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ACHIEVING VLJ TRAINING STANDARDIZATION

By Robert Barnes

"About 3 years ago, I began investigating/researching the VLJ industry, FITS program and other articles relating to this new era of aviation … so here we are [today] on the verge of a new era of aviation, which is about to unravel."

-- a professional pilot and VLJ mentoring entrepreneur

Background. An article appeared in the Journal of Civil Aviation Training (CAT) in April 2006 entitled: *Pilot Training: VLJ Makers Adopt Airline Training Concepts*[1]. This article immediately caused considerable comment in the international training community. It seemed to appear that VLJ pilots would need to be as "*professional as airline pilots*" and some training professionals felt this to be an excessive response to a poorly defined training requirement.

Does training for technically advanced airplanes (TAA) really need to be so excessive that there is a fear owner-operators may "wash out" and that manufacturers will need to be prepared to refund their money? This was actually implied in the article. In addition, according to one industry pundit, *"We're hearing increasing chatter about whether VLJ pilots - who may be both the aircraft owner and the business owner - can ever be as proficient as everyone else who operates at 30,000 feet."*

If this is actually the case, then the Achilles Heel for the entire VLJ General Aviation market may very well be training. And, a key component of some already proposed VLJ training programs is pilot "mentoring," which is described in Paragraph 3.5.1 of the NBAA (National Business Aviation Association) VLJ/TAA Training Guidelines[2]:

> *"Upon successful completion of the manufacturer's training program, the need for a mentor pilot must be determined. The decision should be collaborative with the pilot, training provider and insurance underwriter. Should a mentor be deemed necessary, the duration may be derived from the individual's progress, but it must be recognized that the mentoring period for each individual may be differed [sic]. The goal is to use a mentor pilot until such time that the single pilot operator acquires the necessary skills and proficiency for safe operation in all flight regimes ...*
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> *… Mentors are not meant to instruct on the specific aircraft, but to act as a coach. The mentor should not fly as a crewmember, but observe the pilot's aircraft handling, automation use and SRM, and provide feedback to the pilot. However, it is indeed possible that operational intervention by the mentor might become necessary. This intervention may come in a verbal or physical form and there must be an understanding between the mentor and his/her client regarding intervention."*

This guideline simply can not be safely and effectively implemented in its present form. For example:

1. How is the need for a mentor pilot quantified? "Collaboration" tends to imply there is selection without standards which would seem to leave the decision makers open for potential litigation.
2. What performance standards does the mentor use for determining that *"the single pilot operator acquires the necessary skills and proficiency for safe operation in all flight regimes?"*
3. Will there be some form of audit trail required and how will it be administrated?

[1] http://cat.texterity.com/cat/2006-4/
[2] http://web.nbaa.org/public/ops/safety/vlj/

4. Who selects the mentor pilots, verifies their competence against what standard, and pays them for their services?
5. What is the mentor pilot's liability exposure?

And, these are only a few of the issues or concerns that quickly start surfacing when industry stakeholders are asked to comment on the mentor concept. Others include:

- *"Your observations concerning VLJs and mentors [are] interesting and insightful. I don't know if 'the mentor concept...simply can't be implemented.' I do believe that, because of the wildly diverse experience levels of pilots that will be operating VLJs, developing standards will be extremely difficult … As an FAA inspector there is no requirement for a mentor program (§61.63(e)-(g) does require IOE in certain situations, but the word "mentor" does not appear in this rule). So, in the eyes of the FAA regulations, once a pilot receives the type rating, they are good to go … As the FITS program manager, I understand that legal does not always equal safe. So, implementing a mentor program will only enhance safety. But it will need to be an industry developed and implemented. Insurance can help in the implementation (their requirements are usually tougher than the FAA's anyway)."* – **Tom Glista**, National Program Manager for General Aviation Training Standards, FAA
- *"The regulatory environment up here is different from the U.S. (not better, not worse, just different). I am intrigued by your questions. The answers will be even more intriguing."* -- **Jim Dow**, Chief of Flight Training and Examinations, Transport Canada
- *"My perspective would be from Europe and I think that the JAR FCL rules affect the VLJ in a different way. What is interesting is that the FAA is seeking to contain a problem of inexperience by endorsing a mentor program."* – **Graham Rutson**, European Representative to the Cessna Mustang Flight Standardization Board
- *"Mentors will be used to satisfy insurance companies. A satisfactory mentor is someone the underwriter knows and respects. The mentor/ride-along instructor concept has been used for years (decades) ... I don't see a basic pitfall in the concept of mentors, but program viability will depend upon the accident record of VLJs as a class … no one is anxious to be the first to insure owner pilots in VLJs"* – an aviation industry expert and past president of the NBAA
- *"About 3 years ago, I began investigating/researching the VLJ industry, FITS program and other articles relating to this new era of aviation. This came about after many friends queried me as to who would provide the training (mentoring) for clients operating as a single-pilot in an exclusive environment, mainly above FL290. After visiting with some manufacturers and the major aviation underwriters, I realized the need to develop a mentoring program to provide an elite group of pilots with jet, glass cockpit and general aviation experience to support the project. So here we are on the verge of a new era of aviation, which is about to unravel."*—a professional pilot and VLJ mentoring entrepreneur

