Initial Report and Recommendations
of the Aspen/Pitkin County Airport FlightOps Safety Task Force
Spring 2023

INTRODUCTION

On December 7, 2022, by Resolution No. 086-2022, the Board of County Commissions of Pitkin County, Colorado (BOCC) approved the formation of the Aspen/Pitkin County Airport Flight Operations Safety Task Force (Task Force). Since then, the Task Force has met regularly on a monthly basis for the past six months (as of May 11, 2023). During this time, members of the Task Force have interfaced with numerous members of the aviation community, including representatives of the Federal Aviation Administration (FAA), the Aircraft Owners and Pilots Association (AOPA), the National Business Aviation Association (NBAA), the General Aviation Manufacturers Association (GAMA), the Colorado Pilots Association (CPA), the Research Applications Laboratory at the National Center for Atmospheric Research (NCAR/RAL), several airport managers throughout the intermountain western United States, local pilots, and others. Throughout this process, the Task Force has reported regularly through its chair to the Aspen/Pitkin County Airport Advisory Board (AAB).

The Task Force has prepared this report and the following recommendations for submission to, and consideration by, the AAB and the BOCC. This is an initial set of recommendations intended to begin the fulfillment of the Task Force's stated mission: "to maximize safety and reduce aviation accidents and incidents at the Aspen/Pitkin County Airport (ASE) and associated airspace".

EXECUTIVE SUMMARY

As the US General Accounting Office (GAO) reported back in 1993, it is well recognized that flying in mountainous areas is inherently more challenging than flying in the flatlands, and that these challenges can be mitigated by appropriate pilot familiarization, training and flight discipline. Nothing in the 30 years since then, changes in pilot demographics, advances in cockpit technology, other advances in aircraft safety technology, or the growth of general aviation (GA) jet traffic, has changed those basic facts.

While the occurrence of accidents and incidents at ASE and in the surrounding area has trended downwards over the years, a recent spike in runway excursions and flight into terrain warrant action. Our recommendations with respect to wind measurement and reporting conventions, development of constant descent and shallow angle instrument approaches, development of standardized entry and exit routes for lower powered piston aircraft and VFR flight, and recommendations for crews circling to land on runway 33 are to help reduce the risk of future runway excursions and flight into terrain. In very general terms, the recommendations discussed in the pages that follow include:

- Initiating a pilot education and safety campaign;
- Improving wind measurement on and around the airport and a modification to wind reporting conventions;
- Development of a constant-descent, shallow angle RNAV 15 approach with a guided visual segment;
- Changing ASE's airspace classification from Class D to Class C;
- Improving compliance with the immediate turn required by the LINDZ 9 instrument departure;
- Promoting an incentivized Aspen-area mountain flying education and training program.

It is the hope of the Task Force that the BOCC will find these recommendations useful and provide or advocate for the funding and staffing necessary to advance the number one community value officially recognized in the ASE Vision Committee Common Ground Recommendations: “Safety in the Air and on the Ground”.

PRIORITY ITEMS

As shown in the list of recommendations on the next page, these recommendations are organized thematically, and not in order of priority or importance. It would be difficult to prioritize the recommendations in a one-dimensional, linear fashion, because they involve a variety of flight safety factors, all of which are important, many of which interact, and none of which should be back-burnered.

That being said, if there is one salient issue that the Safety Task Force believes should be addressed without delay, it is section II on Wind Strategies, as the Task Force believes that adverse winds have been a primary contributing factor to many of the incidents and accidents at ASE. This is a short-lead item that can, and the Task Force believes should, be addressed immediately.

The second most important recommendation is the pursuit of initiatives that will make flying a stabilized approach and landing easier. A stable approach is generally considered to be one where the aircraft is configured for landing on or before the final approach fix, descending within a constant vertical speed range, and at an indicated airspeed with -5 to +10 knots of the aircraft’s target Vref speed (landing speed over the runway threshold) throughout the final approach segment and no later than 200’ above the airport elevation. A key action to help stabilize approaches includes pursuit and advocacy for an RNAV 15 “overlay” procedure that will result in a constant angle of descent, a shallower descent angle, be flyable by the widest range of aircraft, lead to a more stable approach to landing, and be flyable in both visual and instrument metrological conditions.

As to the third-most important recommendation, this would be the panoply of recommendations under heading “I. Pilot Education and Safety Campaign”. The Task Force believes there are targeted opportunities to build training scenarios with flight training partners that would both help pilots meet recurrent training requirements and benefit their flying to Aspen and beyond. The Task Force believes that enhancements to simulator training, content development, standard operating procedure recommendations, and wide distribution of this content will lead to a reduction in the types of accidents we have seen in the past at and around Aspen and elsewhere in the Colorado mountains.

