing Approval (PMA) authority because the FAA considers such parts exempt under 14 C.F.R. section 21, subpart E.

(3) Under 14 C.F.R. section 21.303(a), no one may produce replacement or modification parts unless they hold a PMA. Exempted from section 21.303(a) are “(1) [p]arts produced under a type or production certificate[,] (2) [p]arts produced by an owner or operator for maintaining or altering its own product[,] (3) [p]arts produced under an FAA Technical Standard Order[, or] (4) [s]tandard parts.”

A parts manufacturer is granted a PMA if he or she has demonstrated that the design of the part meets current airworthiness standards, and the manufacturer has a system in place that ensures that each part produced is quality assured, made in accordance with applicable design criteria, and is safe for use. The PMA process allows, among other things, for production of parts to maintain the large fleet of obsolete aircraft whose type certificate or production certificate holders may be defunct, although in some cases the certificate holders for the product are in existence and unhappy about losing sales to competitors who have gained PMA approval for current production parts.

(4) Parts that have been produced in compliance with an existing Technical Standard Order (TSO) are considered to be ap-

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49 Id. at 903.
50 Id.
51 See AC21-29A, supra note 40.
52 Id.
54 Id. § 21.303(b).
55 Id. § 21.303(d).
56 See Air Transport FAA Approval Process Backed as Means to Curb Bogus Aircraft Parts, AVIATION Wk. & SPACE TECH., Jan. 20, 1992, at 33. Superior Air Parts developed its ability to manufacture replacement Teledyne Continental 0-200 cylinders by reverse engineering and pays no royalties or license fees for what appears on the face of it to be brazen piggybacking.
The TSO approval is an FAA design approval issued to the manufacturer of an article which has been found to meet a specific set of design and performance criteria. The TSO approval is granted by way of a letter of acceptance or a letter of design approval. The part must be “permanently and legibly marked with the name, address of the manufacturer, type, part number or model designation of the article; the serial number or date of manufacture of the article or both; and the applicable TSO number.”

(5) Repaired or overhauled parts are considered acceptable parts when the work is accomplished by a person or facility holding an appropriate certificate. These components may then be resold, returned to service, or distributed through trade channels. The operator of a repair station or the person returning the part to service does not necessarily have to have the blessing of the certificate holder, but the operator has to repair the product in accordance with the applicable service and repair information either from the manufacturer or from generalized repair procedures. Additionally, it is possible for repairs to components to be accomplished if a Designated Engineering Representative (DER) acting on behalf of the FAA and within the limitations of the enabling rules approves engineering information necessary to return the part to service. The bottom line, however, is if there is no approved service or repair information, then there is no repair scheme—no matter how well thought out.

(6) Parts produced by an owner or operator for repairing or altering his or her own aircraft are considered acceptable. This category allows the owner or operator to fabricate simple assemblies, manufacture fabric coverings, and construct sheet

57 See AC20-62D, supra note 37.
59 14 C.F.R. § 21.603(b).
60 Id. § 21.617.
61 AC20-62D, supra note 37.
62 Id.
63 For examples of what would constitute acceptable repairs of a generalized nature, see Federal Aviation Administration Advisory Circular AC43-13-1A (1972).
64 14 C.F.R. § 183.29 (1994).
66 Hearings, supra note 41 (statement of A. Mary Schiavo).
metal parts and patches out of raw stock, among other things. An owner or operator produces parts if the owner "participated in controlling the design, manufacture, or quality of the part."67

With these exceptions, the holder of the type certificate is ultimately responsible for the integrity of the components made and installed under the type certificate. However, many type certificate holders subcontract some or all of their production to outside vendors, machine shops, job shops, and so on, but the parts thus manufactured must conform in all respects with the production and quality standards which were part of the original certification basis of the airplane, engine, propeller, or appliance.

Parts are identified as being in conformity with regulations and type design by an FAA Airworthiness Approval Tag form 8130-3, a TSO number, the FAA-PMA symbol, data from a country which has a bilateral airworthiness agreement if properly certificated, or a document showing that the part was produced by or for a manufacturer holding an approved type certificate or a production certificate.68 Used, overhauled, or repaired parts are commonly identified by an overhauling agency or repair person as conforming with applicable regulations by attaching a maintenance release, sometimes known in the trade as a "yellow tag," or other documentation to the part in question.69

V. WHAT IS AN UNAPPROVED PART?

Periodically, a story appears in the popular press about "bogus" aircraft parts, but there is little that is systematic in the definitions thus applied.70 Parts grouped under that popular appellation may actually be the following: (1) completely counterfeit goods;71 (2) parts produced by legitimate manufacturers outside the chain of accountability that substantiates compliance with the regulatory scheme of certification or distributed without direct ship authority from the certificate holder;72 (3)

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67 See AC20-62D, supra note 37, which gives a rather expansive and counterintuitive view of what an owner or operator produced part consists. The author of this Article is not comfortable with this view, based on his personal acquaintance with certain aircraft owners and operators and his assessment of their mechanical aptitude.
68 Id.
69 Id.
70 Hearings, supra note 41 (statement of A. Mary Schiavo).
71 Id.
72 See AC20-62D, supra note 37.
runout, cycled out\footnote{The term "runout" is used in the industry to describe parts which are life-limited (i.e., they must be replaced at regular chronological intervals and must be removed because the allowable time in service has elapsed). The term "cycled out" has a slightly different meaning. A cycle generally refers to one takeoff and landing sequence; thus, one cycle may consist of several hours of flight. Failure to closely monitor cycle counts can result in an operating hours penalty, as in the absence of reliable documentation, and some amount of clock time may be computed as one cycle. The penalty assessed depends on the manufacturer of the product in question. Chronological requirements for life-limited parts are developed from service history, mean time between failure (MTBF) studies, extensive manufacturer testing, predictive engineering analysis, and knowledge of the material properties of the part and the environment in which it operates.} or damaged parts that are salvaged after removal from service and have been subsequently reintroduced into the parts pool through the use of misinformed, deceptive, improper, unapproved, inadequate, or fraudulent repair schemes and documentation;\footnote{Hearings, supra note 41 (statement of A. Mary Schiavo).} (4) stolen parts; (5) commercial parts which have been converted to aircraft use without passing through more stringent aircraft inspection requirements;\footnote{The typical examples of this class are ball and roller bearings manufactured to industry standards, and electronic components purchased by part number or electrical value, as well as the lawn mower belt, see supra note 35 and accompanying text. Many in aviation are extremely casual about this sort of thing. For example, see MARTIN CAIDIN, THE SAGA OF IRON ANNIE 144 (1979). A casual inspection of a general purpose aircraft battery reveals that special features, such as special vent caps with check valves, are included to control spillage of battery fluids under flight conditions as well as to safely vent combustible battery gases. One may also presume that the aircraft battery is constructed in a robust fashion with a view toward limiting the liability exposure of the maker. Yet, ignoring the clear import of all these considerations, the mechanics on the JU-52 restoration project, instead of selecting a battery made expressly for airborne use, installed two Sears & Roebuck car batteries, lashed together as a sort of homemade substitute. Id.} (6) parts and components which have been overhauled or repaired without authorization and marketed using descriptors such as "overhauled," "reconditioned," "like new," and so on;\footnote{See AC20-62D, supra note 37.} (7) parts for which certification cannot be demonstrated for some unknown reason; (8) parts manufactured to military or foreign aircraft certification requirements which have been improperly converted for use on U.S. aircraft; (9) parts which have been substituted without authority; (10) parts which have been misrepresented as meeting certification requirements; or (11) any combination of the above.

The FAA defines an "unapproved part" as follows:

A part, component, or material that has not been manufactured in accordance with the approval procedures in [14 C.F.R. 73] The term "runout" is used in the industry to describe parts which are life-limited (i.e., they must be replaced at regular chronological intervals and must be removed because the allowable time in service has elapsed). The term "cycled out" has a slightly different meaning. A cycle generally refers to one takeoff and landing sequence; thus, one cycle may consist of several hours of flight. Failure to closely monitor cycle counts can result in an operating hours penalty, as in the absence of reliable documentation, and some amount of clock time may be computed as one cycle. The penalty assessed depends on the manufacturer of the product in question. Chronological requirements for life-limited parts are developed from service history, mean time between failure (MTBF) studies, extensive manufacturer testing, predictive engineering analysis, and knowledge of the material properties of the part and the environment in which it operates.
section] 21.305 or repaired in accordance with [14 C.F.R. section] 43; that may not conform to an approved type design; or may not conform to established industry or U.S. specifications (standard parts). Such unapproved parts may not be installed on a type certificated product, unless a determination of airworthiness can otherwise be made.  

Examples given by the FAA are as follows:

(1) 'Counterfeit' or fraudulently marked parts, components, and materials; (2) Parts shipped directly to users by a manufacturer, supplier, or distributor who does not hold, or operate under the authority of, a production approval for the part (e.g., production overruns); and (3) Parts that have been maintained or repaired and returned to service by persons or facilities not authorized under [14 C.F.R. section] 43 or [14 C.F.R. section] 145.  

VI. THE STRANGE CASE OF THE SUICIDAL MECHANIC AND OTHER STORIES: THE UNDERGROUND PARTS CASES  

Gary Shafer, a Long Island parts distributor, was charged with supplying counterfeit seal spacer rings for Pratt & Whitney aircraft engines.  

After a United Airlines technician ordered a spacer from stock and found it to be of unknown quality and unusual appearance, it was determined that the part was counterfeit and had been produced by a Montreal workshop under the control of Joe Furlat, a Canadian aircraft mechanic.  

Furlat had obtained production blueprints for the part from an employee of Pratt & Whitney. Made of ordinary steel instead of the alloy used in the genuine article, it was unclear whether the parts Furlat made were adequate to perform safely in the elevated temperature environment of a turbine engine.  

Furlat continued to produce counterfeit aircraft parts, distribu-

77 See Federal Aviation Administration, Detecting & Reporting Suspected Unapproved Parts (undated brochure on file with the SMU Law Review). This informative brochure is available without cost at any FAA Flight Standards District Office (FSDO) and from FAA Aviation Safety Inspector, Aircraft Certification Service, 800 Independence Avenue SW, Washington, DC 20591.
78 AC21-29A, supra note 40.
79 More Than a Dozen Companies Used Bogus Parts, Newspaper Reports, Air Safety Wk., June 28, 1993.
80 Id.
81 Andrew McIntosh, Plane-Parts Scam Flew Far; City Shop Turned Out Counterfeits in '80s, Montreal Gazette, Nov. 17, 1994, at A1.
82 Id.
83 Id.
ing them in the United States through aircraft parts brokers like Shafer.\textsuperscript{84} Furlat subsequently committed suicide by drinking a quart of whiskey and taping a plastic bag over his head, perhaps in an excess of remorse.\textsuperscript{85} Pratt & Whitney instituted a safety program which uncovered 130 of the counterfeit spacer rings, as well as numerous counterfeit seal rings and other parts in the engines operated by several major airlines.\textsuperscript{86} The spacer rings were also the subject of an FAA airworthiness directive.\textsuperscript{87}

Some of the earlier examples of underground parts cases concern vendors who attempted illegal substitution of parts that the government had contracted to purchase. In some cases, the vendor is involved in reselling parts to the government that the vendor previously obtained as government surplus.\textsuperscript{88}

In \textit{United States v. National Wholesalers},\textsuperscript{89} the successful bidder on a contract to supply voltage regulators to the Army anticipated being able to obtain them from surplus stocks, but due to design changes surplus regulators could not meet the requisite specification.\textsuperscript{90} National Wholesalers then manufactured copies which were substantially equal to the genuine article, but attached counterfeit Delco Remy labels to the regulators.\textsuperscript{91} Although the government discovered the deception, it accepted the regulators because of the military emergency in Korea.\textsuperscript{92} Noting that a claim is false when it is made,\textsuperscript{93} the court, in af-

\textsuperscript{84} Id.
\textsuperscript{85} Id.
\textsuperscript{86} Id.
\textsuperscript{87} See FAA AIRWORTHINESS DIRECTIVE AD91-24-14, Jan. 3, 1992.
\textsuperscript{88} For a fascinating look at the buying and selling of military surplus and the armaments business in general, see WILLIAM B. EDWARDS, CIVIL WAR GUNS 133-43 (1962). Buying surplus and selling it back to the government at inflated prices is not a particularly new idea. General John C. Fremont, the so-called "Pathfinder of the West," purchased Hall's patent breech-loading rifles to arm troops under his command at the outbreak of the Civil War. \textit{Id.} at 135-40. These obsolete rifles were purchased as surplus from government stocks by New York speculators, one of whom was J.P. Morgan, for $3.50 each. \textit{Id.} at 136-37. The rifles were sold back to the government at about $22 each on Fremont's order. \textit{Id.} at 135. Fremont never lived this episode down, and it may have ruined his career. \textit{Id.} at 140-41, 143. Was Fremont wrong? Arguably so. However, 5000 of Fremont's men were armed with good serviceable rifles, albeit of an obsolete pattern, when shoulder weapons of any quality were scarce, no mean accomplishment in the late summer of 1861. \textit{Id.} at 143.
\textsuperscript{89} 296 F.2d 944 (9th Cir. 1956), \textit{cert. denied}, 353 U.S. 930 (1957).
\textsuperscript{90} \textit{Id.} at 946.
\textsuperscript{91} \textit{Id.}
\textsuperscript{92} \textit{Id.} at 948.
\textsuperscript{93} \textit{Id.} at 950.
firming what a label ought to represent, said, "[T]he American label guarantees contents are the product that the label represents them to be, and that is true whether the label is on Bethlehem’s steel or Mrs. Lerua’s tamales."94

In United States v. Aerodex, Inc.,95 a vendor contracted to supply the United States Navy with master rod bearings of a certain type and part number for its Curtiss-Wright R1820 aircraft engines.96 Because it did not obtain bearings conforming to the part number and specification that the Navy had ordered, Aerodex obtained an earlier type of bearing made with a less robust alloy, reworked the bearing surface, and re-identified the bearings with the part number ordered by the Navy.97 The bearings thus modified were not distinguishable from the contracted article.98 A number of the bearings were installed, and when the Navy discovered that the bearings supplied were not those which it had ordered, it removed and replaced them at a cost exceeding $160,000.99

