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Special Federal Aviation Regulation No. 108—Mitsubishi MU–2B Series Airplane Special Training, Experience, and Operating Requirements; Final Rule

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 61, 91, and 135

[Docket No. FAA–2006–24981; Amendment Nos. 61–117, 91–298, and 135–111]

RIN 2120–AI82

Special Federal Aviation Regulation No. 108—Mitsubishi MU–2B Series Airplane Special Training, Experience, and Operating Requirements

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule.

SUMMARY: This Special Federal Aviation Regulation (SFAR) creates new pilot training, experience, and operating requirements for persons operating the Mitsubishi MU–2B series airplane (MU–2B). These requirements follow an increased accident and incident rate in the MU–2B and are based on a Federal Aviation Administration safety evaluation of the MU–2B. This SFAR mandates additional training, experience, and operating requirements to improve the level of operational safety for the MU–2B.

DATES: This final rule is effective April 7, 2008. Affected parties, however, do not have to comply with the information collection requirements until the FAA publishes in the **Federal Register** the control number assigned by the Office of Management and Budget (OMB) for these information collection requirements. Publication of the control number notifies the public that OMB has approved these information collection requirements under the Paperwork Reduction Act of 1995.

The incorporation by reference of certain publications listed in the regulations is approved by the Director of the Federal Register as of April 7, 2008.

FOR FURTHER INFORMATION CONTACT: Ron Baker, General Aviation and Commercial Division, Commercial Operations Branch, AFS–800, Federal Aviation Administration, Room 835, 800 Independence Avenue, SW., Washington, DC 20591; telephone (202) 267–8212; facsimile (202) 267–5094.

SUPPLEMENTARY INFORMATION:

Authority for This Rulemaking

The Federal Aviation Administration's (FAA's) authority to issue rules on aviation safety is found in Title 49 of the United States Code. Subtitle I, section 106, describes the authority of the FAA to issue, rescind, and revise the rules. This rulemaking is promulgated under the authority described in Subtitle VII, Aviation Programs, Part A, Air Commerce and Safety, Subpart III, Safety, section 44701, General Requirements. Under section 44701 the FAA is charged with prescribing regulations setting the minimum standards for practices, methods, and procedures necessary for safety in air commerce. This regulation is within the scope of that authority because it will set the minimum level of safety to operate the Mitsubishi MU–2B.

Background

In response to the increasing number of accidents and incidents involving the Mitsubishi Heavy Industries (MHI) MU–2B series airplane, the FAA performed a safety evaluation of the MU–2B starting in July 2005. The safety evaluation provided an in-depth review and analysis of MU–2B accidents, incidents, safety data, pilot training requirements, and maintenance. During the safety evaluation, the FAA also convened an FAA Flight Standardization Board (FSB) to evaluate proposed training, checking, and currency requirements for pilots operating the MU–2B.

The notice of proposed rulemaking (NPRM) published on September 28, 2006 (71 FR 56905) was based on the recommendations of the safety evaluation and the FSB report. A copy of both the safety evaluation and the FSB report are in the Rules Docket (FAA–2006–24981) for this rulemaking action. In the NPRM, the FAA proposed new requirements for ground and flight training that would apply to all persons who manipulate the controls or act as pilot-in-command (PIC) of the MU–2B. The proposed SFAR also would apply to those persons who provide pilot training for the Mitsubishi MU–2B. Operational requirements, such as a requirement for a functioning autopilot for single pilot instrument flight rules (IFR) and night visual flight rules (VFR) operations, a requirement to obtain and carry a copy of the latest available revision of the airplane flight manual, and a requirement to use a new pilot checklist were part of the proposal. The requirements of the proposed SFAR would be in addition to the requirements in 14 CFR parts 61, 91, and 135.

The FAA proposed that all training conducted in the Mitsubishi MU–2B be done using the standardized MHI training program and a checklist accepted by the FAA's MU–2B FSB. Copies of a training program and a checklist were placed in the Rules Docket for this rulemaking so that interested persons could comment on them. In addition, the FAA requested comment on additional paperwork requirements of the proposed rule.

The FAA proposed a 180-day compliance date for the final rule. However, when published in the **Federal Register** a printing error indicated the compliance date would be March 27, 2007. This date is incorrect. The FAA intended that operators comply with this rule within 180 days of the final rule's publication.

On January 3, 2007 (72 FR 55) the FAA published a supplemental NPRM (SNPRM). The FAA had been monitoring implementation of the MHI MU–2B training program and determined that some pilots with little or no experience flying the MU–2B were requesting training at the requalification level when it was the FAA's intention that these pilots receive training at the initial/transition level. The FAA needed to clarify our intent with regard to the phrase ''operating experience'' as used in the training program. A lack of specificity led to the public not being properly advised as to the circumstances under which the FAA expected a pilot to undergo initial/transition training, requalification training, or recurrent training. In the SNPRM, the FAA proposed experience qualifications for initial/transition training, requalification training, and recurrent training. The comment period for the SNPRM closed on February 2, 2007.

Comments on the Proposed Rule

The FAA received over 90 comments on the proposed SFAR. Commenters included commercial operators, general aviation pilots, organizations representing owners and operators of the MU–2B, and the manufacturer. Most commenters applauded the FAA's requirement for additional pilot training in the MU–2B airplane, but also took issue with the total number of program hours required for pilot training or qualification as a flight instructor. Several commenters noted that the MU–2B, by the FAA's own admission, is a safe airplane and questioned why pilots of other makes and models of airplanes are not required to receive additional training. In general, commenters noted that the MU–2B airplane is safe if ''flown by the book.''

Several commenters stated that the SFAR is well thought out and will address the majority of MU–2B accidents that have arisen out of the lack of pilot training or inadequate pilot training. Other commenters stated that the additional training will not address accidents that occur from bad pilot judgment, such as the two recent

accidents involving pilots who flew into severe thunderstorms. Others commented that the SFAR enhanced the regulatory environment and will improve safety within the population of MU–2B operators.

The Aircraft Owners and Pilot Association (AOPA) supported the idea of an SFAR to address the special challenges of flying an MU–2B, but stated that the proposed requirements are burdensome and go beyond what is reasonable for safety. The National Air Transportation Association (NATA) commended the FAA for the course of action the agency took in developing the NPRM, but expressed concern that the narrow compliance window and burdensome aeronautical experience requirements would reduce available instructors. The National Business Aviation Association (NBAA) praised the FAA for maintaining a data-driven safety focus. After reviewing the FAA's proposal, NBAA concluded that the issuance of an SFAR is the most appropriate regulatory solution in light of a number of possible options. The Regional Air Cargo Carriers Association (RACCA) applauded the FAA's efforts to take a measured approach involving the manufacturer, the operators, and the FAA in developing means to address perceived safety issues with the aircraft. There was a general consensus among many of the commenters that the rulemaking effort benefited from the collaborative process prior to the NPRM that involved the airplane's users, manufacturer, and regulators.

The FAA received 20 comments to the SNPRM. Numerous comments on the SNPRM addressed issues on language in the NPRM. All comments are summarized in this preamble by issue.