Bottom line:

Maximizing the probability of safe VLJ operation is a key component of VLJ risk mitigation. Achieving such safe operation is dependent upon the universal acceptance and implementation of VLJ training standards. It should be further noted that the need for such training standards will not necessarily be limited to just VLJ mentor issues. Stakeholders may identify additional training issues requiring the same level of attention.

Definition of VLJ Stakeholders. The development and implementation of standards require broad stakeholder consensus. For the purposes of this document, stakeholders include all parties who may be affected by or have an impact on the development and implementation of such standards. Each stakeholder group offers a unique point-of-view driven by its own individual goals and objectives. Such groups include, but are probably not limited to, the following:

- VLJ owner/pilots (and prospective owner/pilots)
- VLJ operators (and prospective operators) such as air taxi and air charter businesses
- VLJ mentors (and prospective mentors)
- VLJ instructor pilots (or prospective instructor pilots)
- VLJ training providers
- VLJ airframe manufacturers
- VLJ avionics manufacturers
- VLJ powerplant manufacturers
- Aviation insurers
- International regulators (delivery and operation of VLJs will not be limited to the U.S.)
- Existing associations (e.g. NBAA[3], AOPA[4], NAFI[5], IUAI[6], etc.)

The Development of Standards. As Tom Glista (FAA) states, "*developing standards will be extremely difficult*" yet industry training standards are essential if the VLJs are going to be a commercial success. Let's look for a moment at the topic of standards – what are they and how do other industries approach this issue?

Standards are generally described as voluntary technical agreements between suppliers and customers, aimed at improving product quality and reliability at a reasonable price and steady supply. They ensure compatibility and inter-operability of goods and services and are written documents in the form of specifications, guides, test methods, terminology, practices, etc. Since standards activities represent a coordinated effort among competitors in an industry, they are, therefore, subject to antitrust laws.

Standards are not just developed by and for operational personnel; rather their use should be viewed as a management tool, and consequently should be accompanied by high level support for standards-setting activities. Companies that join together to develop, use, and enforce industry standards can decrease costs, increase reliability and productivity, and ensure access to global markets. On an individual basis, company participation helps to reduce design work, provides access to evolving technology and technical developments, and develops personnel.

VLJ training standards would benefit all stakeholders by:

- reducing/eliminating duplication of efforts
- providing a level of training commonality
- defining market segments and their unique requirements
- promoting competition by lowering barriers to entry
- enabling evolving technology trends

SEMI, a global industry association serving providers of equipment, materials and services for integrated circuit manufacturing, has had an active international standards program since 1973 but SEMI's standards program[7] continues to evolve and only recently did it move to introduce a new process step to ensure more effective dialogue between the user community and supplier communities. It also has the very same issues about restraint of trade and standards enforcement that would be faced by the VLJ stakeholders.

[3] National Business Aviation Association (www.nbaa.org)
[4] Aircraft Owners and Pilots Association (www.aopa.org)
[5] National Association of Flight Instructors (www.nafinet.org)
[6] International Union of Aviation Insurers (www.iuai.org/)
[7] For information on SEMI's International Standards Program go to www.semi.org and click on "standards."