Aerodex alleged that the reworked bearings were interchangeable and just as serviceable as those the Navy had ordered, and thus they did not have the intent to cheat the government that the statute requires.100 Aerodex argued that all information available to them indicated that the parts were totally interchangeable.101 The court, relying on National Wholesalers, determined that deliberate mislabeling of the bearings, combined with the fact that the product was not what the Navy had ordered, made Aerodex subject to the False Claims Act102 because if Aerodex truly believed that the parts were totally interchangeable, there would have been no incentive to deceive

94 Id. at 948.
95 469 F.2d 1003 (5th Cir. 1973). See generally Colvin, supra note 45, at 122. Unlike the typical auto engine, the cylinders of a radial piston engine like the R1820 are disposed in a circle around a central crankshaft with a single crankshaft throw. One cylinder is directly connected to the crankshaft by means of a "master rod," and the other cylinders are in turn connected to the master rod through link rods. It is difficult to imagine an aircraft part more critical to flight safety than a master rod bearing in a radial engine. Failure of this part means immediate and catastrophic engine failure, and the consequences of failure under full takeoff or war emergency power settings are extremely grave.
96 Aerodex, 469 F.2d at 1005.
97 Id. at 1006.
98 Id.
99 Id.
100 Id. at 1007.
101 Id.
the Navy.\textsuperscript{108} The court also held that the Navy's failure to exercise the one hundred percent inspection clause of the agreement was not a waiver of the quality requirement.\textsuperscript{104} The part number that Aerodex had applied to the bearings after it had reworked them was a misleading indication of conformity to quality and fabrication standards, and a Navy inspector would have conducted the Rockwell hardness test which would have detected a softer and less robust alloy only where fraud was suspected.\textsuperscript{105}

In another case with similar facts, \textit{United States v. Franklin Steel Products, Inc.},\textsuperscript{106} Franklin Steel Products contracted to supply master rod bearings to the Navy and, like Aerodex, supplied an earlier type of bearing which had been replated and renumbered.\textsuperscript{107} The court held that Franklin was liable to the government for the consequential damages which flow from a breach of warranty, the breach being found in the failure to supply the parts for which the customer had contracted.\textsuperscript{108} In the agreement that it had signed with the Navy, Franklin expressly warranted that the parts, notwithstanding the inspection clause, conformed in all respects to the specifications listed.\textsuperscript{109} Consequently, Franklin could not assert that the government had waived the inspection clause.\textsuperscript{110}

In both \textit{Aerodex} and \textit{Franklin Steel}, the courts held the vendors liable for damages which were a proximate result of the breach of warranty. The \textit{Franklin Steel} court concluded that since the bearings were required to support Naval aviation in the Mediterranean and Far East fleets, and since the aircraft were dangerous because of the bearings, the Navy's emergency refit program was justified and taxed that expense to Franklin Steel.\textsuperscript{111}

A more ambitious attempt to defraud the government by supplying spurious parts was uncovered in 1987 when Donallco, a well-respected California manufacturer of aircraft parts and dealer in military surplus, was indicted and subsequently convicted of defrauding the government by supplying parts that it

\textsuperscript{103} \textit{Aerodex}, 469 F.2d at 1008.
\textsuperscript{104} \textit{Id.} at 1009.
\textsuperscript{105} \textit{Id.} at 1009-10.
\textsuperscript{106} 482 F.2d 400 (9th Cir. 1973), \textit{cert. denied}, 415 U.S. 918 (1974).
\textsuperscript{107} \textit{Id.} at 403.
\textsuperscript{108} \textit{Id.} at 404.
\textsuperscript{109} \textit{Id.} at 402.
\textsuperscript{110} \textit{Id.} at 403.
\textsuperscript{111} \textit{Id.} at 404.
Donallco had improperly obtained a series of production drawings for certain proprietary fuel pump couplings and drive shafts which were originally manufactured by Pesco and later by Sundstrand when it purchased the Pesco division from Borg-Warner. Donallco manufactured these parts in its own shop without authorization and represented to the government that the parts were surplus, manufactured by Pesco, which had been obtained by Donallco from the Norfolk, Virginia Naval Air Station in prior years.

The deception accomplished two objectives. First, Donallco obtained business at the expense of Sundstrand, owner of the right to manufacture the parts in question by making parts without a license or under proper quality assurance supervision, thus lowering its production and license costs. Second, by representing that the parts were surplus and had been made by Pesco, Donallco bypassed the more stringent inspection requirements of MIL-I-4208, which is mandatory for current new production of parts. Evidently the fact that Donallco was defrauding both the owner of the rights to manufacture the pump shafts as well as the government and was caught red-handed was lost on Donallco’s counsel when he insisted that tests had proved that the parts were “safe.”

The fraud might have gone undiscovered if Donallco had not submitted parts to the government which were dimensionally incorrect and which were rejected by United States Air Force inspectors at Kelly AFB, Texas. Donallco’s government contracts administrator subsequently learned of the existence of the clandestine manufacturing scheme and system of bookkeeping which allowed the parts to be passed off as surplus, and he took incriminating evidence concerning the production of the parts as well as samples of the parts when he resigned his position.

William Allred and several other officers of the company were convicted of conspiracy and making false statements in connec-

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112 United States v. Allred, 867 F.2d 856, 859 (5th Cir. 1989).
113 Id. at 859-60.
114 Id. at 861.
115 Id. at 859 n.4.
117 Allred, 867 F.2d at 863.
118 Id. at 863-64.
tion with procuring government contracts.\textsuperscript{119} On appeal, the court concluded that the evidence uncovered the existence of a "complex and remarkable scheme to covertly manufacture aircraft parts for distribution as new, unused surplus."\textsuperscript{120} The plan defrauded the government since it bypassed the quality assurance program the government established to guarantee that all new parts it buys are approved by government inspectors.\textsuperscript{121}

Significantly, this was not the first time that Donallco found itself having to defend its misrepresentation of the provenance of parts it sold. In the early 1980s, General Signal Corporation (GSC) sued Donallco for misrepresenting parts as new stock from GSC's New York Airbrake division, subsequently pursuing Donallco for contempt for failing to observe the terms of a consent decree.\textsuperscript{122} Donallco had sold parts to two firms, Aviation Methods and Field Aviation, and had represented that the parts were new and unused, when in fact they were not.\textsuperscript{123} In addition, Donallco had passed off parts which had been repaired by using an unapproved chrome plating process as new, and Donallco had stated that the parts met FAA standards when, in fact, the parts did not.\textsuperscript{124} Ultimately, the court upheld the district court's finding of contempt against Donallco, but remanded the case to the lower court for a redetermination of the penalties involved because it was unclear whether the penalty was compensatory or coercive.\textsuperscript{125}

Ontario Air Parts and several of its officers defrauded the FAA and several firms that purchased parts from them by representing that the combustion liners which Ontario sold had been approved for use in civil aircraft by the FAA, when in fact they had not.\textsuperscript{126} Ontario Air Parts also represented that some of its parts had been manufactured by General Electric, when they had not.\textsuperscript{127} The actual manufacturer of some of the combustion liners was Masbe, a Taiwanese firm which supplied the parts to the

\begin{footnotes}
\item[119] Id. at 859.
\item[120] Id. at 872.
\item[121] Id.
\item[123] Id.
\item[124] Id.
\item[125] Id. at 1380.
\item[127] Id.
\end{footnotes}
Republic of China Air Force for use on its Northrop F-5 aircraft.\textsuperscript{128}

The J-85 engine installed in the F-5 is manufactured by General Electric.\textsuperscript{129} It is similar but not identical to the commercial CJ-610,\textsuperscript{130} an engine installed on civil aircraft such as the Jet Commander, Israel Aircraft 1121/1123 series and early Lear products. The military combustion liner produced by Masbe is superficially similar to the civilian product, but differs in important details and is therefore not considered to be interchangeable.\textsuperscript{151}

Ontario Air Parts also sold Masbe combustion liners to the air forces of Thailand and Turkey and did not disclose that the liners were not General Electric products.\textsuperscript{132} At least one engine failure on a military aircraft in Turkey was attributed to the Masbe part.\textsuperscript{133} Ontario Air Parts also obtained military combustion liners, which had been produced by General Electric but were illegally altered and sold to them for use on civilian engines.\textsuperscript{134}

Aeroheat, an aircraft service facility, was awarded a limited repair station certificate in 1985 which allowed it to repair combustion tubes for Janitrol heaters by, among other things, welding them.\textsuperscript{135} Subsequently, it was determined that the certificate had been incorrectly granted since Janitrol’s repair manual prohibited repairs by welding.\textsuperscript{136} The certificate also did not describe the combustion tubes which were to be repaired by part number or model and provided no standard by which the repairs would be evaluated to ensure that the work met the quality standards of the production certificate holder—in this case, Janitrol.\textsuperscript{137} Enforcement was delayed to allow Aeroheat to bring its processes into compliance with regulations because it was thought that the repairs being done were good quality work.\textsuperscript{138}

\textsuperscript{129} Id.
\textsuperscript{130} Id.
\textsuperscript{131} Id.
\textsuperscript{132} Id.
\textsuperscript{133} Id.
\textsuperscript{134} Id.
\textsuperscript{135} Id.
\textsuperscript{136} Id.
\textsuperscript{138} Id.
\textsuperscript{139} Id.
\textsuperscript{131} Id.
\textsuperscript{132} Id.
Aeroheat continued to overhaul Janitrol combustion tubes using the unapproved process, refused to comply with amended certificate restrictions, and refused to post the limits to its repair station certificate. Consequently, Aeroheat's repair station certificate and any airman certificates were revoked in 1989. The operator had been informed that he needed to either obtain a Parts Manufacturing Authority, Supplemental Type Certificate or cease performing the work he was involved in, but he overhauled at least seventy-eight combustion tubes without having the appropriate technical data which would have allowed him to perform the work. Mere visual inspection of the repaired parts was an insufficient basis for approval, and the regulations require that work be done in accordance with approved manuals or methods. Subsequently, the case was settled before a hearing on the merits, and Aeroheat was granted PMA status, but it did not win its appeal of the order denying attorney fees.

Aero Lectrics had its Repair Station Certificate revoked for performing unapproved major alterations on 22 Lucas aircraft generators and certifying a blower as overhauled without having the approved technical data available. Rocky Mountain Airways had experienced difficulty in obtaining generator housings for its DeHavilland aircraft, and Aero Lectrics devised a repair process to salvage otherwise unusable housings by machining the bearing surfaces oversize, chrome-plating the surfaces, and regrinding them to standard size. This process had never been approved by the manufacturer or by the FAA, and Aero Lectrics never obtained approval for its process. In its appeal, Aero Lectrics argued that the repair constituted preventive maintenance because it involved application of preservative material and, thus, was not a major alteration requiring approval by the manufacturer or the FAA. The board disagreed, holding that complex disassembly procedures and unapproved grinding

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139 Id.
140 Id.
141 Id. at *5-6.
142 Id. at *2.
143 Id.
145 Id. at *6.
146 Id. at *3.
147 Id. at *6.
148 Id. at *2.
and plating operations consisted of unapproved major alterations because they change the design of the part by introducing new material. In another instance, Aero Lectrics repaired a blower for Rio Airways and certified that it was overhauled using Rio Airways technical data. However, Rio Airways never had any technical data to overhaul the blower and could not have had it since no overhaul manual from the manufacturer existed at the time.

In 1977, Whittaker Controls prevailed in an unfair competition action in which it alleged that Execuair, a parts vendor, had counterfeited its hydraulic aircraft parts and passed them off as the genuine Whittaker product, when in fact the parts were not. Whittaker was awarded injunctive relief. Evidently, Execuair had produced or obtained counterfeit hydraulic actuators for the Lockheed C-141 Starlifter cargo aircraft that is used by the United States Air Force. Finding that Execuair was in contempt of the original order, the trial court adopted the remedies proposed by Whittaker which required that Execuair desist from using part numbering systems substantially similar to Whittaker's and ordered the destruction of all parts and inventory held by Execuair. On appeal, the Ninth Circuit affirmed the destruction of only the infringing goods, holding that destruction of non-infringing goods is impermissible.

Cutler-Hammer, a well respected manufacturer of electrical components, brought action against Standard Relay Company and Universal Relay Company for selling aircraft relays bearing Cutler-Hammer trademarks which were salvaged goods that were modified to look like new Cutler Hammer relays. Others were of undetermined origin that had had counterfeit labels applied. This was accomplished by applying AN (Army-Navy) numbers to surplus, used, reconditioned, or defective

149 Id. at *3.
150 Id.
151 Id. at *4 n.5.
152 Whittaker Corp. v. Execuair Corp., 953 F.2d 510, 512 (9th Cir. 1992).
153 Id.
155 Whittaker Corp., 953 F.2d at 512-13, 518.
156 Id. at 519.
158 Id.
parts. Universal applied counterfeit nameplates and inspection stamps to similar outdated or defective parts and thereby passed them off as current production. The part numbers, stamps, and nameplates thus applied indicated compliance with performance standards that the relays had not, in fact, met.

When manufacturers and repair stations order relays for aircraft use, they do so by ordering MS (Mil. Spec.) or AN (Army-Navy) part numbers. The numbers indicate that the part has been qualified and conforms to a certain set of discrete performance and inspection standards. The manufacturer or repairman relies on the part number as evidence that the part has, in fact, been qualified to the applicable specification and relies on the reputation of the manufacturer of the relay that the parts have been qualified. In view of the fact that Standard and Universal produced catalogs which depicted Cutler-Hammer products with MS numbers, serious misrepresentation was found in the defendants' practice of procuring obsolete military surplus relays and applying current MS or AN numbers to convey the impression that they had been qualified by Cutler-Hammer. Universal had purchased copies of nameplates and relabeled the relays with the counterfeit labels.

Manufacturers of aircraft subassemblies purchased relays which contained unapproved hardware, were painted in areas which were required to be bare metal, and contained parts which could not have been manufactured after 1955. The defendants had, in other words, rendered a large number of old relays into their component parts, segregated the parts, and reassembled the accumulated components into a sort of bastard relay and identified the resulting product with a genuine part number and trademark.