LIST OF RECOMMENDATIONS

RECOMMENDATIONS

I. Pilot Education and Safety Campaign. Pilot education is the first and most important line of defense against airport and airspace accidents and incidents. There is a lot we can do to improve and enhance pilot education for flight operations at ASE. A mountain flying safety campaign should be initiated consisting of the following elements.

A. Flight Safety Materials and ASE Briefing Guide. A series of written materials on flight safety and flying in and out of ASE, including informational booklets or pamphlets, placards, and pilot kneeboards should be published, digitally and in hard copy, to be made available via the web, through the mail, at the locally based flight schools and FBO, and at other GA airport FBOs which have significant numbers of aircraft flying to and from ASE. The digital form of such materials should include content packs for electronic flight bags (EFBs) that can be distributed by popular flight applications.

These materials could also include a "Briefing Guide" similar to one produced for the airlines for flying into ASE. This Briefing Guide would include the requirements and procedures peculiar to ASE, hazardous condition recognition, and risk mitigation strategies. The Briefing Guide would be provided to those that completed the web-based tutorial discussed in the next section.

B. Pilot Safety Web Page, Web Based Tutorial and Training Video. A pilot safety web page on the airport website should be set up and maintained, including links to aviation weather, safety, training, and other aviation safety-related sources.

This safety web page could also link to a web-based tutorial to train and test pilots on standard procedures used at ASE. This web-based tutorial could be developed in partnership with existing training centers or developed as a stand-alone

product. Additionally, the safety web page could link to a standardized training video developed for ASE either as a stand-alone product or in partnership with existing training centers.

C. Charted VFR Entry and Exit Routes. We recommend – in partnership with the FAA, CODOT, navigation data providers, and flight application providers – the development and charting of visual entry and exit routes for Aspen and the corridors pilots should consider when arriving and departing into the area. It is common practice in Europe to chart and display entry and exit routes into airports (with routes designated for different aircraft or helicopter types), and these routes are already able to be depicted in flight applications used by pilots and can be loaded into aircraft navigation equipment as well. We recommend implementation of charted visual entry and exit routes similar to those used in Europe, adding these routes into aircraft navigation data sources, and depicting these routes within flight applications. Making these routes easy to see and easy to load into navigation systems will enhance safety for pilots less familiar with the area.

D. Mountain Aviation Weather Program. A video on mountain aviation weather and weather avoidance flight planning should be developed and disseminated, again in cooperation with AOPA and the FAA, focusing on Colorado high country weather, for all four seasons, from Steamboat to Denver to Walsenburg to Durango to Grand Junction and back up to Steamboat.

E. AOPA Safety Articles. There should be a series of articles on safety in Colorado mountain flying sponsored by the County and authored by interested local pilots and others, in partnership with AOPA, with an emphasis on flights in and out of ASE and through our mountain airspace.

F. Pursuit of Safety and Training Partnership Opportunities. There is substantial interest in the aviation community in partnering with Pitkin County to

improve safety at our airport. NBAA, AOPA, Cirrus, Citation Jet Pilots Association, Simcom, ForeFlight, and Honeywell are just some of the organizations that have expressed an interest in partnering with Pitkin County to improve and enhance aviation safety at our airport and in our airspace. The county should pursue the contacts that Task Force members have already initiated with these organizations and reach out further to aircraft owner/pilot associations such as the TBM Owners and Pilots Association, HondaJet Owners and Pilots Association, Malibu M-Class Owners & Pilots Association, Pilatus Owners and Pilots Association, Cirrus Owners and Pilots Association, and the American Bonanza Society and work with their safety committees. All these organizations can be enlisted as partners to explore and implement opportunities for jointly promoting aviation safety at ASE.

The possibility of working with aviation insurance companies should also be explored by approaching them with integrated education, training and rating systems packaged to incentivize insurance premium discounts.

Also, there are aviation safety rating companies such as Aviation Group United States (ARGUS), International Business Aviation Council (IBAC) and WYVERN. In the charter aviation industry, safety ratings appear in several ways. ARGUS, IBAC, and the WYVERN rating systems help to set the highest safety standards. These entities set safety standards for part 135 operators (air taxi and fractionals) and rate operators' performance against these standards. The concept of pursuing an ASE-specific rating system designed by "local experts" should be explored with the rating companies. Only very experienced and proficient pilots would be considered for this new "Aspen Platinum Rating". The objective would be to motivate operators to provide the necessary training/experience for their pilots to obtain such status.