Applicability

The FAA proposed that this rule apply to a PIC, second in command (SIC), or any other person who manipulates the controls of the MU–2B airplane. The FAA received many comments asking who would be allowed to manipulate the controls of the Mitsubishi MU–2B airplane. The commenters argued that there are legitimate reasons why a person who is not the PIC and who does not meet the training requirement of the proposed SFAR should be allowed to manipulate the controls. Some of these reasons included flights for the purposes of providing pilot training, maintenance flights, pre-employment pilot proficiency evaluations, and demonstration flights related to aircraft sales. One commenter was concerned that the rule would prohibit a ''pinch hitter'' from manipulating the controls. Pinch hitter courses are often given to provide non-certificated persons with basic piloting skills in order to assist in an emergency, such as the medical incapacitation of the PIC.

The FAA agrees that the proposed restrictions would make it difficult to receive flight training in the MU–2B. The FAA did not intend to prohibit the use of the MU–2B during flight training if the PIC had successfully completed the flight training requirements of the proposed rule.

Some commenters provided valid reasons for a less restrictive regulation. The FAA recognizes that certain maintenance test flights are best performed with two pilots or a pilot and a mechanic. For example, the level of safety when performing an in-flight Negative Torque Sensor Check is greatly enhanced when done by a two-pilot crew or a pilot and mechanic. The FAA has revised the rule language to allow manipulation of the controls by certain persons who have not received the SFAR's required training. The revised rule requires that the PIC must have completed the required MU–2B training and occupy a pilot station, and the flight may not be conducted with passengers or cargo onboard. A nonqualified pilot may manipulate the controls in the three circumstances described in section 2, paragraph (b) of the SFAR.

The FAA considers a pinch hitter course to be a form of flight instruction. The FAA also considers pre-employment pilot proficiency evaluations to be a function of flight training if such evaluations are conducted by qualified instructors meeting the training and experience requirements of this SFAR. The FAA notes that the responsibility and authority of a PIC allows the PIC to deviate from the rules to the extent required in an in-flight emergency requiring immediate action.

Time Allowed for Compliance With the Rule

The FAA proposed that all persons who operate the MU–2B airplane or train in the airplane would meet the requirements of the rule within 180 days of the effective date of the final rule. We felt that an expedited compliance period was necessary because of the potential safety risk identified by the safety evaluation. Based on comments and other actions that have mitigated these risks, such as voluntary compliance with the training program, the FAA has extended the compliance period to 1 year.

Many commenters expressed concern that 180 days is too short a time period for compliance. Two commercial training providers (SIMCOM and Howell Enterprises) and the airplane manufacturer (MHI) suggested 365 days as an alternative. One commenter noted the scarcity of flight instructors for the large number of pilots who would need training, stating that there are only three qualified instructors in the United States and only one simulator. Another commenter noted that some pilots are delaying recurrent training to see what the final rule will mandate; thus there will be a rush to training. Most persons commenting on this issue suggested a 365-day compliance period. Commenters also noted that if all pilots are trained in the proposed 180 days, the instructors would have nothing to do the other half of the year. They also posited that a one-time compliance window would make everyone's recurrent training in following years fall within the same 180 days.

Many commenters noted that commercial operators and most general aviation pilots are already receiving some sort of annual training. The commenters believe a longer (1 year) implementation period will allow these pilots to retain their current training cycle. The NATA believes a 1-year compliance time is more economically efficient, as it will allow MU–2B pilots flying under part 135 to complete the training defined in the SFAR in conjunction with currently required part 135 checks. They also argued that longer compliance time will have a minimal impact on safety.

The FAA agrees that a 180-day implementation period is too short. The SFAR will allow pilots to match existing annual training cycles whenever possible to reduce compliance costs. The final rule will take effect 60 days after publication in the **Federal Register**. The compliance period will be 305 days from the effective date. Therefore, the operators and trainers for the MU–2B will have 365 days from the date of publication of the final rule to comply.

Pilot Training

Many commenters agreed with the need for specialized training but raised concerns with the type and length of training. Some commenters felt that the SFAR did not go far enough, especially for initial training and part 135 operations.

Minimum Program Hours

The FAA proposed to adopt the hours of training determined by the FSB and incorporated in the MU–2B Training Program. We have decided to reformat the proposed training program and include it as Appendices A through D

to the SFAR. We have not added any additional requirements to the training program in the appendix, and it is fundamentally the same as the training program that we placed in the rules docket for comment.

One commercial training provider commented that the training program reduces ground training hours below what is currently provided and should be increased. Another commenter asserted that 8 hours of recurrent training is excessive for already proficient pilots. Several persons commented that 6, rather than 8, hours of requalification training is more reasonable. One commenter stated that a PIC should have at least 10 hours of in-flight training in the MU–2B before taking a check ride. Two commenters stated that the required training hours are arbitrary.

The FAA established the minimum required ground and flight training program hours after carefully reviewing all FAA-approved training programs and the proposed MHI training program. A team of pilots representing a cross section of the airplane's user demographics received the training. Proficiency levels and completion times were closely tracked. Additionally, the FAA has monitored the completion times for training conducted using the MHI training program since its approval. This monitoring has validated the number of training hours proposed. Accordingly, the FAA has determined that the program hour requirements represent the minimum number of hours required to reach an acceptable level of safety and proficiency. The FAA notes that training providers can add additional hours to the program if they feel it is needed.

A commenter stated that the 4 hours of recurrent training, followed by a check ride, is too exhausting. This person suggested that the training be broken into two, 2-hour training sessions, each 6 months apart. The FAA clarifies that the recurrent training requirement must be completed annually. The SFAR does not prohibit the division of the training into segments. Thus, the requirement may be met in two or more training sessions in order to align with existing training cycles.

Training to Proficiency

The FAA proposed to adopt the hours of training determined by the FSB and incorporated in the MU–2B training program, which vary depending on whether the pilot is receiving initial/transition, requalification, recurrent, or differences training.

Several commenters suggested training to proficiency rather than imposing a set number of hours of training. The commenters also noted that the number of hours proposed is too much training for some and too little for others.

The FAA points out that the MU–2B training program requires that the student complete a minimum number of program hours and that the student is trained to an acceptable level of proficiency as defined in the training program. Additionally, although the training program addresses pilot proficiency and skill, the training program also provides a body of knowledge addressing best practices, procedures, and operational techniques, as learned throughout the safety evaluation and the FSB process. Therefore, the FAA has determined that the program hours represent the minimum amount of training time needed. The FAA will continue to monitor the time required for completion of the training and may adjust the required training program hours if necessary.

Credit for Part 135 Training

The FAA stated in the proposed rule that the hours of training in the MU–2B training program are in addition to other training required by parts 61 and 135. Based on comment, we realize that some training maneuvers may be redundant. In this case, the maneuver is only performed once, but credit is given in both training programs.

A commenter stated that the FAA should recognize part 135 training that is already required (i.e., § 135.293 aircraft competency check, § 135.297 instrument proficiency check, § 135.299 line check). Part 135 operators already receive a total of 3 hours of in-flight testing each year, plus the training that will be required by the SFAR. The commenter does not think the SFAR considered the part 135 training.

In drafting the NPRM, the FAA did consider training already conducted under part 61 and part 135. Maneuvers covered under the Final Phase Check required by the training program may not satisfy all the requirements of a § 135.293, § 135.297, or § 135.299 check. Many maneuvers listed on the FAA Form 8410–3, *Airman Competency/Proficiency Check*, are not required under the final phase check of the training program. In the event that maneuvers or other training requirements appear in both training programs, credit should be given for the training under both programs. To the extent the training is conducted in an MU–2B airplane, and the maneuvers are identical, credit will be given for both program hours and completion of maneuvers. Such actions should be well documented, as this allowance does not eliminate any of the recordkeeping requirements within either training program. Operators must ensure that all requirements of part 135 are met. However, operators are not required to perform the same maneuvers twice (i.e., once for the Final Phase Check and again during a § 135.293 proficiency check). All items for both programs must be completed, even if that results in exceeding the minimum number of program hours.