Magno Palacios, a West Hartford, Connecticut resident who manufactured parts for Pratt & Whitney, was charged by state authorities with larceny because he placed Pratt & Whitney parts.

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159 Id. at 873-75.
160 Id.
161 Id. at 880.
162 Id. at 871.
163 Id.
164 Id. at 872.
165 Id. at 873.
166 Id. at 874.
167 Id.
168 Id. at 875.
169 Id.
trademarks on aircraft parts he manufactured without authority to do so, subsequently disposing of the parts through a broker.\textsuperscript{170}

A senior quality control inspector at the Lucas Industries transmission plant in Park City, Utah was indicted as a result of a government fraud inquiry.\textsuperscript{171} Lucas Industries had previously pled guilty to thirty-seven counts of fraud and paid a fine of $18.5 million dollars.\textsuperscript{172} Lucas Industries produces transmissions for military aircraft and falsified test reports when the gearboxs failed the performance and durability test requirements.\textsuperscript{173} The inspector directed employees to report that transmissions had passed quality control tests, when in fact they had failed.\textsuperscript{174}

Lucas Industries also agreed to pay an $88 million civil settlement in the matter, and it is alleged that the transmissions Lucas Industries supplied for 1,500 military aircraft were responsible for engine fires and aborted takeoffs and had a shorter than expected service life.\textsuperscript{175} In three separate associated actions concerning fraudulent certification and testing of military parts, Lucas Industries has had to pay $118 million in fines and penalties.\textsuperscript{176}

Dominic Rvocco received a thirty-seven-month federal prison sentence and was barred from working in the aviation business for three years after release.\textsuperscript{177} Rvocco was convicted of conspiracy and mail fraud in the manufacture and sale of unapproved aviation gaskets.\textsuperscript{178} One of Rvocco’s companies, Amcorp, manufactured the gaskets, and another of his companies, Ramco, sold the gaskets by mail order.\textsuperscript{179} Ramco represented that the parts were FAA approved, when in fact Amcorp did not have approval


\textsuperscript{172} Id.

\textsuperscript{173} Id.

\textsuperscript{174} Id.


\textsuperscript{176} Id.


\textsuperscript{178} Id.

\textsuperscript{179} Id.
to manufacture the gaskets.\textsuperscript{180} The sentence Rvocco received was the maximum allowed under the federal sentencing guidelines, and U.S. District Court Judge Ackerman, perhaps in an excess of hyperbole, referred to his conduct as "heinous."\textsuperscript{181}

VII. THE ECONOMICS OF EVASION

Honest manufacturers of certificated aircraft products typically invest a large amount of capital in development, substantiation, and oversight in an effort to deliver a product that conforms to the type certificate. Much of this effort is devoted to design, quality assurance, inspection, and reliability engineering of parts which may then be subcontracted to smaller manufacturers to produce. The price that is charged for the part is partially representative of the cost of the engineering support services and quality assurance associated with the finished product.

The price the part sells for also reflects overhead costs associated with carrying adequate liability insurance, providing product support and technical services, and maintaining adequate stocks of parts to meet eventualities. It is also, to some degree, reflective of the cost associated with maintaining services and inventories for product lines which have slow turnover or slim profit margins, as well as providing for an adequate return on investor dollars.\textsuperscript{182} A further cost escalator is that quality assurance and testing at a level that assures conformity with the type certificate typically produces a high number of rejected parts, which may not be easily repaired or otherwise recycled.

Economic incentives to circumvent the established system of certification and oversight are provided by the fact that compliance with certification and oversight exponentially increases the cost of parts obtained through legitimate channels. The evader can offer the product at a much lower price because he or she is not burdened with high overhead and consequently does not need to recapture these expenses. Another loophole for evaders exists because there are currently no restrictions on trading in damaged, worn out, or otherwise unserviceable aircraft parts.

\textsuperscript{180} \textit{Id.}
\textsuperscript{181} \textit{Id.}
\textsuperscript{182} For example, McDonnell Douglas Corporation provides limited technical and engineering assistance for aircraft which have not been made for forty years and more. Every scrap of ship's record paper is carefully microfilmed and catalogued, and the original copies are securely stored. It is presumable that the other aircraft manufacturers have similarly costly documentation systems.
Consequently, large quantities of aircraft materials exist in a regulatory vacuum, with the ever present possibility that substantial numbers of these parts may be improperly converted back into the pool of legitimate spare parts. Those who buy and sell such material, so long as they do not actually install it on certificated products and have not misrepresented it, may well be beyond the reach of regulation.

Another economic incentive of a negative sort is found in a decided reluctance to disclose the existence of a suspect part

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183 For a good discussion of metallurgical problems in the gas turbine engine, see G. Geoffrey Smith, Gas Turbines and Jet Propulsion 117-34 (5th ed. 1951). "Hot section" parts in turbine aircraft engines operate under special conditions which affect their airworthiness and require a somewhat extended discussion. The hot section is generally considered as that area directly exposed to the elevated temperatures of combustion, and special periodic inspections of the components within the defined hot section are required. Both rotating and fixed hot section parts encounter temperatures not far removed from the range where plasticity sets in. Id. The chemistry and distribution of the fuel or atmospheric constituents, combined with elevated temperatures, can have an adverse effect on the life of the component parts. Rotating parts are subjected to high levels of centrifugal stress, and turbine blades are subject to extreme gas temperatures and velocities, stratified temperature gradients, and torque. In essence, the blade, which is set at an angle to the gas flow to capture its energy and extract work, is constantly attempting to rotate on its vertical axis. The blade undergoes blade creep, a progressive and predictable plastic deformation, and stresses at the blade root which, combined with the heat encountered, may cause cracks to appear and propagate quickly both in the blade and also in the rotor itself. Id. at 117, 122. When a new blade is installed and subjected to heat and rotation inside an engine, a short period of high creep ensues, followed thereafter by a steady and predictable rate of creep. Id. As the end of the useful life of the blade approaches, the rate of creep begins to rise and abruptly escalates until the blade fails. Id. The safe life of hot section parts is highly predictable over time if cycles and hours of service are carefully monitored. Such monitoring allows timely and safe removal of parts nearing the end of their useful life, as well as allowing for efficient recapture of any remaining useful life on such parts which have been salvaged. Environmental and operating excursions such as hot starts, overheating, and overspeeding adversely affect the useful life of such parts, and often parts must be taken out of service prematurely in such a case. However, the parts thus removed, on visual inspection, appear similar to the serviceable part. Thus, the only way for the subsequent purchaser to distinguish between such parts in the absence of accurate documentation is by destructive inspection of the part itself. Since the grain structure of metal is in some respects thermographic, a section of a turbine blade or other hot section part, if sliced, etched, and examined under the microscope, can in some circumstances reveal the temperature to which the metal has been subjected. The reason for this technical digression is to point out that large numbers of extremely expensive turbine engine parts which have been damaged beyond repair and which cannot be easily distinguished from acceptable parts exist in a sort of gray market of sale and resale, and spurious documentation may then be generated to fraudulently assure the resale customer of the value and utility of the parts.
BOOTLEG AIRCRAFT PARTS

found on an aircraft or in inventory. It may be feared that disclosure could precipitate adverse action by regulatory authority against the operator's certificate. Such an operator may be also financially unable to absorb the loss that disclosure would force. The operator would then have only the uncertain remedy of a civil action against the supplier and might thus decide to let sleeping dogs lie. Additionally, no violation of the installer's certificate presently occurs unless an unairworthy part is installed on a certificated product—mere possession of unairworthy parts is no offense, assuming that the origin, source, and identification of the part is otherwise legitimate and has not been misrepresented.\footnote{184} Thus, such a discovery might well lead to a quiet disposal effort. In other cases, the operator may not want to look too closely at a good deal.\footnote{185}

Product counterfeiting is unfortunately not unique to the aircraft industry.\footnote{186} In the transportation industry, counterfeit hardware and other parts have plagued the over-the-road trucking business for years.\footnote{187} One commentator has estimated that

\footnote{184} Installation of unapproved parts has negative implications concerning the airman's license because the mechanic is required to certify airworthiness. For a case which elaborates on the theme of certifying airworthiness and the sometimes hard choices that conscientious aircraft mechanics are called on to make, see Hawaiian Airlines, Inc. v. Norris, 114 S. Ct. 2239, 2242-43 (1994).

\footnote{185} See Hearings, supra note 41 (statement of A. Mary Schiavo) (indicating a new and aggressive stance in enforcing the law in this field). Among the statutes Schiavo cites that are used against offenders are 18 U.S.C. § 2 (aiding and abetting); 18 U.S.C. § 32 (endangering flight safety); 18 U.S.C. § 371 (conspiracy); 18 U.S.C. § 1001 (false statements including deliveries of inferior or untested parts or unapproved substitution and falsification of test reports and certification as well as false customs declarations); 18 U.S.C. § 1341 (mail fraud); 18 U.S.C. § 1343 (wire fraud); 18 U.S.C. § 1962(c) (RICO); 18 U.S.C. § 2314 (interstate transportation of stolen property); 18 U.S.C. § 2319 (trademark infringement); 18 U.S.C. § 2320 (trafficking in counterfeit goods or services); 18 U.S.C. § 542 (false customs declarations); 18 U.S.C. § 545 (smuggling); and 19 U.S.C. § 1304 (mislabeling country of origin).

\footnote{186} For some other examples of product counterfeiting, see James Bikoff, Imitation Is the Most Dangerous Flattery, Says an Expert—Counterfeit Products Can Kill You, PEOPLE WKLY., June 3, 1985, at 110 (farm machinery, luggage, corn oil, wine, transmission parts, agricultural chemicals, transistors, medical equipment, drugs); Peter Carthy, Fakes' Progress, ACCOUNTANCY, Dec. 1, 1994, at 44 (antibiotics, computer parts, bicycles, liquor, compact disc recordings, sneakers, statuary); Todd Mason, How High Tech Foils the Counterfeiters, BUSINESS WK., May 20, 1985, at 119 (oil filters, clothing, birth control pills, credit cards); Jed S. Rakoff & Ira B. Wolff, Commercial Counterfeiting: The Inadequacy of Existing Remedies, 73 TRADEMARK REP. 493, 496-513 (1983) and cases cited therein (detailing historical origins of product counterfeiting).

\footnote{187} See Donald E. Tepper, Protecting Yourself Against Counterfeit Bolts, PRIVATE CARRIER, Oct. 1988, at 14, 17.
American importers imported over one billion counterfeit bolts from Japan between 1974 and 1985. These bolts were deliberately misidentified by the manufacturers at the request of the importers although the manufacturers did not sell counterfeit bolts in their own country. Due to the fungible nature of hardware generally, the bolts found their way into the pool of parts available for replacement use or supplied to component manufacturers. Some repair facilities, worried about a rash of “fifth wheel” fastener failures, discovered that the aftermarket bolts they used to secure fifth wheels were both counterfeit and inferior. Another truck repair shop found that most of its stock of Grade 8 bolts were counterfeit.

VIII. LIABILITY: TALES FROM THE DARK SIDE

Aviation maintenance facilities and service personnel have often been found liable under general principles of negligence or breach of contract, and courts most often use these principles of analysis in the absence of specific statutes or ordinances.

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188 Id. at 17.
189 Id.
190 Id.
191 Id. at 16. I once personally witnessed from afar some of the effects caused by an overturned trailer load of liquid propane. Given the potential for this sort of misadventure on the highway, it is difficult to comprehend the sort of reckless indifference to consequences which Tepper describes.
192 Id.
193 See Robert A. Brazener, Annotation, Liability for Alleged Negligence of Independent Servicer or Repairer of Aircraft, 41 A.L.R. 3d 1320, 1322 (1972 & Supp. 1995) [hereinafter Brazener, Liability]; see also Stephen C. Kenney, Recent Developments in Aviation Law, 61 J. AIR L. & COM. 3 (1995). The General Aviation Revitalization Act of 1994, Pub. L. No. 103-298, 108 Stat. 1552 (1994) limits liability to a period of eighteen years following installation of a new part. Kenney, supra, at 80. The Act is prospective and does not protect the manufacturer who knowingly misrepresents or withholds information in the application for a type or airworthiness certificate. Id. A nonstatutory exception to state liability exists under the federal common law “government contractor defense.” Under the holding in Boyle v. United Technologies Corp., 487 U.S. 500 (1988) where the United States approved design specifications for military aircraft, the equipment conforms to the specifications, and the manufacturer warned the government about dangers not known to the United States, liability cannot be imposed on the military contractor. Id. at 82. See also Stefan A. Kaiser, What Can Be Done About Bogus Aircraft Parts?, 19 AIR & SPACE L. 298 (1994). In the European Union, when maintenance organizations, aircraft operators, and other parties purchase aircraft parts outside the European Economic Area, they are strictly liable as importers under domestic laws implementing Commission Directive 85/374, art. 3 § 2, which states that “liability without fault on the part of the producer (of industrially produced movables) is the sole means of adequately solving the problem, peculiar to
In *American Airways, Inc. v. Ford Motor Co.*, one of the fundamental cases bearing on the liability of aircraft repairmen, the court found that an aircraft owner has the right to rely on a repairman's performance. In that case, a critical part was gravely flawed, and the defendant failed in his duty to conduct a proper inspection and advise the customer of recommended repairs as he was required to do by the agreement between the parties. Consequently, the court held the defendant liable for breach of contract by way of dereliction of duty, and the damages assessed included sums paid to third parties by the insurance carrier. This case concerned a defect that the pilot could not have detected by the use of reasonable care in performing a preflight inspection, and it is significant to note that the case was decided on a contract theory.

In a case decided on the common law of bailments, a ten-inch-long screwdriver was discovered in the wreckage of an Aerona which had crashed, allegedly because the controls had jammed. The screwdriver was of a type used by the repair facility, and its location in the underbelly of the aircraft was such that it could have interfered with the flight controls before being dislodged by the force of the accident. The court held that the flying service was under a common law bailor's duty to inspect and furnish an airplane which was reasonably fit for its intended use and to take reasonable care in so doing. Although the flying service argued that the cause of the accident was the fledgling pilot's inexperience and negligence, the court found that, in a case of circumstantial evidence, a jury could reasonably have found that negligence of the repairer was the cause of the loss of control and the accident that followed.

our age, of increasing technicality, of a fair apportionment of the risks inherent in modern technological production. " *Id.* at 298. If the importer brings in a defective, counterfeit, or unapproved part, not even the most rigorous inspection will allow the importer to avoid liability because the importer in such a case is held strictly liable. Commission Directive 85/374, art. 7 does not offer the importer the possibility of exculpation based on the exercise of reasonable care. *Id.* at 299.