G. Safety Stand Down and Fly-In. Another opportunity for engagement with the aviation community is an "ASE Safety Stand Down", a symposium for pilots and others in the aviation world. This could be a 2-3 day event hosted by Pitkin County, preferably in cooperation with aviation organizations such as AOPA, NBA, Experimental Aircraft Association (EAA) and the CPA at a suitable venue, such as the Aspen Institute, focusing on aviation safety, with a general focus on mountain flying, and a specific focus on flights operating at ASE. The feedback from the aviation community on this concept has been positive. This idea should be pursued.

H. Flight Training Center Outreach. The principal US flight training companies such as FlightSafety, SIMCOM, RedBird Simulations, and CAE SimuFlite should be encouraged to work with experienced ASE pilots to institute enhanced ASE-specific training modules in their initial training and recurrency curricula. ASE can also work with these training centers to develop scenario training for high-mountain airports, including ASE and these other airports.

ASE-specific simulator-based flight training could be developed either in conjunction with existing initial and recurrent flight training or as a stand-alone curriculum. This would be in addition to the simulator training that is already available in the marketplace. The training syllabus would be developed or augmented by local experts that have extensive training experience in each category of aircraft. The same experts could be available for in person consulting.

I. Safety Operation Packet Delivery Systems. With whatever safety materials are generated for pilot education, there will be issues regarding how best to get that information out to pilots. QR-code signage posted at the FBO and on the airport website, articles in aviation periodicals, hard packets that can be distributed to pilots on request and/or by publication, video links, etc. are all possible channels for dissemination of safety information. All reasonable avenues for getting ASE

safety materials in the hands of pilots who will be using our airport and flying through our airspace should be explored and utilized.

J. FAA "From the Flight Deck" Video. The FAA has an online video safety series entitled "From the Flight Deck". It "provides pilots with actual runway approach and airport taxiway footage captured with aircraft mounted cameras, combined with diagrams and visual graphics to clearly identify hot spots and other safety-sensitive items."

There is a placeholder on the FAA's From the Flight Deck webpage for Aspen. However, the status of that video has been "Video Coming Soon" for some time now. The video, when completed and available to the public for viewing, should be a valuable addition to ASE's safety toolkit. The FAA should be encouraged to finish production of the video and to post it as soon as possible.

II. Wind Strategies. The winds at ASE are often strong and complex. Runway 15 landings with tailwinds, turbulence and wind shear caused by wind spill over Shale Bluffs and other landforms and rapidly changing winds on Runway 33 departures have all been implicated in numerous airport accidents and incidents. In the NTSB report recently issued on the Hawker incident, for example, the NTSB concluded that the pilot made a decision to take off after receiving conflicting wind reports: one source indicated winds that exceeded aircraft tailwind limits, and another source indicated winds within limits. The aircraft, unfortunately, was unable to develop sufficient lift due to the strong and gusty tailwinds, the pilot then aborted the takeoff, and the aircraft departed the runway surface. Three recommendations directed at better addressing the wind challenges at ASE are:

A. Instantaneous Winds. The wind information to pilots is available on an hourly basis, with 1) a 120-second wind average, which may be up to 59 minutes old, communicated by a radio loop recording and digitally to advanced cockpit

screens, 2) a current 120-second wind average, which is communicated by tower controllers to aircraft via voice radio prior to takeoff or landing, and 3) an "instantaneous wind", which is a current 3-second wind average and which is communicated by the tower to pilots via voice radio on request. We recommend the following with respect to the Instantaneous Winds convention:

a. Inclusion of and definition of the convention in FAA in the Aeronautical Information Manual and communication of this change to pilots via an FAA SaFO;

b. Modify ATC procedures to only provide Instantaneous Winds on request and not unsolicited;

c. Modify ATC procedures to only provide Instantaneous Winds if they indicate a worsening of conditions.

B. Deployment of Additional Wind Sensors. There are two wind sensors on the airfield, at the north end of the field, and a number of windsocks at various locations on the airfield. This is a common airport configuration. The problem is that at ASE the winds at the different ends of the runway and along its length can vary greatly in direction and strength over relatively short time periods. Different windsocks at an airfield may point in several different directions simultaneously, and at ASE they often do. Installation and utilization of additional sensors with advanced technological methods of getting their readings to pilots about to take off or land, without unduly increasing the workload of tower and approach control personnel, could be challenging but an important safety improvement if feasible. Discussions with the appropriate FAA representatives and the pilot community should be pursued with the aim of improving the wind sensing and reporting capabilities at the airport. Multiple wind sensor deployment is not a novel practice. At a minimum, additional exploratory wind sensors should be installed as soon as possible to help us

understand the conditions throughout the length of the runway even if these reports are not yet integrated into FAA displays and procedures.