Credit for Prior Training

The FAA did not allow credit for prior training in the proposed rule because it determined that much of the training lacked standardization and had differing procedures.

Some commenters felt that pilots with a high level of experience, previous factory training, or 'third party annual training' for insurance purposes, should be exempt (grandfathered) or have a reduced number of training hours. The FAA also received comments that the proposed training program as presently defined is the only approved training program. This single program means the entire MU–2B community is required to use the proposed training program. Another commenter suggested that existing approved training programs are adequate. Several commenters requested exemption from the SFAR training requirements because of participation in other approved training programs.

During the MU–2B safety evaluation, the FAA reviewed 23 approved training programs. There was little standardization among these training programs. Many taught techniques and procedures that were contrary to those published in the airplane flight manual (AFM). Therefore it was the conclusion of the safety evaluation and the FSB, that in order for training to be effective, there must be one standardized training program. The FAA will not allow persons to be grandfathered from the SFAR based on previous training. However, as explained later in this document, training conducted between July 27, 2006, and the effective date of this rule, using Mitsubishi Heavy Industries MU–2B Training Program, Part number YET 05301, Revision Original, dated July 27, 2006, or Revision 1, dated September 19, 2006, is considered to be compliant with this SFAR.

Demonstration of Proficiency

The FAA's safety evaluation and the FSB both recommended that

standardized training conclude with a demonstration of proficiency. This demonstration was a part of the proposed training program and allows for simultaneous training and checking during requalification and recurrent training.

The AOPA believes that pilots should not be required to pass a formal checkride at the end of their training. Instructors should be allowed to evaluate or ''check'' a pilot's performance during the course of training.

The final phase check of the training program is different from a formal checkride. During a formal checkride, where the pilot has made application for a certificate or rating, the inability to satisfactorily demonstrate proficiency will result in a failed checkride. During a final phase check required by the MU–2B training program, if the pilot cannot satisfactorily demonstrate proficiency he or she has not failed a checkride. Those pilots that do not perform to an acceptable level of proficiency may need additional training in order to complete the training program. The requirement of a final phase check ensures that all pilots not only receive the training, but also have acquired the skills and proficiency necessary to safely operate the airplane. The final phase check is also different from a formal checkride because the training program allows for simultaneous training and checking during requalification or recurrent training. Students can be given credit for successfully completing maneuvers while receiving the training. However, simultaneous training and checking is not allowed by the training program during initial/transition training.

Training Satisfying a Flight Review

The proposed rule did not specifically address the part 61 flight review in conjunction with the proposed training program. The final rule accommodates part 61 flight training, but only if the training is done in the MU–2B airplane.

The AOPA commented that the recurrent training should satisfy the requirements for a flight review as described in 14 CFR 61.56. The FAA notes that § 61.56(a) requires a flight review that includes at least 1 hour of flight time. The MU–2B training program requires a minimum of 6 hours of flight training in the MU–2B airplane for initial/transition training. Those pilots that opt to conduct requalification or recurrent training in the MU–2B airplane instead of a flight training device are required to receive a minimum of 4 or 8 hours respectively of flight training in the MU–2B airplane. Those pilots that attend initial/transition training, or conduct requalification or recurrent training in the airplane, easily satisfy the minimum amount of flight training required by § 61.56(a). Additionally, the ground training requirements for initial, requalification, and recurrent training covers the subjects required in § 61.56 (a)(1) and (a)(2). Therefore, the FAA agrees that successful completion of the flight and ground training requirements for initial/transition, requalification, or recurrent training meets the requirements of § 61.56 provided that at least 1 hour of the flight training was conducted in the Mitsubishi MU–2B airplane. Therefore, the FAA will recognize those persons that document successful completion of the applicable portions of the training program in the Mitsubishi MU–2B airplane as having met the applicable requirements of § 61.56. In this circumstance, no separate endorsement for the flight review will be required.

Grace Month for Training

The AOPA and two other commenters asked that we allow training conducted in the month before or after (a grace month) it is due to be considered as accomplished in the month it was due (the base month). The FAA agrees that completing training in the month before or after the month in which compliance is required can be considered as completed in the month it is due. However, this allowance does not re-establish a pilot's base month. This practice is allowed in other training requirements, such as in part 135 training. The rule language has been adjusted to reflect this allowance. The FAA notes that the grace month only applies to the training required by this SFAR.

Training Profiles

The FAA proposed incorporating by reference the training profiles in the proposed MU–2B training program. These were developed by the manufacturer while working with the FSB. Commenters expressed concern with some of the profiles.

One commenter felt that the engine inoperative non-precision and missed approach procedure, as published in the proposed training profiles, is dangerous. The commenter stated that requiring the pilot to extend the landing gear only when landing is assured invites training accidents, and if performed during actual instrument conditions, is contrary to the accepted instrument procedures of having the aircraft configured and stabilized inside of the final approach fix (FAF). The FAA recognizes that the profile as published, for a single-engine non-precision approach, deviates from common practices. However, during the FSB's evaluation, FAA test pilots flew a variety of makes and models of the MU–2B. They flew the MU–2B at various weights positioned throughout the airplane's center-of-gravity (CG) envelope. This included the maximum allowable take-off weight at the rearward limits of CG envelope. The drag penalty induced by configuring the airplane for landing at the FAF made it difficult to maintain a number of non-precision approach profiles. Airspeed often deteriorated below a safe speed while trying to maintain the profile in the landing configuration. Maintaining adequate airspeed became especially difficult when a circle-to-land maneuver was required. As a result of these findings, the FAA modified the single-engine non-precision approach procedures to delay deployment of the landing gear until landing is assured. This procedure has been included in the MU–2B training program in the applicable MU–2B model checklists.

The FAA notes that several elements of the training program have been revised since the training program was placed in the docket. The MU–2B Training Program now provides the profile for Take-Off Engine Failure Flaps 5° or Flaps 20° and the profile for the One Engine Inoperative Non-precision and Missed Approach. Corresponding changes were also made to the training program checklist to reflect the changes to the maneuver profiles. The FAA has determined that these changes are within the scope of the notice. There are no other substantive changes to the MU–2B Training Program except as modified by the proposal in the SNPRM.

Simulator Training

A commenter suggested a one-time training requirement in a simulator for those failures that cannot be safely simulated in the airplane. This training would include engine failure at rotation and the in-flight Negative Torque Sensor Check. The FAA considered this option but recognizes that there are no FAA-approved MU–2B simulators in operation and only two FAA-approved, Level 5, flight training devices (FTD). Both of these devices are located at a single facility in Florida. The FAA determined that it would pose an economic hardship to make the entire MU–2B community travel to Florida to train at this facility. Additionally, although the FAA embraces the use of simulators and FTD, not all training providers have them available, nor are

they the only method for delivering effective training.

A commenter also posited that the annual recurrent training should include three takeoffs and landings in the actual MU–2B airplane under the supervision of a qualified check airman or flight instructor. The FAA notes that safety can be enhanced by use of FTD during recurrent training. Therefore, the SFAR allows recurrent training to be conducted in an FTD or the MU–2B airplane.