195 *Id.* at 820.
196 *Id.* at 818-19.
197 *Id.* at 820.
198 Aircraft Sales & Serv., Inc. v. Gantt, 52 So. 2d 388, 391 (Ala. 1951).
199 *Id.*
200 *Id.*
201 *Id.* at 392.
In cases where the defect was such that it would have been
detected by a preflight inspection or exercise of ordinary care,
liability of the repairman is more difficult to establish. In *Vroo-
man v. Beech Aircraft Corp.*,\(^{202}\) the court found the standard of
liability to be “whether the airplane was defectively made or re-
paired, and if so whether the manufacturer or repairer had
knowledge of the probable danger of such defects and could
have reasonably foreseen or anticipated the consequent harm to
this appellant.”\(^{203}\) This holding may be compared to *Lock v. Packard Flying Service*, in which a pilot took an aircraft from a
maintenance shop that had removed the rudder for repairs and
failed to notice the rudder was missing.\(^{204}\) The court held that
removal of the rudder without warning did not constitute negli-
gence because the repairman could not have reasonably antici-
pated that a qualified pilot would not make a preflight
inspection and notice such a defect.\(^{205}\) It appears that in this
case the primary responsibility of the pilot was to perform an
adequate preflight inspection, and the pilot’s actions were, in
the court’s words, “grossly negligent acts.”\(^{206}\)

Similarly in *Kenty v. Spartan Aircraft Co.*,\(^{207}\) a pilot who left only
a general description of his aircraft with service personnel could
not hold them liable after they serviced the wrong aircraft.\(^{208}\)
The unfortunate Mr. Kenty was killed in another airplane crash
before his case came up on appeal.\(^{209}\) The license number of
the plane that was actually serviced by Spartan was noted on the
service ticket, which was handed to the pilot for his signature.\(^{210}\)
He complained about the amount of oil that had been provided
and was directed by Kenty to sign the service ticket, which he
did.\(^{211}\) Both Kenty and his pilot never checked the fuel gauge
that was visible to both of them, and as a result, the plane ran
out of fuel after a period of time and crashed.\(^{212}\)

However, in a case where there was some evidence of negli-
gence on the operator’s part, the court found that the mere fact

\(^{202}\) 183 F.2d 479 (10th Cir. 1950).

\(^{203}\) Id. at 481.


\(^{205}\) Id.

\(^{206}\) Id. at 519.

\(^{207}\) 276 P.2d 928 (Okla. 1954).

\(^{208}\) Id. at 929.

\(^{209}\) Id.

\(^{210}\) Id.

\(^{211}\) Id.

\(^{212}\) Id. at 930.
that the plaintiff was somewhat negligent did not excuse the defendant’s negligence in improperly assembling an engine which seized and caused a forced landing. Although the record of ten flights between Miami and Havana by the operator revealed significant operating problems with the right engine of the operator’s Curtiss C-46A such as high oil temperatures and erratic governing, the undisputed fact that the engine had been improperly assembled in a fundamental way outweighed any negligence on the part of the operator.

In summary, it may be inferred from the principles in the cases that where a plaintiff is able to demonstrate that repair personnel knowingly or negligently installed parts which were not certified or were otherwise obtained through extralegal channels, and those parts were the proximate cause of an accident, and the pilot could not, through the exercise of ordinary care detect the nonconformity, a breach of duty as well as breach of contract would be established. Correspondingly, where it can be demonstrated that the pilot knew of the nonconformity and chose to operate the aircraft anyway, the repairer’s liability would be more difficult to establish. As it was held in the American Airways case, operators and pilots, as well as the public, must rely on service persons to do their job properly. It would be necessary only to demonstrate that someone, somewhere in the chain of control from procurement to installation and inspection knew or should have known that a part was not certified and therefore not airworthy to impute liability to the repair facility.

A cautionary tale is presented by Fagerquist v. Western Sun Aviation for parts installers who install defective or inferior parts. In what would have otherwise been a routine product liability...
case concerning the installation of a defective cylinder on an aircraft which crashed, killing the pilot, Western Sun was held liable for a $1.5 million judgment. Western Sun attacked the damage award as excessive. The record revealed that the manufacturer of the defective cylinder settled quickly with the plaintiff for $20,000, leaving Western Sun alone to shoulder the burden of the award.

Insurance carriers in such a situation might be less than happy to defend such an operator. Most, if not all, aviation liability insurance policies contain exclusions from liability in the event the aircraft is operated in violation of applicable rules or regulations.

In Security Mutual Casualty Co. v. O'Brien, a declaratory judgment issued by the trial court stating that insurance policies covered the loss of an aircraft destroyed in a midair collision while being operated by a renter was reversed by the New Mexico Supreme Court. The court held that under state law, a clear, unambiguous exclusion applied to void a policy when the airplane lacked a current annual inspection, even though there was no causal connection between the accident and the lapsed airworthiness certificate.

In Coren v. Puritan Insurance Co., the court held that an exclusion for lack of a valid airworthiness certificate was applicable when mechanics had disabled the torque-sensing oil lines on a helicopter's engines, which created the potential for the engines, if operated, to exhaust their oil supply. The pilot, two friends, and three female companions took the aircraft from the repair facility and went for an unauthorized ride after drinks at a nearby tavern, and the helicopter crashed when the engine oil was lost.

\[217\] Id. at 634-35.
\[218\] Id.
\[219\] Id.
\[221\] 662 P.2d 639 (N.M. 1983).
\[222\] Id. at 641.
\[223\] Id. at 640-41.
\[225\] Id. at 381.
\[226\] Id.
In *O'Connor v. Proprietors Insurance Co.*, the Colorado Supreme Court reached a similar conclusion, although it appeared from the record that only a paperwork violation existed. In the lower court, it was shown that the one hundred-hour inspection that was performed on the airplane by a mechanic with an Aircraft and Powerplant (A & P) rating was identical to the annual inspection that must be conducted by a person holding an Inspection Authorization (IA) rating. Nevertheless, the court found the exclusion applicable. In his dissent, Judge Coyte of the appeals court noted that federal air regulation is so pervasive that "virtually no plane crash [occurs] without the violation of at least one regulation." The Colorado Supreme Court affirmed, noting that "when the regulation is clearly or implicitly safety-related, the application of the exclusion should be precluded by public policy only where the insured can show that the violation of the regulation was not a cause of the accident." The plaintiff had not made an affirmative showing that the violation was not the cause of the accident.

In *Potter v. Ranger Insurance Co.*, the court, applying Alaska law, held that an exclusion applied to deny coverage to persons who operated an aircraft without a valid airworthiness certificate, whether or not they know that the certificate is ineffective. The court held that the only reasonable interpretation of the exclusion clause was that the company did not want to insure airplanes that do not have their airworthiness certificates in full effect.

In *Monarch Insurance Co. v. Polytech Industries, Inc.*, a policy exclusion was upheld which unambiguously declared that the aircraft could not be operated unless in accordance with the terms of the current airworthiness certificate, including an an-

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228 Id. at 285-86.
230 Id.
231 Id. at 1183.
232 O'Connor, 696 P.2d at 286.
233 Id.
234 732 F.2d 742 (9th Cir. 1984).
235 Id. at 744.
236 Id.
237 655 F. Supp 1058 (M.D. Ga.), aff’d, 833 F.2d 1020 (11th Cir. 1987).
nual inspection. Although the insurer demonstrated no causal connection between the exclusion and the accident, the defendant in error did not disprove causal connection. On these facts, the court determined that the specific exclusion in the policy demanded summary judgment for the insurer.

Conversely, the Texas Supreme Court reached a different result, based on public policy objections. In Puckett v. United States Fire Insurance Co., the court held that a breach of the Federal Air Regulations in and of itself would not trigger an exclusion unless a causal connection was shown between the breach of the regulation and the accident. The fact that the aircraft had not had the inspection required to maintain the airworthiness certificate was not the cause of the accident. In a strongly worded opinion, the court found that where an accident had been caused by pilot error, it was a violation of public policy and produced an impermissible result to allow the exclusion to shield the insurer from liability.

In a case of first impression in Iowa, an insurance carrier attempted to avoid liability on an exclusion based on the pilot's failure to obtain a medical certificate and a lapsed airworthiness certificate. The pilot had not seen the actual policy exclusions and had not been informed that his failure to obtain a valid medical certificate could deny coverage to him. In any event, the cause of the destruction of the Cessna 210 was pilot error in a landing accident. Applying Iowa law, the court held that Iowa Code section 515.101 is intended to preclude insurance companies from avoiding liability due to risks which do not contribute to losses. By comparison, the South Dakota Supreme Court reached the opposite conclusion in a case with similar facts. In Economic Aero Club, Inc. v. Avemco Insurance

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238 Id. at 1065.
239 Id. at 1061.
240 Id. at 1063.
241 678 S.W.2d 936 (Tex. 1984).
242 Id. at 938.
243 Id.
244 Id.
246 Id.
247 Id. at 212. Iowa Code § 515.101 (1995) allows the holder of a contract of insurance to defeat the exclusion, despite how it is characterized, if he or she can show that failure to observe the provision or the violation of the provision did not contribute to the loss.
a pilot whose medical certificate had lapsed was involved in an accident which destroyed a club Cessna 177. The court stated that a different way of construing aviation insurance exclusionary clauses other than their plain meaning was better left to legislative action.

The majority of decisions, however, hold that exclusion clauses which are clear and unambiguous in their intent may jeopardize insurance coverage where the validity of the airworthiness certificate is in controversy, as it would most certainly be if it was shown that conformity with the airworthiness certificate could not be demonstrated because of the installation of unapproved parts, regardless of causation. Moreover, the issue of causation would not have to be established to prejudice the repairman’s case, since discovery of such a situation and the threat of disclosure to a jury would undoubtedly damage an otherwise innocent repairer’s chances for a favorable outcome on the merits. In some cases, courts have held that a finding that an aircraft was not properly equipped, and thus unairworthy, would support a finding of liability against the operator in favor of persons killed or injured in an accident, a point of some significance for the installer of unapproved parts.

In *Southeastern Aviation, Inc. v. Hurd*, the pilot of a DC-3 operated by the defendant reported a malfunction of the only ADF radio receiver installed in the aircraft at the time the aircraft was turned over to the next pilot and crew. Disregarding this information, the flight crew departed en route to an airport which was experiencing limited visibility. Under instrument flight conditions, the pilot reported that the ADF receiver was not operating properly and had not picked up the outer marker. The plane continued for approximately twenty miles before crashing into the side of a mountain. The court found that the DC-3 was unairworthy because of the malfunctioning receiver and

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249 Id. at 645.
250 Id. at 646.
251 For a more complete discussion of the subject of exclusions from aviation liability insurance policies, see Brazener, *Risks*, supra note 220; and Puckett, 678 S.W.2d 936 and cases cited therein.
253 Id. at 445.
254 Id.
255 Id.
256 Id.
should not have been dispatched.\textsuperscript{257} Under the circumstances, the court found that a jury could have found that the operator had been negligent because of the plane’s condition.\textsuperscript{258}

In \textit{Sleezer v. Lang},\textsuperscript{259} a Beechcraft Bonanza, which had been chartered for a trip from South Bend, Indiana to Omaha, Nebraska, attempted to make an emergency landing on an unlighted airstrip, apparently because its fuel had run dangerously low.\textsuperscript{260} While attempting to land at Atlantic, Iowa, the pilot landed in a soybean field short of the runway, and the aircraft nosed over, injuring the occupants.\textsuperscript{261} The pilot was apparently unable to see the airstrip and could not illuminate the area since the aircraft was not carrying flares, as required.\textsuperscript{262} The court held that "violation of any provision of a federal statute, or rules or regulations promulgated thereunder which are intended to assure the safety of travelers in airplanes, is not negligence as a matter of law but may be considered with other evidence in deciding an issue of negligence."\textsuperscript{263}

\textbf{IX. THE INSPECTOR GENERAL’S REPORTS: PROBLEMS REVEALED OR POWER GRAB?}

Industry observers are concerned about an emergent rift between the Department of Transportation’s Office of the Inspector General (OIG) and officials of the FAA.\textsuperscript{264} The Inspector General and her associates have aggressively pursued suspected unapproved parts suppliers and have alleged that some within the FAA are unconcerned about suspect unapproved parts.\textsuperscript{265}

By their testimony some persons inside the FAA do not appear to be convinced that the underground parts industry represents a threat to public safety.\textsuperscript{266} This point of view discounts the demonstrated existence of fraud in the industry and does not convey the message that the persons who hold this view are taking a proactive stance on the subject of air safety. Some sug-

\begin{footnotes}
\footnote{257} Id.
\footnote{258} Id. at 446.
\footnote{259} 102 N.W.2d 435 (Neb. 1960).
\footnote{260} Id. at 442.
\footnote{261} Id.
\footnote{262} Id. at 445.
\footnote{263} Id.
\footnote{265} Id.
\footnote{266} Hearings, \textit{supra} note 41 (statement of David R. Hinson).
\end{footnotes}
gest the Inspector General is “grandstanding,” but the number of criminal cases that have been investigated and successfully prosecuted appears to support the theory that the FAA has been less than vigorous in enforcement.\[267\]

It does not appear to be necessary or desirable to wait for a catastrophe to imagine the existence of a threat to the integrity of the air transport system from bad parts. The three-year investigation concerning LN-PAA\[268\] pinpointed substandard parts as a critical factor in the chain of causation which led to the accident, but the FAA does not include this incident in their statistical base because the aircraft was foreign registered.\[269\] It is apparent to even the casual student of causation that inferior and untraceable parts had a significant part in this incident, and the position of the FAA concerning this matter is disingenuous at best.