C. Advanced Wind Shear and Turbulence Detection Technologies. The Research Applications Laboratory (RAL) at the National Center for Atmospheric Research (NCAR) in Boulder has extensive experience with advanced wind sensing and reporting systems at the Hong Kong and Juneau airports. Such a system might be right for ASE, and federal funding may be available. The possibility of engagement with RAL/NCAR and FAA to develop, if feasible, an advanced wind reporting system for ASE should be pursued. There are also other technologies – such as LIDAR windshear detectors – that may be useful in helping operators deal with windshear at ASE.

III. Improved Instrument Approaches. Most jets and many piston aircraft fly into and out of ASE according to published instrument flight rules (IFR). Those rules include following specific instrument approaches to the airport and instrument departures for leaving the airport. These approaches are published and available for use by any instrument rated pilot in a suitably equipped aircraft.

The publicly available FAA instrument approaches into ASE - versus those that require special authorization - have been designed so that they can be flown by instrument rated pilots and a wide range of aircraft equipped with conventional avionics. The most common approach used – the RWY 15 LOC DME-E – is a non-precision approach with step-downs, has high circling minima, is unusually steep (~6.5 degrees vs the more standard 3.0 degrees), and does not provide vertical guidance to the runway. This approach is ‘high workload” and can terminate with an unstable approach. Unstable approaches and excess speed are a recognized cause of runway excursions and reducing unstable approaches is a focus area for industry organizations.

The FAA also allows the use of non-published "special" instrument flight procedures and "area navigation visual flight procedures" (RNAV) which are not available for general public use and which require special training and additional authorization by the FAA. Although these procedures are infrequently used by GA due to the additional authorization, training, and advanced avionics required, they are less steep, easier to fly, and lead to more stable approach to landing.

Through collaboration with industry associations, we believe there is interest within the FAA to develop a modern RWY 15 RNAV procedure that would overlay the existing RWY 15 LOC DME-E, have a shallower descent angle, have a 'guided visual' segment that would provide autopilot guidance further into the approach, and be usable by a wide range of aircraft. Implementation of this procedure could significantly improve the approach to Aspen and lead to a reduction in risk. This procedure could also be flown by aircraft in VFR conditions in order to enhance stability, speed control, and safer landings in visual conditions.

We recommend that the airport work closely with NBAA and the FAA to expedite the development and publication of this more modern RWY 15 RNAV procedure. In addition to the benefits derived from an approach with a shallower angle and a more constant descent, the procedure would utilize satellite navigation instead of conventional ground-based navigation, and would therefore be available when the conventional navigation aids at Ajax or Red Table were offline (e.g. due to weather, power outage, or lightning strikes). In addition to improving safety, this would increase the reliability of navigation and potentially lead to fewer diversions.

IV. Class C Airspace Designation. There are various FAA regulations regarding how aircraft operate at ASE. For the most part, these regulations work well. A problem has been identified, however, with VFR aircraft just outside our Class D airspace – they are not required to be in radio contact with any ATC facility if they're below

18,000' above mean sea level (MSL) until just before they're five statute miles from the airfield. When this occurs in the approach corridor into ASE, that can make it more difficult for the tower to "maintain separation" between the aircraft that the tower is talking to and the ones they are not talking to. This could be remedied by replacing our Class D airspace with a Class C airspace, which would require pilots to establish radio contact with the tower further out from the field as they fly through our airspace even if they are not headed for ASE.

There is a 3-5 year study process the FAA goes through before changing an airspace classification from Class D to Class C to explore redesignation feasibility and details. Among those details would be the expansion of the footprint and the ceiling of our airspace. The FAA does not usually begin such a process without the support of the local community for the change. The FAA should be requested to initiate that process to provide for more effective communication with and separation of aircraft transiting our airspace.

V. Departure Procedure Right Turn Initiation Language. Most aircraft departing ASE under IFR utilize the standard LINDZ Nine departure procedure, which begins with an immediate right turn taking off from Runway 33 to heading 343°. This is contrary to the general rule that on takeoff a pilot should stay on the extended runway centerline and not turn in any direction until 400' above ground level (AGL). During opposite-direction-landing-and-takeoff operations (ODO) at ASE, commonly referred to as "the Wrap", this right turn needs to be initiated promptly upon takeoff to help maintain the required separation between departing and arriving aircraft. But the FAA has documented numerous departure "deviations" caused by pilots following the general rule and initiating the LINDZ Nine right turn later than they should.

