

Dysfunction in UAS Regulatory Safety Decision Making: Analysis and a New Paradigm

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In this paper the authors postulate that the absence of an articulated paradigm and decisional standards for determining whether a particular UAS operation will be “reasonably safe” for performance over the non-consenting public is the most significant barrier to certification/operating approval for commercial UAS. The authors attribute this gap to, and describe, dysfunctional behaviors on the part of FAA that avoid/prevent effective safety decision making, and discuss why such behaviors are intractable as long as safety decisions reside within government. To effectively address this decisional dysfunction, the authors recommend that FAA’s safety role and authorities be transferred out of government as an element of Congressional legislative corporatization/privatization legislation.

Notwithstanding the activity around getting unmanned aircraft flying in some useful way, it’s difficult to see any organized pathway to regulatory approval of large numbers of commercial UAS in the foreseeable future. Truth be told, regardless the level of demonstrated aircraft performance and reliability, there is no agreed air traffic regulatory approach, including safety standards or a certification construct, for approving wide spread UAS operations over the non-participating public, or over non-welcoming property owners.

Getting UAS into the air in some meaningful way actually boils down to one core policy decision; How safe is safe enough for this this new entrant to the National Airspace System? And under current law scoping FAA’s realm of authority and responsibility, *this determination is a matter of public policy*, inherently governmental in nature, and belonging exclusively to the FAA. Regardless that—and maybe especially because--this determination will impact, for better or worse, the business interests of a broad spectrum of aviation enterprises, it cannot—and should not--be delegated to private sector organizations, especially those dominated by industry representatives.¹ In the final analysis, although such organizations take into consideration the views of outside interests and advisory bodies, FAA officials must make the determination of what’s “acceptably safe” in the interests of, not only of the traveling and shipping public, but also of people on the ground who might be injured or damaged.

¹ The incorporation of private sector resources in all sorts of decision making processes through collaborative task forces and advisory bodies holds inherent dangers, and should be employed by Federal agencies only with extreme caution. Because of resource limitations, individual experts and small and disadvantaged companies are not able to participate on equal ground with larger enterprises in such volunteer activities. The result is that such deliberations are very often dominated by large industrial players. Outcomes therefor are heavily biased toward large manufacturer/operator views and objectives, often to the detriment of competition and public good. This caution applies equally to technical tasking and deliberations, as to as policy oriented issues such as safety standards.

This is not an impossible decision or set of decisions to make. It takes, for example, stating explicitly that the existing level of safety² is acceptably safe (i.e., the public seems satisfied with the current level of safety—they fly every day without fear), and instructing FAA officials that, for certification or operational approval, UAS must demonstrate the level of safety already prevailing in the environment in which they intend to operate. Such target levels of safety (TLSs) can be embodied in regulatory standards, or required as an element of proof in the UAS applicant’s safety case for a specific vehicle or operation.

Benchmarks of current NAS safety already exist³, and certification/regulatory applicants are more than willing to produce granular and environment-specific comparative safety performance data to support their regulatory safety cases. So why, then, is the real goal of all of this frenetic UAS activity—getting drones flying regularly in the NAS--so elusive?

The authors suggest that the answer largely lies in inherent characteristics and decision-making behaviors of bureaucracies. Without postulating the reasons why government officials engage in these behaviors, the following tactics do indeed negatively impact UAS regulatory progress regardless of technical merit or justification:

- **The Naysayer.** This is the person who always searches and finds a catalogue of reasons why something can’t be done. The more reasons against something they generate, the smarter they believe they sound. Because negative participation gets pretty tiresome to others, naysayers pretty quickly learn to **overcomplicate** matters (usually with dazzling techno-speak) or **sidetrack** the discussion into unproductive avenues to achieve the same results. “The devil is in the details” is a favorite catch phrase of naysayers.
- **The Legacy Defender.** This person always will revert to “the way this always has been done.” He or she defends the status quo on the grounds that “it has brought us the world’s safest system,” so we shouldn’t change anything for fear of making things worse.
- **The Process Junkie.** This person or organization spends all their time planning work—creating and tasking advisory committees, writing strategic plans, creating and revising tools to schedule, track, and analyze *someone else’s work*—and never actually gets down to doing work themselves. Planning becomes the product in itself. Sad to say, but proliferating iterative collaborative forums often fall into this category of comforting non-work masquerading as progress.