The differences that existed between the FAA and OIG erupted when Federal lawmen searched the Phoenix shops of Advanced Turbine Services (ATS) and Southwest Turbine, Inc. in 1992, acting on a report that ATS had performed unapproved repairs on turbine engine parts.\[270\] Investigators traced some of the repaired parts to Canada, and airworthiness authorities grounded an airliner after some of the parts at issue were traced to one of the aircraft’s engines.\[271\] It was found after an engine inspection that some of the parts had failed.\[272\]

The proprietors of ATS were charged with “endangering flight safety,”\[273\] but counsel was able to show that the National Transportation Safety Board did not consider that broken turbine blades affected flight safety.\[274\] Subsequently, charges were dropped against the proprietors of the repair facility, their facility was recertified by the FAA, and the inspector who first reported that an issue of flight safety existed was reprimanded for

\[267\] See Elizabeth A. Marchak, FAA Unable to Keep Junk Parts Grounded, PLAIN DEALER, Aug. 7, 1995, at 1A. (noting that the Inspector General recently reported that her office’s efforts have produced 139 indictments, 111 convictions, $44 million in fines, and 22 judicial actions and investigations in progress).

\[268\] See Convair, supra note 2, at 22.

\[269\] Elizabeth A. Marchak, Bogus Aircraft Parts Proliferate, Senate Panel Begins Hearings, PLAIN DEALER, May 23, 1995, at 1A.

\[270\] Phillips, supra note 264, at H1.

\[271\] Id.

\[272\] Id.

\[273\] Id.

\[274\] Id.
his "unprofessional behavior." It was determined by a government-hired testing laboratory that the blade at issue that had failed did so because of metal fatigue and not as a result of the repairs.

The existing tension then erupted into open warfare with chief safety official Anthony J. Broderick over the relative existence of any danger to safety of flight in the case. Some argue Broderick's conduct in this affair may have prejudiced the U.S. Attorney's case in the matter. Inspector General A. Mary Schiavo recently suggested that Broderick was under investigation by the FBI and ought to be removed from office.

The Inspector General has issued audits of various agency functions that are critical of FAA monitoring and activity in the suppression of the trade in unapproved parts. The following is an abstract of significant parts of the reports.

A. Report on Audit of Pricing of Aircraft Parts R6-FA-3-036

This report is part of a survey intended to ascertain whether "reasonable prices" were paid for parts and whether approved parts with acceptable documentation were being purchased by the agency. The audit was conducted in 1992 at the FAA logistics center. Seventy-one part numbers were randomly selected from 4963 part numbers held in the FAA stockrooms. Some 1331 unit parts of the 71 part numbers were checked to determine if there was adequate documentation and traceability for new parts, and whether repaired parts could be traced to approved repair facilities and were listed in the component

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275 Id.
276 Id.
277 Id.
278 Id.
279 Id.
280 See generally DEPARTMENT OF TRANSPORTATION OFFICE OF THE INSPECTOR GENERAL, REPORT ON AUDIT OF PRICING OF AIRCRAFT PARTS R6-FA-3-036 (1993) [hereinafter R6-FA-3-036]; REPORT ON SURVEY OF SURVEILLANCE OF FOREIGN MANUFACTURED AIRCRAFT PARTS R0-FA-4-001 (1993) [hereinafter RO-FA-4-001]; SURVEY REPORT ON PARTS MANUFACTURING APPROVAL PROCESS R6-FA-4-007 (1994) [hereinafter R6-FA-4-007]; REPORT ON AUDIT OF THE CERTIFICATION AND SURVEILLANCE OF DOMESTIC AND FOREIGN REPAIR STATIONS R4-FA-4-009 (1994) [hereinafter R4-FA-4-009].
281 R6-FA-3-036, supra note 280, at iii.
282 Id. at 2. The FAA logistics center is located at the Mike Monroney Aeronautical Center in Oklahoma City, Oklahoma. Id. at 1.
283 Id.
manufacturer's current parts catalogs. The investigators also surveyed thirty parts already installed on three aircraft operated by the FAA.

The auditors concluded that thirty-nine percent of the surveyed line items contained at least some unit parts that could not be traced to an approved manufacturer. Some parts were made by manufacturers operating without Parts Manufacturing Authority (PMA) approval, and manufacturers of some of the parts could not be identified. For example, four pressure switches which were in FAA stockrooms had had the actual producer's name ground off and replaced by a PMA designation. Investigation revealed that the PMA holder did not have authority to produce the parts in question, never inspected them, and in fact had obtained them from a parts broker. The PMA holder was unable to test or inspect the switches, and had not done so, before applying the etched PMA number signifying approval. The actual manufacturer did not have PMA approval to produce that particular pressure switch.

An analysis of thirty parts installed on FAA aircraft which had not been purchased from primary vendors found that eight out of the thirty parts were "suspect." The report argues that airworthiness of the FAA aircraft could have been substantially compromised because the quality of the parts installed was undeterminable. It was found that FAA personnel had not reported instances of suspected unapproved parts because no procedures had been established to perform this task, and no investigation of suspected unapproved parts was undertaken by the agency with reference to work conducted in its own shops.

\[284\] Id.
\[285\] Id.
\[286\] Id. at 3.
\[287\] Id. at 4.
\[288\] Id. at 5.
\[289\] Id.
\[290\] Id.
\[291\] Id.
\[292\] Id. at 6.
\[293\] Id.
\[294\] Id. at 10.
B. Report on Survey of Surveillance of Foreign Manufactured Aircraft Parts R0-FA-4-001

This audit examined FAA surveillance of foreign manufacturers and suppliers of aircraft parts in 1992.\textsuperscript{295} The audit concluded that the FAA was not conforming to its own internal procedures for identifying so-called "priority parts" or determining whether foreign manufacturers and suppliers required surveillance of their operations.\textsuperscript{296} Priority parts are defined by the agency as "parts which, if they were to fail, could be reasonably expected to cause an unsafe condition in the end product."\textsuperscript{297} The auditors found that the agency believed it did not have the necessary resources to conduct required inspections and had not requested those services from foreign authorities, although, under bilateral agreements, it had the right to do so.\textsuperscript{298} Notwithstanding this, the FAA inspected domestic manufacturers for French civil aviation authorities without charge or in exchange for reciprocal services.\textsuperscript{299} The audit concluded that the lack of adequate surveillance was a "material weakness" in the FAA's internal control systems and that the agency had "no reasonable assurance that foreign manufactured priority parts were being manufactured or inspected in accordance with applicable procedures or approved designs."\textsuperscript{300}

C. Survey Report on Parts Manufacturing Approval Process R6-FA-4-007

This audit evaluated the PMA grant process, compliance monitoring program, and verifiability of the PMA list.\textsuperscript{301} It concluded that the aircraft replacement parts manufacturing community largely ignores regulations governing PMA authority, most notably those who manufacture and ship parts without direct ship authority.\textsuperscript{302} Original equipment manufacturers are those who supply material on contract to certificate holders, and their practice of shipping parts directly to the end user without

\textsuperscript{295} RO-FA-4-001, \textit{supra} note 280, at 2.
\textsuperscript{296} \textit{Id.} at 3.
\textsuperscript{297} \textit{Id.} at 4.
\textsuperscript{298} \textit{Id.} at 5.
\textsuperscript{299} \textit{Id.}
\textsuperscript{300} \textit{Id.} at ii.
\textsuperscript{301} R6-FA-4-007, \textit{supra} note 280, at iii.
\textsuperscript{302} \textit{Id.} at 4.
approval short circuits the certificate holder’s quality assurance system, which was a basis for the original certification.\textsuperscript{903} It was also determined that the FAA was hesitant to enforce its own rules on the subject because some within the agency fear the effects of shortages that would be created by a policy of aggressive enforcement.\textsuperscript{904} The audit also showed that the list of PMA holders was inaccurate, not current, and incomplete.\textsuperscript{905} Thus, it would be difficult to determine whether a manufacturer even had PMA authority, except on a case by case inquiry. A sampling of parts approved by one FAA office showed that the PMA list was inaccurate in fifty of sixty-six cases.\textsuperscript{906}

D. REPORT ON AUDIT OF THE CERTIFICATION AND SURVEILLANCE OF DOMESTIC AND FOREIGN REPAIR STATIONS R4-FA-4-009

This report, issued in 1994, is an audit of the FAA certification and monitoring process for repair stations.\textsuperscript{907} The auditors used the agency’s own criteria to uncover whether approved parts were being used by the repair facility.\textsuperscript{908} If the facility could not demonstrate conformity with the type certificate either by physical marks or supporting documentation, the part was considered “suspect.”\textsuperscript{909} By this standard, forty-three percent of newly purchased parts at the surveyed repair stations could not have approval validated or conformity with industry or FAA standards conclusively established.\textsuperscript{910} Ninety-five percent of parts obtained from parts brokers had insufficient information of this type tending to support approval.\textsuperscript{911} Parts were uncovered which were counterfeit, made by unapproved producers, or which had been purchased directly from vendors without direct ship authority from the certificate holder.\textsuperscript{912} In addition, many facilities were using obsolete repair and maintenance publications\textsuperscript{913} and had improperly substituted parts without authority.\textsuperscript{914}

\textsuperscript{903} Id.
\textsuperscript{904} Id. at 7.
\textsuperscript{905} Id. at 12.
\textsuperscript{906} Id.
\textsuperscript{907} R4-FA-4-009, supra note 280, at iv.
\textsuperscript{908} Id. at 4.
\textsuperscript{909} Id.
\textsuperscript{910} Id. at 11.
\textsuperscript{911} Id.
\textsuperscript{912} Id.
\textsuperscript{913} Id. at 16.
\textsuperscript{914} Id. at 22.
Reasonable minds may differ concerning the degree of problems revealed by the audits. It is also possible to take issue with the methods used in arriving at the conclusions that were reached. However, it is not possible to deny the existence of problems within the agency. The reports point to the existence of a systemic and ongoing breakdown in the FAA's own internal control mechanisms, both with regard to its administration of its own procedures and with regard to the maintenance of its own fleet.

One would have hoped that the FAA would have been able to conclusively demonstrate that the parts in its own warehouses, at a very minimum, could satisfy its own criteria, but that has not proved to be the case. The report of the agency's own task force, which was convened in 1995 to study the issue, concluded that unapproved parts are circumventing the existing network of controls and are entering the system.\(^\text{315}\)

It may also be inferred that since much of the FAA Suspected "Unapproved Parts" Task Force's report addresses information gathering and exchange issues, a lack of adequate information concerning the problem exists at the agency, and the actual scope and nature of the problem may be unclear to the agency. Thus, to conclude, as FAA Administrator Hinson did, that no threat to air safety exists when the agency has not yet been able to adequately identify the scope of the threat is to indulge a taste for self-delusion.\(^\text{316}\)

1. **Control Strategies**

a. Voting with Dollars

The simplest and most effective strategy to protect the aircraft operator or shop owner from most underground parts is to develop and prioritize purchasing policies that tend to favor the original manufacturer of the product in question or their approved vendors or repair facilities. The primary manufacturer or vendor of a part or product in the majority of cases has a continuing interest in marketplace survival and has a reputation

\(^{315}\) FAA Suspected "Unapproved Parts" Task Force, Suspected "Unapproved Parts" Program Plan, Oct. 6, 1995, at 1-3 [hereinafter Program Plan].

\(^{316}\) Hearings, supra note 41 (statement of David R. Hinson). Administrator Hinson states, "The Safety Board has not identified the use of any unapproved part as a cause in any air carrier accident." *Id.* On this reading, the Board must have been unaware of the crash of LN-PAA or chose to totally discount the report of competent Norwegian civil aviation authorities.
to uphold in the aviation community. Such a manufacturer or vendor is more likely to have the financial resources and insurance coverage to meet any loss and is much more likely to be able to draw on the proprietary expertise and processes necessary to properly manufacture or recondition a part. The manufacturer or vendor closest to the source of manufacture is also more likely to be able to supply proper documentation, resolve questions concerning traceability, as well as have superior access to product support services and data.

The aircraft owner or operator is in a commanding position to refuse or reject the services of repair facilities that cannot provide assurances that the products they supply are legitimate and traceable and to refuse to trade with vendors who cannot or will not provide adequate product support. It is helpful in this context for the owner or operator to remember that there is a certain correlation between the price he or she pays for parts and the amount of liability insurance a vendor is likely to be carrying. Direct inquiries about the extent and quality of a vendor’s liability coverage are in order, and the economics of this issue are fairly clear.

The individual operator of a repair facility is also in a commanding position to compel resellers to produce adequate documentation demonstrating conformity for the parts they sell, for many of the same reasons. Voting with dollars is an effective control strategy and a sure fire attention getter.

The down side of this strategy is that it makes it more difficult for the operator of a repair facility to compete for work without some other method of underwriting the generally higher cost of parts purchased from sources close to the original manufacturer. It also raises the overall amount that the aircraft owner or operator is likely to have to pay out for a comparable level of service, assuming that the services that are provided under such widely divergent philosophies of operation can ever be equated.

b. The Benefits of One Stop Shopping

Manufacturers can provide incentives for the operator to specify the factory-approved part by making warranties and cost-sharing programs contingent on a demonstration that repair parts installed in the engine or aircraft have been obtained from approved sources. A strong selling point for the service manager bidding on a job is making sure the aircraft owner understands and has given adequate consideration to these facts. As part of this strategy the repair facility can promote itself as a
value-added organization which takes the time and devotes the effort to research such issues and does its utmost to protect the operator's investment.

Additional incentives can be developed to make the repair facility more attractive, in spite of generally higher prices for parts. Developing the expertise to repair and overhaul products, within the scope of a factory-approved program, can be used to offer inducements in the fight to win customers and offset high prices for parts. As an example, one of the facilities I worked for had developed the expertise and obtained factory approval to overhaul and repair the more common types of propellers. Since the profit margin on propeller overhauls is rather high and the shop's cost in labor and materials was relatively low, propeller overhauls were routinely used as loss leaders to attract aircraft operators to patronize the shop when bidding on the hot section repair or engine overhaul. Similar programs of factory approved overhauls for starters, generators, hydraulic components, magnetos, cylinders, and accessories were marketed with similar results.

c. Maintenance Support Plans

Some manufacturers offer maintenance support programs which provide enrolled operators of selected products with major financial protection regarding scheduled or unscheduled maintenance. For a set fee per hour of operation, which is recomputed yearly to reflect the performance of the pool of enrolled products, maintenance other than routine maintenance is subscribed by the manufacturer.317

This plan and others like it are remarkably similar to health insurance plans and can yield significant benefits for the aircraft owner or operator. The maintenance service plan allows the operator to budget maintenance money for the entire year. Such a plan yields significant financial and tax advantages, since it is not necessary to provide a reserve against unscheduled maintenance. The only restriction on the operator is that some scheduling freedom is lost, particularly where service bulletins or modifications are required, and the choice of repair facilities is limited to those that have been approved by the manufacturer.