Today, SEMI's standards development process has four stages:

1. Requirements definition (identifying a need such as mentor training standards)
2. Pre-standard consensus building on value proposition and guidelines (defining the key issues and concerns of stakeholders. For the VLJ situation under discussion, this would be accomplished in a VLJ Mentoring Work Group.)
3. Standards development through a structured, non-biased process
4. Standards adoption and enforcement through commercialization and utilization by stakeholders

This same standards development model could and should be implemented for the VLJ industry. However, it is also important to recognize that the work product for a Stage-2 work group is a white paper and not an operational standard. Therefore, the creation of a structured standards development program will still be required in order to implement any study group recommendations.

Note:

Whether the work product of Stage-2 leads to a VLJ training standard or VLJ training guideline (such as an FAA Advisory Circular) will be determined by those stakeholders participating in Stage-3.

Issues and Concerns. The following issues and concerns have been raised during recent conversations with an aviation insurer:

1. *"The type rating is essentially to ATP standards, so the pilot must be able to fly with that degree of proficiency. Moreover, the NBAA training standards are a good start on how to get a relatively inexperienced pilot to that point. I'm not too concerned with training standards per se."*

   Comment: Getting a type rating is a relatively simple first step; however, the FAA is seeking to contain a problem of inexperience which a type rating doesn't address by endorsing a mentor program. Unfortunately, the NBAA mentor guidelines are a very poor start. They are not operationally designed (e.g. they do not call for any form of specific measured performance) and there is no standard way to implement them. What actually is a mentor pilot required to do and under what conditions? Not only do they not provide a means to mitigate risk, they leave all involved open to unnecessary liability. Also, has anyone done the numbers as to how many mentors might be needed? If VLJ market projections are anywhere near correct, this is a very large number. Without a qualified and effective mentor pool, containing the problem of inexperience with mentors will not be possible.

2. *"Your original point, and the point that concerns me, is that upon achieving the type rating, some pilots may need to build experience in type before being admitted to the everyday world of jet pilots. That experience building would be done with a mentor pilot. The mentor pilot is not intended to be an instructor, but is a guide (and a check) for the pilot's flight planning, decision making, self evaluation, etc. that are not tested on the type rating check ride. Those are the everyday operational skills that the mentor pilot must guide and assess over time."*

   Comment: What are these "*everyday operational skills*?" The general aviation pilot flies in a dramatically different operating environment than does the airline pilot and we are about to introduce the hybrid of GA/airline operations with air taxis. No one has done a task analysis yet to determine how different these new skills really are from the established norms. The assumption has been that airline pilots will make great mentors because they fly jets in a high altitude environment. The reality is that they fly in an extremely controlled procedural operation with significant back-up support while general aviation pilots have no back-up and no established operational structure. They are strictly independent operators. When someone says "GA pilots need to become as professional as airline pilots," it's obvious that they don't understand the operational differences. What does "professional as airline pilots" really mean and how is such professionalism achieved then verified? Standards can address this issue.

3. *"I don't think of VLJs as their own industry. They are mid-way between the AOPA and NBAA crowds, but they are all business uses of general aviation aircraft. Once we get past the learning curve for how to evaluate pilots of these aircraft, they will be just another part of the general aviation community."*

   Comment: The VLJs may not be their own industry but they are definitely a new industry segment as are all Technically Advanced Airplanes (TAA). VLJs are being certified for both Part 91 and Part 135 operations which are dramatically different and the training/evaluation standards need to reflect that fact. When flown under Part 135, their operations fit NBAA but, when flown under Part 91, their operations more closely align with AOPA. Which association should be driving the training standards for VLJs?

4. *"I don't think the manufacturers want to be seen as a distinct segment of general aviation. They expect to draw buyers and pilots from both segments of the industry on either side of them. I may be wrong, but I don't think they'll be interested in setting themselves apart."*

   Comment: Actually, entrepreneurial manufacturers are constantly setting themselves apart in order to capture market share. How does Eclipse or Adam compete in the marketplace with Cessna, Piper, or Honda? One of the problems with this new industry segment is that no one wants to share information because it might damage the differential advantage they have through closely-held innovative technology or marketing. And, once again, the VLJ is not necessarily only a general aviation product.