² FAA Order 100.161 CHG 1, p. 19,

<http://www.faa.gov/documentLibrary/media/Order/Order%201100.161%20CHG%201.pdf>

³FAA does publish an annual Portfolio of Goals, which provide some performance statistics and aspirational goals for various aspects of the NAS, including general aviation and commercial aviation accident rates, but these are not granular enough for AMOC comparisons. See https://www.faa.gov/about/plans_reports/media/FY14_POG.pdf

- **The Dribbler.** Even though this person is an empowered decision maker, he or she tosses the issue back and forth, up and down the agency hierarchy, around to other offices, even back and forth between partner agencies and sanctioned advisory bodies, but never personally gets around to shooting for the decision hoop.
- **The Ditherer.** This person can't make any decision, even—and sometimes especially—on the smallest things. He or she constantly sees both--or numerous--sides to every issue, and continually sifts through the same data over and over, reformulating the data hoping for inspiration to hit. This often is a very nice person who works very hard, but this person should not be in management, especially in a decision making role.
- **The Big Talker.** This person keeps bringing the discussion to a higher and higher level, or more and more generalized concepts that are not susceptible of implementation. It all sounds good, and usually the big talker spends lots of time congratulating his/her own organization, and/or the community, for all the great “progress” being made...and never gets to the task of designing and managing implementable action.
- **The Deflector.** This person usually is an apologist for the organization. He or she finds reasons why their organization is not to blame for the inaction, points the finger somewhere else, declares that their organization would succeed but for the failure of someone or something else, and advocates for action by someone else. (“The NAS Plan would have succeeded except Congress didn't fund us sufficiently.”)
- **The Data Hound.** This person continually demands and generates more and more data purportedly to justify an action. The irony is that the more data this person demands or generates, the harder, and the farther away the decision actually becomes. This person becomes (conveniently?) paralyzed because there will be good data on both sides of any issue.
- **The Team Player.** This person doesn't act because doing so might embarrass or bring to light the failure of a colleague, or another part of the organization—basically, people and organizations have a tacit agreement to support even the bad or non-decisions of someone else on the team. And the person supported might even be the team leader. Team loyalty is elevated beyond public service or success.
- **The Excuse Maker.** This person or organization has learned that a credible (and often pathetic, personal) excuse is accepted equally with actually doing the job. Over time, if this ploy succeeds without challenge or consequence, excuse making becomes habitual and shameless—the SOP. This can happen at the highest level, e.g. an organizational recognition that, no matter how incredible the excuse, Congress will humiliate the agency spokesperson, but no real consequences will be dealt.
- **The Ostrich.** This is the person who constantly self-congratulates and praises the organization, regardless how pathetic the product or job done. This person dismisses criticism as self-interested, or uninformed (the critic must be unaware of how good a job we're doing!), and plows ahead on the same path regardless outside objections.

- **The Sycophant.** This person or organization praises, supports, and defers to whomever is in a superior position, regardless how stupid, impractical, or disruptive the course set. Usually “kick down” behavior comes along with the “kiss up” attitude. This behavior occurs not only at the top levels, but happens throughout subordinate divisions as well.
- **The Opossum.** These people and organizations smile and nod at top management direction or policy, while at the same time ignoring, slow rolling or passively resisting directives. They can, and do, outlast iterative management changes without implementing a single initiative.
- **The Short-timer.** This person’s vision is fixed firmly on retirement, and he or she resists any action that might create a stir—or even cause them to be noticed—before they get escape unscathed. This person is not necessarily a lower level bureaucrat...the behavior can be observed at the highest levels, where it is particularly intractable, and destructive.
- **The Deferrer.** The SOP of this person is to mine every decision for reasons why a decision should be deferred. This becomes an art form.
- **The Mouse.** This person is uncomfortable—actually afraid—to make any decision. Whether it’s fear of embarrassment, scar tissue from overly critical parents, or fear of outside criticism, who knows, and who cares? The result is, this person simply won’t decide. And don’t think this only happens at lower levels in the organization. It occurs also at the highest levels, often masked by other behaviors listed above—deferral, excuses, team playing, deflecting, etc.
- **The Self-Interested “Operator.”** This is an actor outside the bureaucracy, who supports the bureaucrat in whatever stupid or ill-advised (from a practical or public interest point of view) course he/she is taking because it furthers that outsider’s self-interest. Count among these contractors, outside interest groups, and industry representatives and their lobbyists, including companies with vested interests in legacy systems and services. Responsible executives inside an agency are especially susceptible to the influence of these actors when they have an eye to a “second-career” after retiring.

These behaviors are endemic to bureaucracy in general, not just FAA.

So, as a matter of public policy, is there something that can be done to improve the safety decision making process inside government? Are there incentives or sanctions that can effectively be applied so as to prevent many of these anti-decision making behaviors and tactics, and improve government bureaucratic decision making so that reasonable, implementable safety decisions are made in a timely manner? Or has history proved such attempts futile? After all, FAA along among all Federal Agencies has long had complete statutory freedom to craft its own personnel and procurement processes.