Eagle airport has a similar situation, where on departure pilots should initiate an immediate left turn, not for ODO but for terrain avoidance. But the need there for

an early turn is the same. Accordingly the Eagle BEVVR One (RNAV) departure plate has the following language to inform pilots that they should begin the turn, which there is to the left, immediately upon takeoff: "Begin a climbing left turn as soon as practicable but no later than DER [departure end of the runway] heading 260°" (emphasis added).

It should be suggested that the FAA consider amending the departure plates for ASE to include language similar to that found on the Eagle airport departure plate, such as "do not initiate the turn until abeam the tower."

Additionally, Eagle has an RNAV (satellite based area navigation) instrument departure that commands the early turn in the flight management systems (FMSs) in suitably equipped aircraft. If LINDZ9 could be converted into, or complemented by, a similar RNAV departure, that could help. This concept can be discussed with or suggested to the FAA.

Appropriate notices on the early right turn departure might also be posted at the FBO, at all flight schools and in other appropriate and conspicuous places where GA pilots can see them, and on the airport's GA website. Coordination with the FAA should be established, since official instrument flight procedure terminology must conform to US Standards for Terminal Instrument Procedures (TERPS).

VI. GAO Recommendations Follow-Up. In 1993 the United States General Accounting Office (GAO) prepared an extensive report on aviation safety entitled "FAA Can Better Prepare General Aviation Pilots for Mountain Flying Risks". This study focused principally on ASE and other mountain airports and made various recommendations on how to better equip GA pilots for flying in mountainous environments.

Unfortunately, not all those recommendations have been implemented. They include, but are not limited to, developing recommended mountain VFR routes, publishing recommended VFR approach and departure routes for mountain airports, depicting such routes on VFR navigational charts, instituting specialized training for mountain flying, and developing and promoting appropriate and effective incentives to encourage – not require – GA pilots to obtain this training prior to operating in mountainous areas and to obtain recurrent training.

A discussion should be had with the FAA and appropriate aviation organizations such as AOPA, CPA, NBAA and others to move forward with the unfulfilled recommendations of the GAO report. Although there is overlap between these recommendations and those stated above, it should be useful to remind our aviation partners that these recommendations have been around now for three decades and that action should be taken. Such discussion should focus on developing and implementing the following:

A. Pilot Mountain Flying Certification Program. An FAA-certified mountain flying program focusing on the high-altitude ranges of the Front Range, Sawatch, Elks, and San Juans should be developed and implemented with our aviation industry partners. And/or there could be a voluntary "ASE Navigation Certificate" produced locally or with aviation partners.

B. Pilot Safety Training Incentives. Such a certification program would need to be voluntary to be supported by our aviation partners and the broader US aviation community to be successful. A system of incentives should be established to encourage, induce and support pilots in undertaking the training. Fuel discounts, discounts on FBO charges, possibly on landing fees, could be considered for inclusion in an incentive program.

VII. Appropriate Legal Disclaimers, etc. The informational and training products the consideration of which is included in these recommendations cannot address all the increased safety factors involved in mountain flying. These products should be accompanied by appropriate and enforceable exculpatory agreements, disclaimers, releases, waivers, assumption of risk, indemnity, and other provisions as a condition of use to protect the County and others from third-party liability arising from claims of use of said products and training. Legal counsel should be consulted to ensure that as a condition of use of any and all such products the end user has agreed, and there is a record of such agreement, that the appropriate warnings have been given, and that the appropriate exculpatory agreements have been obtained. For online products, the appropriate "click-wrap" release agreements such as are used in software and on-line transactions should be employed.

VIII. Safety Outreach Coordinator. The recommendations of the Task Force will take some time to implement and require dedicated staff to implement. A safety outreach coordinator should be hired either on an employee or contract basis to carry implement the recommendations of the Task Force, working in conjunction with airport management and guided by the Task Force.

IX. Next Phase of the Task Force's Work. The submission of this report concludes the first phase of the Task Force's work, but this is just the start. The next phase of the Task Force's work will be to work with airport staff and assist and guide the Safety Coordinator in beginning the implementation of these recommendations. The BOCC may wish to have the Task Force come back to the BOCC in six months to report on the Task Force's progress.

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