317 For a short description of a maintenance service plan, see Garrett Turbine Engine Co. Garrett TPE 331, Turboprop Pilot's Brief and Operational Tips 57 (undated).
Of course, two major disadvantages of these plans are that they are voluntary and only apply to selected product lines.

For the manufacturer, the service plan can limit exposure to suspected unapproved parts because the maintenance facility has already been assessed and qualified and, thus, is something of a known quantity. It can be expected to be conservative in its parts purchasing practices, and the manufacturer always has a certain amount of oversight concerning the maintenance facility and its inventory. The manufacturer also has oversight over the operator regarding service bulletin and modification compliance as well as scheduled maintenance.

Some manufacturers also use a carrot and stick approach to induce operators of their products to avoid suspected unapproved parts. They may wield the warranty cancellation sword to extract compliance from operators who are not enrolled in MSP programs. Some manufacturers are also known to utilize informal “cost protection” incentive programs to rebate maintenance costs to operators who are otherwise in compliance with warranty rules regarding the source of parts used to maintain the product.\footnote{\textsuperscript{318}}

d. The Aircraft Parts Authentication and Tracking System (APATS) Program

Avmark, a private aviation consulting and management firm, in association with technology giant Xerox, is attempting to develop and promote a parts identification and authentication system, with Avmark supplying marketing muscle and Xerox supplying technical expertise, which, it is asserted, will “eliminate the use of unapproved or non-airworthy parts in the aircraft industry.”\footnote{\textsuperscript{319}}

The proposed APATS system consists of marking and sensing technologies.\footnote{\textsuperscript{320}} Using a variety of technologies suited to the particular item, such as microengraving or microholograms, which are embedded in a transparent coating applied with a spray gun, the system would allow verification by use of a variety of sensing and detection technologies, including optical scanners, mechanical scanners, and passive transponder interroga-

\footnote{\textsuperscript{318} The one program of this nature that I am familiar with is not described in any of the manufacturer’s literature, but the existence of the program was generally known in the aviation community. \textsuperscript{319} See Simon Elliot, \textit{Beating The Bandits}, \textit{Flight Int'l}, Nov. 2, 1994, at 36. \textsuperscript{320} \textit{Id}.}
The system as it has been described by Avmark's president calls for the application and integration of several different technologies to perform verification and authentication. Information concerning a particular part would be supported by a database for those parts identified by the proprietary system. The system would not allow universal access to data concerning an individual subscriber's inventory for competitive reasons.

Avmark, among others in the air transport industry, is of the opinion that the problem of counterfeit aircraft parts is not well addressed by more regulation from the Federal government. Avmark's president did not articulate her firm's reasons for stating that regulation is a bad idea when lack of competent regulation and enforcement has produced the problem which may benefit her firm and its process. Avmark merely "disagrees" with it. It is also undetermined what position would be taken with regard to the numerous violations of trademark law, criminal law, and antitrust statutes which are a feature of the underground parts landscape and which the Avmark system would no doubt reveal.

For example, if the lineage and provenance of a subscriber's inventory is proprietary, the ultimate decision whether to place an underground part in service is still within the control of the operator with no more oversight than there is currently. This does not appear to address the problem of controlling the traffic in underground parts and seems to fail at removing the incentives to traffic in such items. It may be argued that Avmark's interest in the issue is more correctly ascribed as self-interest because comprehensive regulation and enforcement would make the APATS system unnecessary.

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321 Id.
322 Id.
323 Id.
324 Id.
325 See U.S.A.: Case of the Flying Bedspring—Bogus and Counterfeit Aircraft Components, LONDON (U.K.) DAILY TELEGRAPH, Feb. 19, 1993, at 17. In this article, Mike Rioux, senior maintenance expert for the U.S. Air Transport Association, says that a counterfeit part might be just as good as a genuine one. Id. In Rioux's opinion, the airlines will never cut back on safety, and he really does not believe that someone would knowingly produce parts that could down an airplane. Id. Rioux's opinions are interesting, coming from a high official in the preeminent industry association.
326 Elliot, supra note 319.
327 Id.
In short, all the APATS system could guarantee would be that there was a history somewhere concerning a part bearing a proprietary identifier which might or might not be accessible. The system depends on total confidence in its integrity for its validity, and the ingenuity of evaders, if considered, is not discussed. It would also add to the price of the part with the requirement for an elaborate record-keeping database and tracking system, without any corresponding benefit in security.

For those who participated, some benefit would be gained, but many, not being under compulsion, would ignore the system and lower their expenses by externalizing the costs associated with their operations. The system Avmark proposes has built-in incentives for dissemblers and fakers and, thus, presents no real unified approach to addressing and controlling the problem of underground parts in a system of competent regulation. Many who practice the criminal arts respond only to the threat of penalties or sanctions, and a posture on Avmark's part that discounts this reality or argues against further regulatory efforts appears shortsighted. One commentator has suggested that the situation calls out for more regulation, not less. Kaiser suggests that until recently international cooperation and coordination and the question of licensing aircraft parts traders were trade-related political issues, but since bootleg parts have become common, licensing of parts traders and enforcement at the international level are required to assure aviation safety.

In sum, the existence of systems such as that which Avmark hopes to promote ought not to act as a bar to further regulation, licensing of vendors, or effective enforcement on the part of government. As good as it may be, the APATS system cannot exert any direct influence over the customs, criminal justice, and regulatory agencies of the many sovereign nations of the world.

e. Other Technologies of Interest

Manufacturers of consumer goods have been active in the fight against product counterfeiting, and the technologies in place and emergent in those fields show considerable promise for authenticating aircraft parts. Allied Corporation, faced with

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328 My father once observed that nowhere is human intelligence and creativity more clearly demonstrated than when fraud lies at the heart of the transaction.
329 Kaiser, supra note 193, at 300.
330 Id.
the problem of low quality imitations of its products, has de- 
veloped a proprietary system for authenticating its oil filters which 
depends on a small metal tag packaged with every oil filter it 
sells. The easily implantable tag is made of a special alloy 
unique to Allied Signal, the existence of which can be verified 
by use of a low-cost scanner. Levi Strauss, the clothing manu-
ufacturer, has utilized a system of label verification using an optical 
scanning system designed by Light Signatures, a California 
company. Interestingly, Light Signatures candidly admits that 
it did not know whether the system is cost effective in Strauss’s 
case since the anticounterfeiting trend among manufacturers is 
“embryonic.” The problem of information exchange is com-
plicated because many manufacturers of consumer goods are re-
luctant to discuss their anticounterfeiting efforts or technologies. American Banknote Company, in association 
with other companies, has pioneered the use of holographic 
technologies which have been used successfully to stop credit card 
counterfeiting. Other emerging technologies, such as 
embedding microscopic plastic chips or other distinctive items 
in sprayable coatings, show some promise in source identifica-
tion of products.

Interestingly, the firms which are presently utilizing an-
ticounterfeiting systems are using them for spot checks of retail-
ers, identifying distributors and sources of potential counterfeit 
items and the like. Reliance on the legal system as the pri-
mary source of detection and control is not the preferred strat-
ey of the most forward thinking element of the business 
community in the battle against product counterfeiting.

On the whole, the development of low-cost and easily used 
scanning technology and verification and anti theft strategies in 
retail commerce which are within the ken of the humblest shop

332 Id.
333 See Mason, supra note 186, at 119.
334 Id.
335 Neubarth, supra note 331, at 102.
336 Id.
338 Neubarth, supra note 331, at 102.
clerk is a phenomenon which ought to make the members of the aircraft industry who argue that effective anticounterfeiting strategies are too expensive and uncertain to implement pause.

f. Trademark Infringement, Unfair Competition, and Other Legal Strategies

A trademark is defined as follows:

[A]ny word, name, symbol, or device, or any combination thereof [that is] (1) used by a person, or (2) which a person has a bona fide intention to use in commerce and applies to register on the principal register established by this chapter, to identify and distinguish his or her goods, including a unique product, from those manufactured or sold by others and to indicate the source of the goods, even if that source is unknown.\(^{339}\)

Trademarks identify the origin of a product, even though that origin may not be known to the purchaser.\(^{340}\) Trademarks are said to symbolize the somewhat nebulous concept of goodwill by providing, at a minimum, verifiability of source identification to purchasers, and in so doing, trademarks are an assurance of quality and consistency for the purchaser.\(^{341}\) Trademarks can consist of words which allow direct identification, such as Pampers or Tylenol. Names or slogans serving as source identification, such as The Heartbeat of America (Chevrolet) or graphic images such as the stork (Vlasic pickles), are considered trademarks, as are devices such as the shape or distinctive appearance of a package or a product which indicates the source or origin of the product.\(^{342}\)

Part numbers and alphanumeric markings on aircraft parts are protectable as trademarks under certain conditions. In Williams v. Curtiss-Wright Corp.,\(^{343}\) an aircraft engine manufacturer’s part number had a single letter prefix added by a competitor who then proceeded to utilize the number in its parts lists and


\(^{341}\) Id. For a well-reasoned and comprehensive decision which surveys the common law of trademarks and which touches on many of the issues under discussion, see El Modelo Cigar Mfg. Co. v. Gato, 7 So. 23 (Fla. 1890).


\(^{343}\) 691 F.2d 168 (3d Cir. 1982).
as an identifier on its reverse engineered parts. The court viewed this act as trademark infringement, because the part number was a proprietary drawing number. In general, numbers on their own cannot be exclusively appropriated as trademarks, but may be protected as trademarks if they indicate ownership or origin. Marks which indicate quality or grade, on their own, are not trademarks, but a single letter, if adopted, is. Inspection stamps, PMA symbols, the five-number federal source identifier many aircraft firms apply to their parts, and the like are also considered trademarks because they identify the product as having a unique and discrete origin.

It may be inferred that, under most conditions, a part number referable to a proprietary drawing can be considered a trademark; thus, application of such a number by a seller of underground aircraft parts leaves him or her open to a charge of trademark infringement. In conjunction with application of other marks which serve to provide source identification, liability for trademark infringement is nearly certain.

The act of passing off one’s product as that of another in an attempt to take advantage of the competitor’s goodwill and reputation is a paradigm act of unfair competition, as well as an abuse of the consumer’s trust. In the Coats case, the Supreme Court remarked that regardless of the trademark issue, competitors have no right to dress their goods to deceive the public and trade on the plaintiff’s reputation. It is “an attempt by one person to induce customers to believe that his products are actually those of another.” Deceptive practices of this nature embody some of the elements of common law forgery, and some states recognize trademark counterfeiting as a type of forgery.

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344 Id. at 169.
345 Id. at 170.
346 Id. at 174. See Coats v. Merrick Thread Co., 149 U.S. 562 (1893); In re Union Oil Co., 88 F.2d 492 (Ct. Cust. App. 1937); Intel Corp. v. Advanced Micro Devices, Inc., 756 F. Supp. 1292 (N.D. Cal. 1991) (holding that the number 386 was a generic term, and plaintiff never asserted rights to numerical designators it used).
348 The phrase “rip-off” was never more aptly applied to a business practice.
349 Coats, 149 U.S. at 566.
351 For example, see State v. Trumbull, 187 A.2d 445 (Conn. Cir. Ct.), cert. denied, 204 A.2d 935 (Conn. 1962) (counterfeiting bearing manufacturer’s cartons so as to pass off surplus as the genuine article is prosecutable as forgery); and Jacobs v. State, 640 N.E.2d 61 (Ind. Ct. App. 1994) (counterfeit trademark
A plaintiff sets out a prima facie case of passing off (for purposes of federal law) by demonstrating the following: (1) a false or misleading representation of the source or origin of the goods was made; (2) there is a likelihood of confusion in the mind of the public about the source or origin of the goods; (3) the confusion is a result of the false representation; and (4) the goods were used in interstate commerce.552 Long suggests that a plaintiff ought to use the following evidence to substantiate that passing off has occurred: (1) evidence of the distinctive nature of the mark at issue or the existence of secondary meaning in the public mind; (2) evidence of actual confusion in the public mind; (3) the offender’s prior knowledge of the plaintiff’s rights in the mark or marks; and (4) use of similar packaging or false representations as to the source of the goods.553

Another writer suggests that manufacturers faced with the threat of counterfeit imitations of their products have available several current strategies to combat the problem.554 Bush suggests manufacturers can explore the following avenues: (1) aggressive pursuit and prosecution of product counterfeiters; (2) reward honest distributors financially for avoiding counterfeit or knockoff goods; (3) use legal action to drive up the price of selling counterfeits and thus erase any comparable advantage gained by the vendor selling the imitation; (4) let it be known that offenders will not escape prosecution; and (5) build internal knowledge and monitoring systems for product distribution systems.555

Some states adopted criminal simulation statutes based on Model Penal Code section 224.2 which criminalizes the practice of making or altering a product to give a false appearance of antiquity or origin that it does not have or if the offender validates, possesses with intent to sell, or offers such an item for sale.556 The leading case in interpreting the law of criminal sim-

553 Id. at 220.
555 Id.
ulation regarding counterfeit goods is *State v. Frampton*. A defendant who sold bogus Wilson baseball gloves with an aggregate value of over $1000 challenged the statute by asserting that it had been preempted by federal law and was vague and overbroad. The court indicated that the Utah statute was not preempted because it did not interfere with the right of an offended party to seek redress under the Lanham Act and also held that the subject matter of the statute could be applied to those who forge or alter modern articles of commerce. The court also held that the amount of the fraud was the amount which the seller received or offered for the goods. Consequently, since the seller had offered the gloves at a price of forty dollars and had thirty-eight gloves in his possession, the seller was properly convicted of felony criminal simulation because the total value of the goods exceeded one thousand dollars.