The authors suggest that, as long as the function remains in government, there really is no way to eliminate the natural tendency of bureaucrats to avoid high risk safety decisions. This is because, in government, the benefits of taking a risk are inherently divorced from the potential costs and consequences. Using UAS as an example, all the benefits of a good risk decision, i.e. business and operating opportunities, inure to UAS

operators and their customers. On the other hand, serious consequences of a bad risk decision⁴ fall on the government decision maker--blame from superiors or the public, personnel downgrade, transfer to a bad assignment, or firing. Good safety risk acceptance decisions are usually ignored or taken for granted, both inside and outside the organization, and rarely if ever explicitly rewarded with promotions or pay incentives. Even if bureaucrats were rewarded for risk-involved decision making, the incentives available within government pale in comparison with the personal professional consequences that can ensue if a safety risk decision goes bad. So why would any government official decide to approve even and overwhelmingly reasonable safety risk?

On the other hand, private companies can and do make good safety risk decisions every day, even in the context of inherently dangerous activities. Private enterprise balances the benefits (profits) against the potential costs of risk (liability for injury/lives lost/property damage, public relations damage).⁵ If the benefit outweighs the cost, the private sector entity goes ahead with the program or activity, and then insures or self-insures against the risk. Consumers themselves play a critical role in this process, deciding for themselves how safe something needs to be. Customers signal to the private company the appropriate balance of safety and cost through the “price point”—if you include too much safety in the product, it gets too expensive and the customer won’t buy it. And as we have seen in other less regulated industries, safety becomes one of a variety of factors customers consider when making purchasing decisions among a variety of available features (e.g. the less expensive economy car versus a model marketed on the basis of crashworthiness.) The tort liability/insurance underwriting system serves as a very effective deterrent to unreasonably dangerous products, and is pretty much the source of safety assurance for most products the public uses every day.⁶

So, in the context of renewed interest on the part of the Administration and Congressional in corporatizing FAA or some of its functions, the time is ripe to consider some serious market-based privatization approaches. And these approaches should not be confined to provision of air traffic control, but should be considered also for application to the provision of safety assurance. Regardless what form corporatization of FAA takes, the authors recommend that safety risk analysis and assurance functions

⁴The occurrence of an accident or mishap is not necessarily the indicator of a bad risk decision. 100% safety is impossible, and as long as the mishap falls reasonably within the range of anticipated failures, the risk decision is still sound.

⁵ Government does attempt to approximate this process with cost/benefit analysis, but the outcomes are often distorted by political/policy factors, and outcome-driven inputs.

⁶ Although various federal and state agencies promulgate or approve industry standards addressing the most likely, significant or egregious instances of risk or abuse, there is no comprehensive federal government certification or licensing system for the manufacture of most things the public uses every day. Injury or damage from most defective products is primarily—and pretty effectively--deterred and remedied through the legal liability (tort) system and related insurance industry. It can be argued that fear of law suits and financial liability for negligence, as well as coverage requirements and limitations imposed by insurance carriers, have produced a remarkably safe environment for consumers and provide a lucrative source of redress for those injured or damaged by defective products. In the case of aviation products, legal liability principals can be expected to be especially effective: “strict liability” versus “negligence” principles apply--that is, manufacturers and operators are liable for any loss or damage they cause, regardless of whether they acted negligently or with reasonable care.

be eliminated or transferred from government to the privatized entity—not retained in government.⁷ This is the only way to assure that business-like approaches are applied to safety risk analysis, mitigation, and acceptance, and that the safety precautions taken are reasonable and appropriate in terms of both cost and potential benefits. Retaining safety functions in government while corporatizing other parts of FAA will simply perpetuate dysfunctional bureaucratic safety-decision making as described above, and will continue to stifle innovation and inhibit business opportunities.

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⁷ If the pure market approach is politically untenable, organization on the model of the National Highway Traffic Safety Administration (NHTSA) might be considered. NHTSA does not certify or license vehicles or operators, but does perform regulatory intervention *by exception* concerning repeated or common safety problems that are not satisfactorily being addressed by the automobile manufacturing industry and/or tort liability system. See https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/motor_vehicle_safety_unrelated_uncodified_provisions_may2013.pdf; http://www.nhtsa.gov/cars/testing/comply/Mission/1_ovsc_1.html; <http://www.nhtsa.gov/cars/rules/import/FMVSS/>; [https://one.nhtsa.gov/Data/National-Automotive-Sampling-System-\(NASS\)](https://one.nhtsa.gov/Data/National-Automotive-Sampling-System-(NASS)).