In-House Training

Another commenter stated that part 135 companies should not be allowed to train in-house but should require their pilots to attend professional training companies to satisfy the SFAR requirements. The commenter also stated that there is too much latitude when part 135 companies conduct the training. The FAA considered this option but we are not changing existing part 135 regulations and guidance that allow commercial operators to conduct in-house training. Since there are no FAA-approved part 142 training centers for the MU–2B airplane, requiring commercially provided training for part 135 operators is not possible. Commercial operators can contract with training facilities to provide some types of instruction if the curriculum is approved by their Principal Operations Inspector, but this is not a requirement.

Monitoring Training Implementation and Training Quality

A commenter asked if the FAA will ensure that all MU–2B owners and pilots are trained to at least the proposed levels. The commenter also asked where the FAA plans to get the personnel to do surveillance on the SFAR training. The FAA is confident that pilots will be trained to at least the proposed levels. The FAA determined that successful completion of the training program requires a demonstration of proficiency to carefully defined performance standards. The FAA's Commercial Pilot Practical Test Standards are used as a guide to determine the pilot's level of proficiency under the MU–2B training program. Successful completion will be documented by a flight instructor meeting the experience requirements of the SFAR. A substantial amount of training has already been conducted using the FAA-approved MHI training program. Many pilots have voluntarily attended this training in anticipation of the issuance of the SFAR. The FAA has monitored this training and is satisfied with the quality and effectiveness of the program and its instructors. At the time of closure of the public comment period for the NPRM, approximately 6 percent of the MU–2B pilot community had received the new training. The FAA also held a workshop to ensure a smooth implementation of the FSB report for commercial training providers and part 135 operators.

The FAA will continue to monitor the training and SFAR implementation and conduct surveillance as part of its annual work program for field inspectors. Additionally, FAA guidance material was updated to assist inspectors and operators.

A commenter asked how the increase in training will prepare pilots for a loss-of-control of the airplane during an emergency. The FAA has determined that the mandatory training will provide the pilot with the knowledge and skill to fly the airplane safely within its designed operational limits under normal, abnormal, and emergency conditions, including operations with one engine inoperative. Many of the MU–2B accidents involved loss of directional control or stalling the airplane due to poor airspeed management or excessive bank angles when maneuvering. The training program emphasizes proper airspeed management, low-speed maneuvering, and the risks associated with excessive bank angles. The training also specifically addresses the loss-of-control accidents that have occurred in the MU–2B. Additionally, pilots must annually demonstrate proficiency in the flight maneuvers to commercial pilot practical test standards. Therefore, the training program focuses on prevention of unsafe conditions while also providing instruction for recovery from them.

Pilot Experience

The FAA proposed that a pilot must have logged 100 hours of PIC experience in multi-engine airplanes in order to operate the MU–2B airplane. That requirement is retained in the final rule.

One commenter questioned why the FAA would require a pilot to receive 100 hours experience in a multi-engine airplane prior to being able to serve as PIC of the MU–2B. This commenter believes that such an experience requirement would be confusing during the MU–2B training. The FAA finds that a pilot needs to have a basic level of experience and understanding of multi-engine airplanes prior to advancing to more complex airplanes. This threshold is consistent with experience requirements of SFAR 73, which describes additional operating experience requirements for the Robinson R–22/44.

Credit for Previous Operating Experience

In the SNPRM the FAA proposed that a person have a minimum level of previous operating experience of 50 hours within the previous 24 months to be exempt from initial/transition training. Based on comments, the FAA has modified this experience requirement in the final rule to also exempt pilots from initial training pilots who have a total of 500 hours previous operating experience. Most of the commenters requested that the FAA consider prior operating experience in the MU–2B. Some commenters noted that the proposed definitions in the SNPRM treat a pilot with significant, but not recent experience (i.e., last 24 months), the same as one with no experience. The AOPA and seven other commenters recommended that the FAA exempt experienced pilots from the initial training requirement if that pilot has at least 500 hours of documented MU–2B PIC experience. Other commenters also requested an exemption from initial training based on experience, although they suggested different determining thresholds. Two commenters suggested a threshold of 250 hours, and one commenter suggested 1,000 hours. One commenter stated that forcing an otherwise qualified pilot to attend initial training on the basis of the last 24 months flying is unfair. The commenter recommended a further qualification be added that states: ''or has logged a total of 500 hours of PIC in the MU–2.'' The commenter added that a pilot meeting this criteria should be able to re-qualify with the training specified in the requalification course.

The FAA agrees that pilots with significant previous experience should be exempt from participating in initial training. These pilots would instead be allowed to attend requalification training. The FAA also agrees that by allowing a form of the above proposed language, the original intent of the proposed rule is retained without penalizing those that have not flown the MU–2B within the past 24 months. Therefore, pilots with at least 500 hours of documented flight time manipulating the controls while serving as PIC of an MU–2B will not be required to attend initial/transition training, but will be required to satisfactorily complete requalification training.

Operating Experience in the Previous 24 Months

In the SNPRM, the FAA proposed that pilots with less than 50 hours of operating experience within the

previous 24 months would be required to attend initial training even if that pilot had already successfully completed initial training in the past. We have modified the final rule to make completion of initial training a one-time requirement.

The NATA commented that the association is in agreement with the FAA that pilots with little or no recent experience in the MU–2B should be required to train in the aircraft in order to obtain sufficient proficiency and experience. The association was not opposed to the FAA's proposed requirement for at least 50 hours of operating experience within the previous 24 months in order to bypass initial training. The NATA stated that with the existing part 135 currency and training requirements, and the level of on-demand charter activity, the 50-hour limit should not be cumbersome or add costly training to the typical part 135 operator. The NATA was sensitive to the fact that some part 91 operators do not support this requirement, and stated that they have no specific position on this requirement as it would apply to that industry segment. The NATA also stated that they appreciate the FAA's efforts to respond to MU–2B concerns with a rational, methodic, and participatory approach.

One commenter asked that we clarify that the 50 hours in the previous 24 months is not a continuing qualification limitation, but is intended to determine the pilot's level of entry into this new program. Another commenter stated the 50-hour requirement in the original NPRM was only intended for new entrants into the training program.

The FAA notes the SNPRM did propose a continuing look-back requirement of 50 hours within the preceding 24 months. Many commenters did not support this requirement, finding it unnecessary and burdensome. The FAA agrees with the comments that a continuing look-back requirement is not needed. The FAA has reviewed the FAA-approved training program and determined that the NPRM did not include such a provision. Furthermore, the FAA notes that after completing initial or requalification training, a pilot must still satisfactorily complete recurrent training annually, which includes an annual demonstration of proficiency. Therefore, the FAA has concluded that a continuing look-back requirement is not necessary.

In response to the comments and further FAA review, the FAA has revised the MU–2B training program and the rule language to include the following operating experience thresholds for determining pilot qualification for the various training options:

A person is required to complete ''Initial/transition training'' if that person has fewer than:

(i) 50 hours of documented flight time manipulating the controls while serving as pilot-in-command of an MU–2B in the preceding 24 months; or

(ii) 500 hours of documented flight time manipulating the controls while serving as pilot-in-command of an MU–2B.

A person is eligible to receive *Requalification training* in lieu of initial/transition training if that person has at least:

(i) 50 hours of documented flight time manipulating the controls while serving as pilot-in-command of an MU–2B in the preceding 24 months; or

(ii) 500 hours of documented flight time manipulating the controls while serving as pilot-in-command of an MU–2B.