5. *"One thing to consider, in defining the objectives, is how the guidelines, or the end product, would be carried through. It seems the FAA has no interest in enforcing standards beyond the type rating. The insurance companies can exercise some influence, but they are not permitted to cooperate in restraint of trade. That means we can't say in the end that insurance companies agree to accept any given set of conditions. Thus, how will guidelines be 'enforced,' if you will."*

   Comment: The SEMI International Standards Model addresses these very issues. It is based upon broad consensus building and has demonstrated an ability to create common baselines in a highly competitive, technically-driven, international marketplace that includes both established companies and entrepreneurs.

6. *"I do think we need some kind of panel to develop structure and a work plan for how mentoring will work. I think that work could be completed within six months if we had the right participants and the means to communicate effectively."*

   Comment: Agreed. See the Recommendations section beginning on page 6.

The Need for VLJ Mentor Selection and Training System Standards. The purpose of standards is to level the playing field for all stakeholders and, in the case of VLJ training standards, to increase the probability of safe VLJ flight operations. The development of standards is done by stakeholder consensus; whereas the implementation of such standards is done by individual stakeholders according to their own goals and objectives. Effective VLJ mentor training standards require the development of (1) a mentor selection system standard; and (2) a mentor training system standard. These standards will then be implemented and/or required by the appropriate stakeholders (e.g. training providers would implement the standard through their training programs whereas insurers would require compliance where applicable).

A mentor selection system standard is needed in order to:

1. Lower training costs and increase the probability of someone becoming a mentor by reducing the number of pilots who quit/fail a mentor training program.
2. Lowers training costs by increasing the probability that the mentors will complete training in the standard footprint.

3. Reduce the VLJ owner's legal exposure. For example, the VLJ owners must hire a mentor who has been through a selection process to reduce their legal exposure. Hiring a "selected" mentor demonstrates that the owner was holding to a higher standard and did due diligence.

A mentor training system standard is needed in order to:

1. Ensure that mentors are appropriately trained to evaluate student performance and complete administrative tasks correctly. Why? Some type of standardized progress report will need to be kept on each student to document when and why the mentoring was accomplished.
2. Ensure that mentors evaluate VLJ pilot performance accurately. Why? Owner-pilots will need to be rated on aircraft handling skills, CRM, the use of automation, and other similar skills after each flight. A standardized evaluation form should be used for these assessments. Mentors will need to be trained in rating techniques to ensure that these evaluations have high inter-rater reliability. High inter-rater reliability means that all the raters will score a given performance in a very similar manner. This will minimize complaints about a given mentor and, if an accident occurs, reduce the likelihood that an accident can be attributed to the early release of an owner-pilot by a mentor.
3. Ensure mentors function effectively as coaches. Why? Mentoring will require the development of specific coaching skills that not all instructors or airline pilots possess.

Developing the first VLJ Training Standard. The first step in developing a VLJ mentor training standard is to gain agreement on the mentor's job description. What exactly will mentors be expected to do and under what conditions? It does not appear that such a job description currently exists although some might attempt to describe the few existing requirements statements as job descriptions (which they are not).

Once stakeholders agree on a mentor job description, the next steps are for the Stage-2 work group to:

1. Evaluate this job description and translate it into specific tasks that need to be accomplished. For example: "Evaluate the student" becomes (1) observe the student during flights;(2) fill out a rating form during/after the flight; and (3) debrief the student.
2. Identify the experience, skills, and abilities necessary to perform each of the newly defined mentor tasks.

A consulting team working with the group can then take the list of experiences, skills, and abilities and determine the types of selection instruments (tests) that will best assess these criteria. This consulting team should also specify the criterion measures that allow the selection system to be evaluated. Recommendations based upon the consulting team's conclusions will be submitted by the Stage-2 work group to the standards development group conducting Stage-3.

While the consulting team is developing the selection system criteria, the study group can determine the issues and concerns that will lead to a training system standard. This will include identifying those tasks from the job description that will require mentor-specific training emphasis and how training for each of these tasks might be accomplished (e.g. group sessions on rating, one-on-one coaching sessions, etc.). Again, this information will be submitted by the Stage-2 work group to the standards group conducting Stage-3.