In another case, a New York court found that modern commercially manufactured products, in this case jewelry fraudulently stamped as 14kt or 18kt gold, are within the subject matter of criminal simulation statutes because the statutes are extensions of forgery law beyond writings or documents, and are designed to protect the consumer against the acts of those who make or alter goods to give a false impression of rarity or ori-

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357 737 P.2d 183 (Utah 1987).
358 *Id.* at 190-91, 193.
360 *Frampton*, 737 P.2d at 196. *See also* People v. Kim, 621 N.Y.S.2d 479 (Sup. Ct. 1994) (for the purpose of prosecution, valuation of counterfeit goods must be based on the value given by affixing the false trademark).
361 *Frampton*, 737 P.2d at 196. The Utah criminal simulation statute, *Utah Code Ann.* § 76-6-518 (1995), and its analogs appear to be more specific than Iowa’s fraudulent practices law, *Iowa Code* § 714.8 (1995), which limits itself in the counterfeit parts context to a person who “manufactures or possesses a false or counterfeit label, with the intent that it be placed on merchandise to falsely identify its origin or quality;” or one who “knowingly attaches or alters any label to any goods offered or kept for sale so as to materially misrepresent the quality or quantity of such goods, or the maker or source of such goods;” or a person who “removes, alters or defaces any serial or identification number or any owner’s identification mark from any property not the person’s own.” *Iowa Code* § 714.8. The Iowa statute thus appears to require a volitional act with regard to a label or identification tag for purposes of misrepresentation and does not make it a crime to alter the serial number on one’s own property. However, *Iowa Code* § 714.16(2)(a), the consumer fraud statute, classifies all such acts as unlawful practices, which are prosecutable by the state as civil actions, and the state may assess penalties of $40,000 per violation.
A later New York case added to this line of analysis when it upheld the conviction under the criminal simulation statutes of a defendant who altered a large number of wristwatches to appear more valuable because of their supposed source or origin.\textsuperscript{363} It appears that the New York courts have thus retreated from an earlier decision holding that a modern, commercially manufactured counterfeit watch lacked "the necessary element of antiquity, rarity, source, or authorship" to invoke the criminal simulation statute.\textsuperscript{364} In \textit{People v. Tanner}, a case involving counterfeit sweatshirts, the court observed that "[n]either the language of Penal Law 170.45 nor the legislative history of the statute show that it should be restricted, as the court in \textit{James} held, to antiques or other rare objects . . . . The purpose of the law . . . is to protect the buying public from deception and trickery."\textsuperscript{366}

The Texas and Arizona courts that have considered the criminal simulation statutes have dealt with the problem of simulated antiques and forged documents. In Texas, the court held that a dealer in antiques who had fraudulently validated the authenticity of two bronze scarab beetles, when in fact they were of modern and common origin was chargeable under the statute.\textsuperscript{367} The defendant had been convicted of theft in the aftermath of a sting operation which targeted his shop, and prosecutors argued the offense was not chargeable as criminal simulation because there was no effort to make the scarabs appear to be rarities.\textsuperscript{368}

The court differed, holding that an underlying assumption of the case against the defendant was that some unknown person made the goods falsely appear to have value or quality because of their apparent age.\textsuperscript{369} Thus, the defendant's knowing authentication of the scarabs violated the criminal simulation statute.\textsuperscript{370} Other Texas courts have criticized this case on the issue of whether the criminal simulation statute ought to be treated as \textit{in pari materia} with theft statutes, although the basic application

\textsuperscript{366} \textit{Id.} at 643.
\textsuperscript{368} \textit{Id.} at 127-28.
\textsuperscript{369} \textit{Id.}
\textsuperscript{370} \textit{Id.} at 129.
of the criminal simulation statute to the act of falsely authenti-
cating articles of commerce appears untouched.\textsuperscript{371}

In Arizona, a court held that an “object,” as the term is used
in the criminal simulation statute, did not apply to a writing as
defined in the forgery statute because the criminal simulation
statute was directed at the problems of faked antiques and art
Treasures.\textsuperscript{372} The Arizona court discussed the inclusion of crimi-
nal simulation as a lesser offense in a case involving allegedly
forged checks.\textsuperscript{373} The court noted that the intent of the statute
was directed at forged works of art, antiques, and natural ob-
jects.\textsuperscript{374} Thus, such an “object” could not be considered as being
within the ambit of the forgery statute, and criminal
simulation could not therefore be considered as a lesser-in-
cluded-offense to the crime of forgery.\textsuperscript{375}

Application of the criminal simulation statutes has some util-
ity regarding the problem of underground aircraft parts, partic-
ularly where state law recognizes the offense and may represent
a usable avenue for control of underground parts where the is-
ssue of personal jurisdiction can be established.

g. Recent Legislative Efforts

In addition, some states have been in the forefront of product
counterfeiting legislation and protection of intellectual property
rights. A case in point is the recently enacted South Carolina
Trademarks and Service Marks Act of 1993 anticounterfeiting
statute which makes intentional trafficking in goods or services
with knowledge of counterfeit marks or in situations where par-
ties ought to have known of the counterfeit mark illegal.\textsuperscript{376}
South Carolina has been joined in this effort by Florida, New
York, and North Carolina. In addition, California has enhanced
its existing penalties for trademark counterfeitors in response to

between the forbidden conduct of criminal simulation as deception and the for-
bidden conduct of theft as acquisition); accord Steptoe v. State, 783 S.W.2d 9
(Tex. App.—Houston [14th Dist.] 1989, no pet.); Cheney v. State, 755 S.W.2d


\textsuperscript{373} Id.

\textsuperscript{374} Id.

\textsuperscript{375} Id.

\textsuperscript{376} Trademarks and Service Marks Act of 1993, 1994 S.C. Acts 486 (codified at
annual losses of $7.5 billion and an estimated 25,000 jobs to the 
counterfeit goods industry.\textsuperscript{377} Florida, which amended sections 831.03 and 831.05 of the 
Florida Statutes to make counterfeiting of private labels or 
trademarks a serious misdemeanor and in some cases a felony, 
also provides for seizure of the goods bearing the counterfeit 
marks by any law enforcement officer.\textsuperscript{378} New York recently 
amended sections 165.72-.73 of the penal law, making trade-
mark counterfeiting a class E felony where the retail value of the 
goods in question exceeds $1000 and a class C felony where the 
value exceeds $100,000.\textsuperscript{379} North Carolina legislation enacted 
this year makes application and use of counterfeit trademarks a 
felony.\textsuperscript{380}

h. Other Statutory Avenues

The various state consumer fraud and deceptive trade prac-
tice statutes are primarily intended to prevent the machinations 
of door to door aluminum siding salesmen, purveyors of miracle 
driveway recoating treatments, and the like.\textsuperscript{381} However, there 
is no reason that an interested attorney general could not pur-
sue and win a case involving counterfeiting or fraudulently certified 
aircraft parts or that an interested manufacturer or operator 
might not convince an attorney general to go after a dishonest 
distributor or seller of such parts. In Iowa, the statute allows the 
attorney general to pursue consumer fraud as a civil action and 
assess penalties of $40,000 per violation.\textsuperscript{382} Generally speaking, 
if a party offered such items for sale in the state, did business in 
a state, or otherwise threatened the health and safety of the resi-
dents of a state such as Iowa, personal jurisdiction would be ass-
ured for the purposes of the consumer fraud statute.

Another novel approach to the problem of product counter-
feiting in general has been taken in New York. In 1165 Broadway

\textsuperscript{377} See Stacey M. Berg et. al., California Enhances Counterfeiting Penalties, 5 No. 12 

\textsuperscript{378} Act of June 15, 1995, 1995 Fla. Sess. Law Serv. ch. 95-300 (West) (to be 
codified at FLA. STAT. ANN. §§ 831.03,.05).

\textsuperscript{379} Act of Aug. 2, 1995, N.Y. Laws ch. 535 (to be codified at N.Y. PENAL LAW 
§§ 165.72-.73).

N.C. GEN STAT. § 80-11.1).

\textsuperscript{381} For a good survey of the scope of state trademark law and its relationship to 
federal law, see Arthur J. Schwab, Trademark Rights and Remedies Under State Law, 5 

\textsuperscript{382} IOWA CODE § 714.16 (1995).
Corp. v. Dayana of N.Y. Sportswear, Inc., the landlord of a commercial building commenced eviction proceedings against the tenant because the tenant was engaged in the manufacture of counterfeit sportswear contrary to state law. The tenant argued that the statute permitting landlords to institute eviction against tenants engaged in illegal businesses was an impermissibly broad reading of the statute and that the statute should only be applied where the uses endangered the health and safety of the community. The court held that the proscription against illegal activity was plain on the face of the statute. The teaching of the 1165 Broadway case is that creative use of existing statutes such as New York’s real property law may be made in the effort to suppress the trade in counterfeit aircraft parts.

2. Toward a Rationalized System of Regulation-Risk Assessment vs. Positivism

There are differences of opinion regarding the extent to which underground parts compromise safety and the steps which ought to be taken. One commentator noted that the fact that a part lacks documentation which demonstrates its conformity with approval provisions of 14 C.F.R. section 21 does not necessarily indicate that it is improperly made, defective, or substandard since it might have been directly sold by a manufacturer who lacks PMA approval. However, he states that there is "no principled basis upon which an end user may presume that it actually conforms to type design." Beach observes that "[t]he primary risk to air safety is posed by counterfeit and other nonconforming parts which are manufactured in secret by unapproved and unqualified producers who have neither access to type design information nor a moral or economic interest in ensuring that the parts they produce conform to approved data."

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384 1165 Broadway Corp., 633 N.Y.S.2d at 725.
385 Id.
386 Id. at 726-28 (recitation of other illegal activity which the statute and its analogues have been used to suppress).
387 See generally N.Y. REAL PROP. ACTS. LAW § 715(1) (McKinney 1994).
388 Hearings, supra note 41 (statement of Chester Paul Beach).
389 Id.
390 Id.
Along with the Aerospace Industries Association, Flight Safety Foundation, Regional Airlines Association, and the Canadian Ministry of Transport, Michael Rioux, speaking for the Air Transport Association, takes the position that parts brokers and suppliers ought to be regulated. Rioux further opines that airlines are "extremely cautious" about selecting sources for spare parts and rely on reputable suppliers as a vital link in the supply chain.  

David Hinson, FAA Administrator, states flatly that suspected unapproved parts do not pose a significant safety problem for the air transport system. 

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391 Id. (statement of Michael Rioux).

392 Id. (statement of David A. Hinson). Mr. Hinson has a unique view of what constitutes a "safety problem," and I certainly hope he feels the same way about the products he and his family purchase at the corner pharmacy. See Mason, supra note 186, at 119. For examples of some bogus parts related air safety problems which may have escaped Mr. Hinson's steely gaze, see Pasztor, supra note 175, at B6 (gearboxes installed on F18 fighters which bore fraudulent testing reports were responsible for 70 emergency landings and 40 other system failures including engine fires); FSF Probe Says Bogus Parts Problem Grows As Regulators Fiddle, AIR SAFETY WK., Feb. 7, 1994 (unapproved tail rotor shaft nuts linked to crash of helicopter in U.K.); Marchak, supra note 267, at 1A (two men arrested who sold at least 14 uncertified scrap crankshafts which fit small commuter planes; parts distributor falsified information in reselling engines from airliner destroyed by fire; NTSB says several civilian helicopter crashes caused by counterfeit parts in U.S.); Dallas Man Pleads Guilty in Bogus Parts Scheme, U.S. Department of Transportation News Release 95-94, June 23, 1994, available in WESTLAW, 1994 WL 279208 (parts reseller fraudulently certified that turbine disks were never exposed to severe stress or heat when aircraft on which they were previously installed crashed in 1989 in Brazil); NDT Firms Indicted on False Aircraft Parts Inspections, NDT UPDATE, Nov. 1, 1992 (falsified records of ultrasonic inspections of critical aircraft parts, which were never performed); Florida Man Sentenced in Bogus Parts Scheme, U.S. Department of Transportation News Release 08-95, Feb. 6, 1995, available in WESTLAW, 1995 WL 45518 (parts broker conspired to falsely certify aircraft parts); Andrew McIntosh, Danger in the Air; Industry, Government Take Aim at Aircraft Parts Black Market, MONTREAL GAZETTE, Feb. 11, 1995, at G1 (Canadian Transport Safety Board found counterfeit helicopter blades in wreckage of a flying school helicopter, although deficient maintenance caused the crash, and subsequently discovered existence of a dozen more pairs); Anna Cifelli Isgro, The Hidden Threat to Air Safety: Substandard and Bogus Spare Parts May Be Causing Crashes, FORTUNE, Apr. 13, 1987, at 81 (helicopter crash which killed traffic reporter Jane Dornacker suspected to have been caused by faulty clutch whose parts did not meet government specifications); Edward H. Phillips, FAA Targets Lycoming Piston Engine Bolts, AVIATION WK. & SPACE TECH., Mar. 27, 1995, at 36 (failed connecting rod bolts caused forced landing of Cessna 177 RG; 2,473 counterfeit bolts had been shipped to customers; FAA issued emergency airworthiness directive); Two Men Sentenced in Plot to Sell Stolen Blueprints of Aircraft Parts, DALLAS MORNING NEWS, Nov. 29, 1994, at 21A (men who stole blueprints from aircraft engine manufacturer apprehended in attempt to sell them to independ-
Administrator for Regulation and Certification, stated that he had "not found a benefit to accrue from the regulation of suppliers." He feels that more regulation will not prove a bar to the criminal, and deceives the public into thinking that there is some benefit to be gained by more regulation. Broderick is of the opinion that no breakdown of responsibility is occurring, possibly because the ultimate source of responsibility is the installer of the part, and the fact that the air transport system is safe proves that more regulation is not needed. In fact, Broderick rejects the notion that a complete "chain of custody" ought to be maintained for parts held by users. Broderick rejected an industry group request for mandatory registration of suppliers. AvMark, as previously noted, is against further regulation of parts suppliers.