A person is required to complete *Recurrent training* within the preceding 12 months. Successful completion of initial/transition or requalification training within the preceding 12 months satisfies the requirement of recurrent training. A person must successfully complete initial/transition training or requalification training before being eligible to receive recurrent training.

Successful completion of initial/transition training or requalification training is a one-time requirement. A person may elect to retake initial/transition training or requalification training in lieu of recurrent training and receive credit for recurrent training for that year.

These definitions have been included in the Compliance and Eligibility section of the SFAR.

Type Rating vs. SFAR

In the NPRM, the FAA discussed why it determined that an SFAR is more appropriate for the safe operation of the MU–2B than a type rating alone. This decision was based on the recommendations of the safety evaluation and the FSB.

Bankair, Inc. did not agree that it is necessary to mandate training that goes beyond the requirements of a type rating for this airplane. Another commenter said the FAA has failed to adequately consider a type rating for the aircraft or to adequately justify having an entirely special and new pilot competency program.

The MU–2B safety evaluation and the FSB found that a portfolio of corrective actions are required that go well beyond the reach of a type rating or pilot training alone are needed to significantly reduce the accident rate of the MU–2B. The SFAR allows the FAA to mandate actions that are far more stringent and broader in scope than what would be achieved through a type rating alone.

The FAA has determined that there is a need for annual recurrent training and an annual demonstration of proficiency. A type rating would not require recurrent training or additional checks because the aircraft is not required to be operated by a two-pilot crew as part of its certification basis. However, the FAA notes that some part 135 operations do require a two-pilot crew. An SFAR can mandate the conditions under which the aircraft may be operated, such as, in compliance with the new manufacturer's data (including new checklists or use of an autopilot), or other operational requirements determined necessary by the FSB. None of these requirements would be addressed by the issuance of a type rating. An SFAR can also impose higher experience requirements for those instructing or administering tests in the MU–2B than is presently required by existing regulations. Therefore, this SFAR provides a higher level of safety than would be achieved by issuance of a type rating alone.

Training Monopoly

A commenter stated that it does not make sense that he should forego all other flight training except at a flight school A commenter also suggested the FAA was supporting a commercial training monopoly. The FAA does not agree. This standardized training can be provided by any instructor or commercial training organization that meets the experience requirements for instructors as described within this SFAR. This rule does not require that all SFAR compliant training be conducted at a commercial training center or flight school.

Availability of Training Program

One commenter expressed concern about access and availability of the training program. Another commenter requested that the FAA reopen the comment period, claiming that Mitsubishi will not release the training program to the public and the public cannot comment on the proposal without evaluating it. This commenter requested that the FAA have Mitsubishi publish all of their information and then re-open the comment process. A commenter also noted the manufacturer requires a Memorandum of Understanding (MOU) to be signed by the recipient before being provided a

copy of the training program. This commenter felt that he should not be required to sign the MOU.

The FAA posted a copy of the MHI training program to Rules Docket FAA–2006–24981 prior to the NPRM comment period opening. This training program remains in the Rules Docket and may be downloaded by interested parties. As previously noted, the FAA has decided to place the requirements of the MU–2B Training Program in Appendices A through D to the SFAR. The SFAR will be published in the Code of Federal Regulations making the MU–2B Training Program publicly available. The FAA has determined that the public has reasonable access to the training program.

Procedures Not Covered by the Training Program

One commenter noted that a pilot cannot operate the MU–2B contrary to the training program and wondered about other procedures not in the training program such as IFR holds, GPS approaches and DME arcs. With this SFAR, the FAA does not intend to change operational procedures that are not contained in the MU–2B training program. The FAA notes that such procedures are already covered by existing FAA regulations and guidance.

Revisions to the Training Program

Although no comments were received about the proposed rule provisions related to future training program revisions, the FAA notes that absent future rulemaking that makes a later revision of the training program exclusive and mandatory, operators must use the MU–2B Training Program contained in the SFAR The FAA has added a new section 8 to the SFAR to give credit for use of certain prior versions of the MHI training program for a specific time period. Section 8 states that ''Initial/transition or requalification training conducted between July 27, 2006, and the effective date of this rule, using Mitsubishi Heavy Industries MU–2B Training Program, Part number YET 05301, Revision Original, dated July 27, 2006, or Revision 1, dated September 19, 2006, is considered to be compliant with this SFAR, if the student met the eligibility requirements for the applicable category of training and the student's instructor met the experience requirements of this SFAR.'' This addition was made to allow those pilots who have already completed the MHI training program during the rulemaking process to receive credit for initial/transition training.

Requirements for Flight Instructors

The FAA proposed a variety of experience requirements for flight instructors who conduct training in the MU–2B airplane, depending on whether the instruction is in the airplane, in a simulator, or in an FTD.

One commenter stated that the SFAR adequately addresses the need for flight instructors to be trained and current in the MU–2B airplane. One training provider suggested that the experience requirements for pilot examiners and check airmen be increased from 100 hours to 300 hours. Another commenter felt that the experience requirements for instructors, pilot examiners, and check airmen should be increased to 500 hours. The FAA notes that existing regulations allow instruction and checking in the MU–2B to be conducted with as little as 5 hours PIC time in make and model. The requirement that this be increased to 300 hours for instructors and 100 hours for examiners is a substantial increase over what is now required. The experience requirements in this SFAR are also consistent with thresholds established by other prior rulemaking for certain aircraft, such as SFAR 73 for the Robinson R–22/R–44 helicopter (62 FR 16298), and the recommendations of the FSB Report.

Another commenter stated that the 50 hours of operating experience within the previous 12 months for instructors, whether in the airplane or simulator, is not enough experience for someone who provides training in the MU–2B. The FAA notes that existing regulations allow flight instruction in the MU–2B to be conducted with as little as 5 hours PIC time in make and model. The increase to 50 hours within the previous 12 months significantly increases the experience requirements for MU–2B instructors. Furthermore, this 50-hour requirement is just one of many experience requirements for MU–2B instructors. Other experience requirements for an instructor such as the currency requirement of § 61.57, the flight review of § 61.56, the 2,000 hours of PIC time, and 800 hours PIC in multi-engine airplanes, combine to set a high experience level for MU–2B instructors. The specific purpose of the 50-hour requirement is to ensure that instructors have recent experience in the MU–2B airplane, training device, or simulator. The 50 hours must be obtained within the past 12 months.

A commenter also found that the 100 hours of PIC time required for a designated pilot examiner was too little time. The FAA notes this is only part of the total requirement. That examiner is also required to have the training required by this SFAR and to maintain currency in the MU–2B. The 100 hours is based on the FSB recommendations, other aircraft training requirements, a previous SFAR, and the FAA's experience in checking and evaluation.

A commenter noted that under part 135, a flight instructor does not have to hold a valid and current certificated flight instructor certificate (CFI). The commenter commented that, for part 135 operations, a flight instructor should hold a valid CFI certificate with multi-engine and instrument ratings for at least 2 years. In addition, the check airman or CFI should have 300 hours as PIC acquired while the sole manipulator of the controls as described in 14 CFR 61.51(e)(1)(i).