Note:

The publication of VLJ Training Standards requires that stakeholders establish a formal standards development and approval process (Stage-3).

Recommendations:

1. Attract more stakeholders and get them actively involved in the issue of VLJ training standards development. This is currently being done through one-to-one e-mails and the list of involved stakeholders is approximately 25. This activity can be moved to the next level by using a series of short surveys and encouraging peer involvement. There should be an on-going plan devel-

oped to reach out to the stakeholder community to identify and add additional participants. This activity requires funding.

2. Organize a VLJ Mentoring Work Group to define what standards and/or guidelines need to be developed to ensure the effectiveness of the VLJ Mentor Program. This is the Stage-2 work group described under "Developing the First VLJ Training Standard" (above). This activity requires funding.
3. Establish a formal standards development and approval process. This activity requires funding.

Organizational options:

"Considering the points I make, and conversations you've had with others, do you think a separate VLJ association is needed?" -- an aviation insuer

No matter what level of activity this document causes to take place, that activity will need a sponsor. The actual work can be done by a small team of consultants working with designated stakeholder representatives but nothing will happen without one or more companies standing behind the concept of VLJ training standards and ensuring that they become a reality.

1. One company. In a highly competitive environment with multiple stakeholders (such as this), one company simply can not effectively lead a standards program since it is always perceived (correctly) as having its own agenda.
2. Multiple companies. A group of stakeholders sharing the costs makes the process more acceptable but such groups tend to include only the industry leaders to the exclusion of the smaller entrepreneurs. This situation leaves everyone open for anti-trust litigation. Also, who manages the budget?
3. Standards Organization. Gathering a representative cross-section of stakeholders into a non-profit organization dedicated to developing a broad consensus has proven to be the most effective approach. Funding can be achieved through annual memberships but no one is excluded from participating in the standards development process (just the voting).

Contributing to the content of this document:

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- **Tom Bliss**, president of Bliss Marketing Multimedia, has been a marketing and communications consultant to Motorola Satellite Systems (Launch of the IRIDIUM satcom network); Motorola Government Avionics (ATC radios) Honeywell Avionics and Engine divisions and Boeing Helicopters. He was responsible for marketing introductions of the first business aviation color weather radar (WXR-300 at Rockwell Collins); the first color electronic flight instrument systems (EFIS) at Sperry Flight Systems; launch marketing campaigns for King Video Ground Schools; the Allied-Signal/GE CFE738 Turbofan engine; and introduction of the AmSafe Inflatable Restraint System (AmSafe airbag seatbelts). He has logged time in more than 30 aircraft types and is a current 2,000-hour instrument/commercial pilot and owner of a Cessna P210N.
- **Dr. Diane Damos**, president of Damos Aviation Services, Inc., and general aviation pilot. Dr. Damos has been involved with pilot selection since 1970. She assisted in the development of computer-based tests of information processing and cognition for pilot selection for both the United States Navy and Air Force. She has consulted with numerous domestic and foreign air carriers and training schools on both ab initio and experienced pilot selection.

- **Bruce Gould**, associate of Damos Aviation Services, Inc. Dr. Gould was the lead scientist for job satisfaction/job attitude research conducted by the Air Force Occupational and Manpower Research Division and for the Air Force officer selection and classification programs. He was also the principal scientist in charge of the development of the Air Force Officer Qualifying Test. In 1994 he was appointed technical director for the Technical Training Research Division of the Air Force. In this capacity he had oversight of research programs involving virtual reality environments for training, computer-based training, and the development of training criteria and program evaluation procedures.
- **Bettina Weiss**, Director of International Standards, SEMI. Ms. Weiss has been working in the semiconductor industry for over 13 years. She joined SEMI in January of 1996 in the SEMI Europe office in Brussels, Belgium as Standards Coordinator. In 1997, she transferred to SEMI Headquarters in San Jose, California as Standards Development Specialist and later Manager, Program Development where she was responsible for the expansion of the SEMI International Standards Program into new technologies and markets. Since November 2003, she has been Director of International Standards and MEMS where she has global responsibility for the Standards Program as well as the worldwide activities in the SEMI MEMS Initiative.