Although the views of those who believe that further regulation is not needed because the safety benefits are not shown in the record have some currency, their arguments do not address the fact that, as Beach points out, lack of documentation means that there is no reliable basis for anyone to conclude that a
given part is airworthy or conforms with type design. Further, as
James Frisbee pointed out, where the flight crew is dead and
cannot testify as to why they lost control, it is unlikely that an
investigation team can identify an equipment failure when the
aircraft is spread in pieces over several acres of ground.\textsuperscript{400}

The oppositionists also do not confront the issue of wide-
spread criminality in the reselling black market—indicating
clearly that the involved parties themselves are not concerned
with safety. The "risk assessment" lens being used by some
within the FAA concerning the subject of air safety is a new and
disturbing point of view which bodes ill for the aviation commu-
nity and in the particular circumstances posed by the black mar-
ket in aircraft parts has little to recommend itself as a predictive
tool.\textsuperscript{401} On the contrary, it represents the view of those who,
standing on a diving board on a pitch dark night, prepare to
leap on the theory that nothing bad has happened yet, so there
is no reason to conclude that the pool is not full. Risk assess-
ment as a justification for policy depends for its utility on reli-
able knowledge of the various risk factors involved, which are
derived after long and careful study. It can hardly be said to be
reliable where key elements of the statistical base, such as a stan-
dardized terminology, a reliable and accurate reporting system
and a means of assessing human criminality, are missing.

The FAA Suspected "Unapproved Parts" Task Force recently
released a report detailing what it believes the FAA's role in the
unapproved parts controversy ought to be, possibly at the prod-
ding of the Inspector General.\textsuperscript{402} Most of the recommenda-
tions that are made in the task force report are directed at issues of
policy, information exchange, and definition, and there is little
in the report that would lead to an immediate resolution of the
unapproved parts problem. The task force's thirty recommen-
dations,\textsuperscript{403} while needed, are incremental in nature and cannot
be expected to bear fruit rapidly or bring pressure to bear on
the sellers of bootleg parts in the short term.

\textsuperscript{400} Hearings, supra note 41 (statement of James M. Frisbee).

\textsuperscript{401} Id. (statement of David R. Hinson).

\textsuperscript{402} See generally PROGRAM PLAN, supra note 315. The placement of parentheses
around the term "Unapproved Parts" in the title of this report, Suspected "Unap-
proved Parts" Program Plan, and the name of the task force itself, FAA Suspected
"Unapproved Parts" Task Force, is food for thought for the paranoid, and it begs
the question of why this obvious exercise in style was thought necessary.

\textsuperscript{403} Id. at app. G.
The overall goals of the task force’s proposed program plan are to clarify FAA unapproved parts policies, standardize the use of terminology, establish a national program office and an enhanced parts reporting system, improve cooperation with law enforcement, pay more emphasis to receiving inspections, clarify responsibilities of maintenance persons, expedite the rulemaking process, improve FAA in-house training, define scrap disposal procedures, and define procedures which could allow the timely removal of unapproved parts from stocks as well as from aircraft.404

The only substantive recommendations made in the program plan are to make the reporting process for suspected unapproved parts mandatory405 and to require destruction of scrap parts,406 although the report declined to address the consequences of such a rule.407 A second rulemaking effort endorsed by the task force was to “prohibit any person from making a fraudulent or intentionally false statements involving a record that represents the acceptability of an aircraft product, part, or material for use in civil aircraft.”408 This appears to be duplicative of existing law since such deliberately false and misleading statements are already prohibited and prosecutable under a multitude of federal and state statutes. As well, this recommendation does not appear to address the issue of making such statements concerning parts which are intended for use on military aircraft and thus offers no protection where parts have dual usage (as many do) and the vendor chooses to misrepresent their condition with a caveat that they are fit for military use only.

The agency task force did not support mandatory registration or licensing of parts resellers or brokers, but supports a voluntary program of broker and reseller accreditation being promoted by industry and FAA.409 This program proposes to select auditing firms and auditors who would then audit firms and brokers seeking accreditation.410 “Special enforcement considera-

404 Id. at 1-5 to 1-8.
405 Id. at app. G (recommendation 6).
406 Id. at 6-18 to 6-20.
407 Id. at 6-20.
408 Id. at app. G (recommendation 8).
409 Id. at 6-4 to 6-6.
tion” would be used to police the system. Thus, if an operator using an approved distributor installed an unapproved part, only the distributor would be subject to enforcement. If an operator used an unaccredited distributor, both the operator and the distributor would be subject to enforcement action.

Apart from the obvious constitutional and liability arguments that such a two-tiered system of law enforcement raises, there are serious legal questions raised by a system of law enforcement that would selectively prosecute some vendors and operators based on their lack of participation or membership in an allegedly voluntary scheme of self-regulation. Further, such a plan would escalate the already significant price differences between the legitimate manufacturer and distributor’s products and those of the less scrupulous vendor and thus, paradoxically, increase rather than decrease the rewards for cheating.

In addition, the task force recommended that FAA obtain legislative authority to seize and destroy counterfeit parts, although it was not specified how this would be accomplished, and such a provision may be duplicative of existing law.

Fashioning an effective program of controlling the excesses of the aircraft parts industry must cope with political realities as they are found in the post modern era. Thus, a program which argues for a significant increase in agency costs or regulatory burdens faces the prospect of an uphill battle for funding in an era of declining budgets, deficits, and government deconstruction. Nonetheless, a certain level of oversight is appropriate if only because even fiscal conservatives would probably concede that the job of assuring air safety is too important to be eliminated or privatized, particularly where lack of effective controls in the market is at least partially responsible for the problem of unapproved parts.

Any approach to the issue must recognize that there are four separate areas that need to be addressed: provenance assurance

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411 Id.
412 Id.
413 Id.
414 Id.
415 PROGRAM PLAN, supra note 315, at app. G (recommendation 14).
416 See James Ott, Reform Issues, Cuts in Budget Rock FAA, AVIATION Wk. & SPACE TECH., July 3, 1995, at 29. Not everyone agrees. The situation Ott describes is reminiscent of that of the farmer who thought feed for his draft horse too expensive. The solution appeared to be to train the horse to work without eating. About ten days later, the horse seemed to be getting used to the idea when it unfortunately died.
of the parts themselves, rationalization of existing regulatory structures, installing a coherent and standardized technology of identification and accounting which is easy to use and hard to fool, and increasing the level of surveillance in the marketplace. Additionally, it is worthwhile to note that preventing the manufacture or introduction of a bootleg part into commerce is as valid a control strategy as detection and elimination of existing parts or punishing offenders after the fact, and probably is considerably less expensive on a unit basis. It is, in fact, locking the barn door before the horse escapes, not after. Thus, the following suggestions are offered as possible approaches to the problems discussed.

a. Meaningful Quality Assurance and Training

The first line of defense for any operator or repair facility in defending itself from suspected unapproved parts is the awareness, integrity, knowledge, authority, and independence of its staff, particularly parts persons, quality assurance inspectors, and mechanics, for they are responsible for certifying that materials and repairs conform to type specifications and applicable regulations.

The basis of effective quality assurance is independence, authority, and technical expertise, combined with an inquiring mind and substantial practical experience. Unfortunately, many organizations do not have standardized and effective training programs for quality assurance inspectors or a well-developed idea of what sort of responsibilities an inspector or an inspection department ought to be charged. Similarly, some firms do not have such a philosophy for making their other employees aware of their role in controlling suspected unapproved parts. Sometimes, the quality assurance function is seen as an obstacle to production or a sinecure for superannuated mechanics, rather than a central part of the entire operation. Output-oriented managers who are boosters of the "production team" school suggest that the task of inspection ought to be to facilitate production by any and every means.

The thinking manager will at once realize that if the integrity of the production and repair process cannot be accounted for at every step by competent persons who are properly acquainted with what the law requires, the integrity of the system and its verifiability is not determinable. Such risks, being unknown, cannot be intelligently weighed.
It will be apparent that there are no responsibility requirements for aviation service managers, parts stock persons, purchasing administrators, salesmen, secretaries, or groundkeepers. The only persons charged with the responsibility to certify conformity are the persons performing the work, the persons directly supervising when the actual worker is uncertificated, or the quality assurance inspector.

Regardless of the legal requirement for certification, the practical manager will grasp that all persons involved in parts supply need to be properly trained in recognizing the unapproved part. A well-thought out, ongoing, and substantial set of procedures and training programs for these persons is necessary to insure conformity with the regulations and the repair station certificate and guarantee the integrity of the work performed by focusing on assuring the traceability and airworthiness of all parts used by the facility.\textsuperscript{416}

b. Mandatory Reporting of Suspected Unapproved Parts Within Forty-eight Hours—Designated Material Examiners

A rule that required mandatory reporting of a suspected unapproved part within forty-eight hours of becoming aware of its questionable status, as well as mandatory reporting to the production approval or certificate holder, could prove useful in generating the level of reporting that would allow the agency and component manufacturers to ascertain the scope and extent of the suspected unapproved parts problem and identify problem manufacturers and resellers in an expeditious fashion.

In order to address the large number of inquiries that such a policy would generate, a separate class of FAA-designated material examiners could be created to resolve many questions concerning suspected unapproved parts without additional burden to the agency beyond certification and surveillance of the newly created designees. This class of designees would be required to submit findings to the agency and could be given the authority to issue stop sale orders pending resolution of contested findings of fact.

\textsuperscript{416} See 3 DOUGLAS AIRCRAFT CO., MCDONNELL DOUGLAS CORP., QUALITY ASSURANCE MANUAL, FAA CERTIFIED REPAIR STATION NUMBER ML3R688L (1991). For a comprehensive and well-thought out procedure manual for repair station quality assurance personnel, one cannot do much better than this document.
c. Mandatory Mutilation of Unretained Parts

A requirement that all scrap parts and removable data plates which are not returned to a primary manufacturer or authorized remanufacturer or retained by a repair facility for future reconditioning be mutilated beyond repair before transfer to a third party would eliminate one large source of black market parts and misleading documentation. As part of this rule, a record of retirement from service report would be required to be transmitted to the manufacturer of the part or its successor so that the manufacturer’s database could be updated.

d. Manufacturer Serial Number/Subsequent History
   Computer Bulletin Board

Manufacturers of serialized parts would be required to make serial number and subsequent history records easily accessible either by means of the Internet or by on-line BBS services and to take steps to upgrade the quality and accuracy of their information retrieval services. An opportunity for large database management firms such as credit reporting agencies could be created to provide such a service at a modest cost. Facilities should be provided so that parts personnel and receiving inspectors can receive rapid verification of a part’s certification status for a modest fee. To minimize the adverse impact and confusion that such a system might cause in the industry, a phase-in period would be incorporated which could be retrospectively extended year by year, while incorporating current production parts.

For manufacturers with a relatively modest production level, a computerized bulletin board service utilizing a PC platform or an Internet home page and a dedicated phone link could be implemented rather inexpensively. Although this level of record keeping represents more work for suppliers, it is worth remembering that large data management firms are used to undertaking record keeping tasks of this magnitude. In short, if TRW can maintain reasonably accurate credit histories on millions of Americans which can be accessed for a modest fee, the technology exists to do the same for serialized aircraft parts.

e. Mandatory Registration and Licensing of Parts Resellers

The current position of the FAA and some sectors of the aviation industry is that licensing of parts brokers and resellers is not needed and will not produce any increase in air safety. How-
ever, licensing would allow identification of persistent offenders and high risk areas of the aircraft parts industry and would pose no great barrier to the vast majority of legitimate businesses. Licensing, if adopted, should also allow for the identification of the principals associated with corporate resellers. At some future time, a bonding requirement or some proof of financial responsibility as a requirement for licensing could be phased in if conditions warranted it and the particular applicant was deemed high risk. This information could be made accessible for minimal cost through the same electronic channels created to verify the certification status of other individuals and firms subject to FAA certification.

f. Standardized Portable Identification Technology as the Primary Method of Part Authentication and Verification

This requirement could be as simple as a system of bar coding and portable scanning devices such as those used by every UPS delivery driver. Some have objected to the cost of this to the individual repair station operator, but the inexpensive and common technology now readily available makes these objections of little significance. With a phase-in period to allow every manufacturer to incorporate permanently affixed bar codes to their products by means of etching, this system would make it significantly more difficult to introduce unapproved parts into commerce. A phase-in period for further improvements in technological verification methods is desirable. A permanent oversight working group within the FAA to monitor technology, make recommendations, and implement improvements could be established. Adoption of a standardized technology should not be a bar to proprietary systems of verification technology, but should be the primary source of verification.

417 Software which allows the user to add bar codes to any graphic or printed document is readily available. In conjunction with a modest investment in a personal computer and a trained operator, few parts producers or resellers in today's world can argue that the price is prohibitive or that the utility of the technology is speculative. See supra note 337 and accompanying text. Implantable passive transponder technology is the nightmare of aficionados of Dana Sculley and is currently in use both in implants meant to identify stray pets, microchips imbedded in breast implants, livestock monitoring, and loss prevention systems familiar to ordinary consumers.
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g. Rationalization and Limitation of the PMA and Repair Station Rolls

As part of its audit, OIG determined that there was no easy way to determine PMA status on any particular part. A first step toward rationalization of the PMA process might be to declare an open re-enrollment period and then remove from the rolls all PMAs which were not renewed. Thereafter, all PMAs would lapse every five years, subject to renewal, similar to the procedure which is used to license manufacture of pesticides. Such a process would remove large numbers of "stale" PMAs and place the burden of continuing enrollment on those who benefit most from it, and it would also allow for a periodic review of PMA holders. In addition, PMA granting authority should be subject to review by a centralized working group in the interest of enforcement and oversight standardization.

A similar process should be enacted without delay to review all repair station certificates, if only to remove from the rolls stale certificates and those certificates which the holders are not entitled to hold because they were improvidently granted or because lack of oversight has caused the holders to become lax in their responsibilities. Additionally, a centralized working group should be established without delay to oversee standardization of the repair station certification process.

\[418 \text{See } 7 \text{ U.S.C. } § 136d(a)(1) (1994) \text{ (requirement for cancellation of registration of any pesticide at the end of five years unless the registrant requests continuation).}\]