The FAA does not intend to change the general qualification requirements for part 135 flight instructors, but rather to establish minimum experience requirements for all instructors who provide training in an MU–2B. Additionally, requiring 300 hours as PIC as sole manipulator of the controls or requiring that instructors for part 135 operations hold a certificated flight instructor certificate would be beyond the scope of the FAA's proposal.

A commenter stated it will be difficult for an instructor to have 50 hours of PIC MU–2B time annually, that 50 hours is not useful if it is only flown in ''straight and level'' flight, and that proficiency is what is useful for a flight instructor. The FAA has determined that the recency of experience and the amount of flight time in the airplane are important qualifications for a flight instructor who provides instruction in the MU–2B. This level of experience was also recommended by the FSB Report.

The NATA commented that the total flight time and PIC flight time requirements for instructors are burdensome and could significantly limit the number of instructors qualified to provide training to MU–2B pilots. Additionally, the proposed rule would require designated pilot examiners to have an excessive amount of aeronautical experience in the MU–2B but would not require the same of FAA inspectors.

The FAA has determined that although the rule will increase the experience requirements for MU–2B instructors, the rule will not significantly reduce the number of instructors that are presently teaching in the MU–2B. In order to maximize the number of instructors available to provide training in the airplane, the FAA revised section 5 to allow the Flight Instructor Airplane experience requirements to be met using a

combination of PIC time and experience acquired while providing instruction in a FAA-approved MU–2B flight training device or simulator. The FAA has also extended the compliance period by 6 months to allow a more orderly implementation of this rule. The training and checking requirements for FAA inspectors are the same as for the public when the inspector is acting as the PIC, administering check rides, or otherwise manipulating the controls.

One commenter stated that safety would be diminished because local instructors would no longer be allowed to conduct an Instrument Competency Check (ICC) for the MU–2B. This SFAR does not require that instrument currency be maintained exclusively in the MU–2B. Also, the SFAR does not prohibit local instructors from giving an ICC. The only requirement is that the instructor meets the qualifications of the SFAR in order to give instruction in an MU–2B.

One operator commented that part 135 pilots, in commercial operations, do not carry logbooks or present logbooks during training. The logbook requirement is only applicable to part 91 operators. The commenter also stated a part 135 operator keeps records in compliance with 14 CFR 135.63(c) to include the completion date and result of every phase of training and checking for 5 years after the pilot's employment ends. Logbook endorsements are generally used as provided in part 61 at the student and private pilot level. The commenter requested that the references to pilot logbooks should be changed to ''logbook or other permanent pilot record.''

The FAA notes that § 135.63(c) addresses the recordkeeping requirement for multiengine load manifest and does not address documentation of pilot training. Section 135.63(a)(vi) addresses recordkeeping requirements for initial and recurrent competency tests, proficiency, and route checks required by §§ 135.293, 135.297, and 135.299. Section 135.63(a)(vii) addresses recordkeeping requirements for determining compliance with flight time limitations found within part 135. However, none of the above referenced rules address the documentation requirements of part 61. Additionally, 14 CFR 61.51 requires that all pilots, regardless of which regulations of 14 CFR under which they operate, keep a logbook and within it, document and record training and experience used to meet the requirements for a certificate, rating, flight review, aeronautical experience, or recent flight experience. This SFAR does not change the applicability or requirements of the existing § 61.51 rule. The requirements of this SFAR are not limited to part 135 operations. Pilots that operate the MU–2B will need to be able to demonstrate compliance with this SFAR whether or not they are employed by a part 135 operator. This documentation is best accomplished through a logbook endorsement, which is consistent with existing regulations.

A commenter stated that the proposed SFAR requires endorsement of the pilot logbook by a ''certificated flight instructor.'' The commenter posited that this text should be changed to ''instructor'' or ''flight instructor'' since part 135 does not require the use of a CFI. The FAA notes that the eligibility, requirements, and privileges of a flight instructor are described in detail by existing rules under 14 CFR parts 61 and 135. The FAA also acknowledges these requirements may be different for training conducted under part 61 as compared to part 135. Part 135 operators can use a CFI but can also use an instructor authorized by the FAA in lieu of a CFI. The FAA has changed this language accordingly.

Autopilot Requirement

The FAA proposed that no one could operate the MU–2B airplane under IFR, IFR conditions (i.e., instrument meteorological conditions (IMC)), or night VFR unless that airplane has a functional autopilot. That requirement is retained in the final rule. However, the FAA has described the requirement in a simplified form. The final rule does not require a functional autopilot for day VFR or when operating under IFR in daytime VMC conditions when maintenance of an inoperable autopilot has been deferred using an approved minimum equipment list (MEL).

Most persons commenting on the autopilot requirement did not see the need for this requirement. Some persons commented that the autopilot is unnecessary and rarely used; one cited that no other airplane is restricted when the autopilot is nonfunctioning. Experienced pilots commented that they prefer to ''hand fly'' the airplane. Another commented that, if the autopilot is mandated, a pilot may become dependent on it.

Several of the MU–2B accidents involved single pilot night-time VFR and IFR operations in high-density terminal areas with high pilot workloads. The flight training profiles flown by FSB members during the safety evaluation included a human factors workload evaluation. One airplane was equipped with several cameras that allowed post-flight evaluation of the pilot's workload. The FSB pilots completed numerous questionnaires developed by human factors specialists to measure task saturation. Questionnaires and flight video reviews were completed during post-flight interviews with a human factors specialist. Using techniques developed by the National Aeronautics and Space Administration, testing showed a significant reduction in single pilot workload and stress and improved performance when an autopilot was used in actual flight conditions. The FAA recognizes that in some conditions use of the autopilot may be inappropriate or even prohibited, such as during flights into icing conditions. The FAA also recognizes some pilots routinely hand-fly the airplane. The SFAR does not mandate the use of the autopilot during any particular phase of flight. That decision remains solely with the PIC. The SFAR does require that a functioning autopilot be installed for certain types of operations (IFR, IFR conditions, and night VFR). This requirement provides the pilot with access to a significant safety enhancing tool if he or she should need it to reduce pilot work load, during normal, abnormal, and emergency conditions.

The AOPA requested that the FAA eliminate the requirement to have a functioning autopilot for night VFR and for IFR in visual meteorological conditions (VMC) and allow an instrument and multiengine rated pilot to act as the safety pilot for an MU–2B PIC flying in IMC. Flightline/AmeriCheck, Inc., also requested that operators be allowed to conduct operations with two pilots, either two PICs or one PIC and one SIC in lieu of a functioning autopilot. Instead of grounding the airplane when the autopilot is not functioning, one commenter suggested the flight be limited to two qualified pilots; one of which meets the part 135 training and checking requirements as a SIC. In addition, one person commented that safety would be enhanced by a person in the right seat who could assist the PIC with minor duties even though he or she may not be MU–2B qualified.

The MU–2B safety evaluation and the FSB recommended that all operators of the MU–2B attend standardized pilot training. Therefore, the FAA has determined that a second pilot must meet the training requirements of this SFAR in order to provide the equivalent level of safety of a functional autopilot. Operators can conduct IFR and night VFR operations without a functioning autopilot when using a properly trained second-in-command meeting the applicable requirements of this SFAR.

We also received comments that requested relief from the autopilot through the use of a minimum equipment list (MEL). The NBAA commented they have long held that two qualified and trained pilots are one of the best safety investments in an aircraft and thus support the autopilot requirement. But, the NBAA also stated that FAA should consider allowing the use of an MEL for a nonfunctioning autopilot. Flightline/AmeriCheck, Inc. requested that they be allowed to maintain their authorization to defer repair of an inoperative autopilot by using their existing FAA-approved MEL.

The FAA notes that experience has shown the normal operation of every system or installed component may not be necessary when the remaining operative equipment or other mitigating conditions can provide an acceptable level of safety. The FAA also acknowledged that operations with inoperative equipment are possible while maintaining an acceptable level of safety by requiring appropriate conditions and limitations.

Therefore, the FAA will allow, when provided by existing rules, single pilot IFR in VMC conditions under the SFAR with the autopilot inoperative under certain conditions. The deferred maintenance and repair of the autopilot must be completed in accordance with the repair category and provisions specified in the operator's FAA-approved Mitsubishi MU–2B MEL, and the operator must obtain FAA approval to use a MEL for his or her airplane. This relief does not supersede any existing crew requirements for an SIC, including but not limited to operations described in 14 CFR 135.99, 135.105, and 135.111. This relief will allow operators time to locate parts and facilities for repairs, ferry aircraft to repair stations, and complete trips. Under certain conditions, the aircraft with an approved MEL will not be immediately grounded due to an inoperative autopilot, and operators will have a reasonable period of time to make repairs. The FAA has changed the rule language to specifically allow for the use of an MEL under the SFAR.

One person stated that if IFR flight is not an option due to a non-functioning autopilot, the pilot may push the limits of VFR rules to an unsafe situation. Another person noted that on long trips, one leg of the flight may be delayed if the airplane without a functioning autopilot must wait for good weather to avoid flying in IFR conditions. The FAA does not agree with the comments that pilots will fly in marginal VFR weather (scud run), or delay their trips when their autopilots are inoperative. Deferred maintenance and repair of the autopilot using an approved MEL will provide an alternative to choosing to fly in marginal VFR weather.

Additional commenters noted that parts for installed autopilots are difficult to obtain. The FAA recognizes that parts for the autopilots are becoming increasingly scarce and support for the existing autopilots may someday end. However, to date, the FAA is unable to identify autopilots that cannot be repaired. Additionally, the FAA notes new autopilots are under development for the MU–2B.

One commenter suggested that requiring a functioning autopilot modifies the airplane type certification basis. Another commenter stated that to require an autopilot defies the certification basis for the MU–2B because the airplane was type certificated for single pilot operations.

The FAA notes that the autopilot requirement is an operational requirement and not a certification requirement. Furthermore, in most of today's modern cockpits, aircraft that are permitted to be operated with a single pilot are required to have a functional autopilot installed. Requiring an autopilot does not change or modify the airplane's original type certification basis.

Some commenters asked which aspects of the autopilot must be functional or, if one facet is not functioning, how the airplane could be flown to a repair facility. A commenter said grounding the airplane due to a non-functioning autopilot is excessive. The FAA disagrees. A functional autopilot is one in which the system and components are operative and working properly to accomplish the intended purpose. That autopilot is consistently functioning within its approved operating limits and design tolerances. Operators have many ways to verify that their autopilot is functioning properly including conducting the preflight check as described by the manufacturer. Operators can find this information in the Supplemental AFM.

Another pilot recommended additional specific instruction in autopilot inoperative strategies during recurrent training.

The MU–2B training program provides instruction for operation of the airplane with and without the autopilot operational. The training program requires the pilot to demonstrate proficiency while hand-flying the airplane.

Airplane Flight Manual

The FAA proposed that operators of the MU–2B airplane have on board the most recent revision to the AFM. One commenter noted that an out-of-date AFM is a common problem for many MU–2B airplanes, and was confident that the SFAR solves this problem. The SFAR requires the operator to have the appropriate AFM on board the airplane and accessible during the flight.

The FAA notes there may be differences between checklist, procedures, and techniques found in the MU–2B training program required by this SFAR and procedures found in the AFM procedures sections (Normal, Abnormal, and Emergency). Until the AFM is updated, a person operating the MU–2B must operate the airplane in accordance with the required pilot training specified in section 3, paragraphs (a), (b), and (g) and the operating requirements of section 7, paragraphs (d) and (e). If the AFMs are updated, the FAA may initiate additional rulemaking. At that time the FAA may mandate that the operators obtain and use the latest version of the AFM. The chart below shows the current versions of the AFMs as of the date of publication of the SNPRM.

MHI DOCUMENT NUMBER AND REVISION LEVEL FOR MU–2B SERIES AIRPLANE—AIRPLANE FLIGHT MANUAL

Model	Marketing designation	Type certificate	Applicable AFM revision level		
			Document No.	Revision No.	Date issued
MU–2B–60	Marquis	A10SW	MR–0273–1	14	July 11, 2005.
MU–2B–40	Solitaire	A10SW	MR–0271–1	12	July 11, 2005.
MU–2B–36A	N	A10SW	MR–0196–1	14	July 11, 2005.
MU–2B–36	L	A2PC	YET 74122A	12	August 9, 2004.
MU–2B–35	J	A2PC	YET 70186A	13	August 9, 2004.
MU–2B–30	G	A2PC	YET 69013A	13	August 9, 2004.

MHI DOCUMENT NUMBER AND REVISION LEVEL FOR MU–2B SERIES AIRPLANE—AIRPLANE FLIGHT MANUAL—Continued

Model	Marketing designation	Type certificate	Applicable AFM revision level		
			Document No.	Revision No.	Date issued
MU–2B–26A	P	A10SW	MR–0194–1	12	July 11, 2005.
MU–2B–26	M	A2PC	YET 74129A	12	August 9, 2004.
MU–2B–26	M	A10SW	MR–0160–1	10	July 11, 2005.
MU–2B–25	K	A10SW	MR–0156–1	10	July 11, 2005.
MU–2B–25	K	A2PC	YET 71367A	12	August 9, 2004.
MU–2B–20	F	A2PC	YET 68034A	12	August 9, 2004.
MU–2B–10	D	A2PC	YET 86400	12	August 9, 2004.
MU–2B	B	A2PC	YET 67026A	12	August 9, 2004.

Checklist

The FAA proposed and the final rule requires that all operators of the MU–2B have a copy of an MU–2B checklist appropriate for the MU–2B model being operated on board the airplane, accessible for each flight at the pilot station, and used by the flight crewmembers when operating the airplane. These checklists must be accepted by the FAA's MU–2B FSB. The manufacturer has developed make and model specific checklists for each MU–2B model. These checklists have been already accepted by the FAA's MU–2B FSB and are appropriate for unmodified versions of the models listed. A list of the checklists for the various models of the MU–2B series airplane are in section 3 (g), table 1, of this final rule.

A commenter was pleased to see a standardized checklist and added that it will result in improved safety. Another commenter stated that the checklist should be aircraft specific, which could be accomplished by providing a checklist template to be customized to fit the specific aircraft.

During the safety evaluation, FAA test pilots evaluated a standardized checklist developed by MHI and found it to be a significant safety improvement. A standardized cockpit checklist that emphasizes proper operational procedures is critical to the safe operation of the MU–2B. The FAA and MHI engineers and test pilots carefully considered cockpit layout, flow patterns, crew resource management, and pilot work load when determining the checklist items. This rule requires that any MU–2B checklist used be accepted by the FAA's MU–2B FSB. Operators with airplane configurations different from the airplane as originally delivered, or later modified, may submit other checklists for review by the FSB.

Another commenter who has installed an aural checklist in his MU–2B asked if this would be prohibited under the SFAR. Yet another suggested that the checklist be customized to allow for individual configurations.

In accordance with existing FAA guidance and procedures, the MU–2B FSB is responsible for reviewing, and accepting or rejecting any checklists submitted by the manufacturer or the public. For the purpose of this rule, the term ''approved or accepted'' means the FAA has received the proposed checklist, reviewed the checklist content, and determined it to be safe for use while operating the MU–2B airplane.

The MU–2B FSB will review all submitted checklists, including aural checklists or those not produced by the manufacturer, if an operator has an airplane configuration that is different from that originally delivered. This review will conclude with a determination of whether the submitted checklist can be accepted. An operator may submit their proposed checklist to the MU–2B FSB at the address in the footnote and request that the FSB review the checklist for acceptance.[1] The rule language has been changed to reflect this process.

One commenter said he had reviewed the checklist, and at 162 pages it is too long for a pilot to run through before takeoff. Another commenter said that the checklist should flow from system to system, not as things are arranged in the cockpit.

The FAA posted to Rules Docket FAA–2006–24981 a sample of the manufacturer's checklist for comment. This is one, but not the only, possible format that the FAA may accept. This 162-page document includes checklists for normal, abnormal, and emergency procedures, but also includes instructions for checklist use, an expanded section that describes in greater detail the actions required, warnings, notes, and cautions. In the back of the binder, there are also performance charts that were not previously contained in the AFM. These charts include the following: ''Weight for Positive Gradient After Takeoff with Flaps at 5 or 20 degrees'' and ''Single Engine Rate of Climb with Flaps at 5 or 20 Degrees.'' These charts are important pre-flight decision making tools and using them can enhance safe operation of the airplane. The FAA notes that the manufacturer's checklist is comparable in size to those of airplanes of similar complexity.

The FAA stated in the NPRM that we would publish specific checklists for each MU–2B model and seek public comment. A checklist for each model of the MU–2B airplane has been approved by the FSB. These are listed in section 3(g) of the rule.

Costs of the Rule

Some commenters indicated the costs of the proposed rule are higher than those estimated by the FAA. These comments are discussed below by issue. For a more complete discussion of costs and benefits, see the Final Regulatory Evaluation, which has been placed in Rules Docket FAA–2006–24981.

Compliance Date

As discussed earlier in this document, compliance with this final rule is required 1 year after publication in the **Federal Register**.

Extending the compliance date decreases the requalification training for all MU–2B pilots currently receiving training. The baseline training cost is the cost of the existing recurrent training (rather than zero). In addition, the actual final cost estimate of requalification training for those pilots currently getting training is reduced by the travel costs and value of travel time to the training facility. As a result of extending the compliance date to 1 year, the total cost estimate for this SFAR decreases $3 million to $4 million.

Although some part 135 operators send their MU–2B pilots to commercial training providers, many part 135 operators have in-house training

[1] The MU–2B FSB is located at FAA Central Region Headquarters, Aircraft Evaluation Group MKC–AEG, Room 332, 901 Locust, Kansas City, MO 64106; telephone 816–329–3233.

programs and would not incur any travel, lodging, or per diem costs. The analysis in the final regulatory evaluation does not reflect this potential lower cost, but recognizes that the cost estimate is a potential overestimate of the actual costs because many MU–2B pilots flying under part 135 would not incur travel, lodging, or per diem costs.

Value of Aircraft

One commenter stated the FAA will ''kill'' the value of the MU–2B, and he could not afford to walk away from a $400,000 investment he could not use or sell. In related comments, other persons stated the loss of value could be more than $100,000 per airplane. In contrast, another commenter stated he ''welcomed the FAA intervention'' in hope that we might be able to put the safety issue behind us and restore lost value to the MU–2B fleet.

The FAA is requiring MU–2B pilots (with a minimum of either 50 hours PIC time in the MU–2B in the last 2 years or 500 total hours in the MU–2B) to receive requalification training. This will entail a total additional cost including lodging, meals, incidental expenses, and value of time of approximately $5,000 for pilots currently getting training, or $13,000 for pilots not currently getting training. Pilots will also be required to receive annual recurrent training in the future, at a total additional cost of about $2,000 per year for pilots currently getting training or $10,000 per year for pilots not currently getting training. Such a safety expense is very small compared with a $400,000 airplane.

The MU–2B price was falling before the proposed rule was issued. Several factors, including the poor MU–2B safety record, higher maintenance costs, less availability of parts, and newer products with better capabilities, may help explain the falling price of MU–2Bs.

Impact of Aircraft Value Loss on Business

A commenter complained, ''Our fleet value has dropped significantly. Our MU–2Bs are a standalone division of the company. If the MU–2B division can not turn a profit, the business division will be shut down. Pilots and mechanics will be let go.''

The decision to shut down a certain division is a business decision that is not based on the value of the MU–2B. The value of existing capital is not relevant in the decision to continue to provide current services. The value of capital is relevant in the determination of the shutdown value of a business. The FAA does not believe this rule will force companies out of business. As shown in Regulatory Flexibility Analysis, found in the Final Regulatory Evaluation, the pilot training cost is estimated to be greater than 2 percent of annual revenues for one small entity operator, and greater than 1 percent of annual revenues for five small entity operators. (Refer to Table RF–5 in the Final Regulatory Evaluation in Rules Docket FAA–2006–24981.)

Recurrent Training Cost

A commenter stated that the cost of recurrent training should be reviewed. He found the price of recurrent training not $1,937 per pilot as estimated in the NPRM, but $4,100 at SimCom.

In the NPRM, the FAA estimated that the average additional cost per pilot for recurrent training would be $1,937. This is in addition to the current cost the pilot is paying for recurrent training. ($4,100 + $1,937 = $6,037) The existing 3-day recurrent training course at SimCom costs $4,100 (refer to Table 3 in the Regulatory Evaluation of the NPRM). The FAA estimated that the future recurrent training cost at SimCom would be $4,600 and that the training would spill over into a 4th day (refer to Table 4 in the NPRM's Initial Regulatory Evaluation). So the total additional cost for the recurrent training course alone is $500 ($4,600 − $4,100 = $500). The average per diem costs (i.e., lodging, meals, and incidental expenses) in Orlando, FL is $137 per day based on the 2006 federal government per diem rates (refer to Tables 5 and 6). The total additional cost for the recurrent training course plus the additional day of lodging, meals, and incidental expenses would be $637 ($500 + $137 = $637). The additional costs due to travel (round trip travel costs and the value of travel time) are zero because the student would incur the same travel costs to attend the training. Since student pilots would be spending an additional day in recurrent training, the estimated value of time for the additional day is $288.51 (8 hours × $36.06 average hourly value of time = $288.51). The $36.06 average hourly value of time is an average of the hourly value of travel time savings for general aviation purposes [2] and the mean annual wage of Commercial Pilots of small fixed or rotary winged aircraft.[3] Hence, the total additional cost for an existing student in the recurrent training program at SimCom would be about $925 ($637 + $288.51 = $925.51).

The FAA conducted a similar analysis for existing students at Howell Enterprises and at Professional Flight Training, and then conducted a weighted average of the additional costs per pilot at these 3 training facilities and arrived at an average additional cost of $1,937 per pilot. The total per pilot costs of training at Howell Enterprises and at Professional Flight Training are higher than at SimCom because these training facilities conduct the training in the customer's airplane. Hence, the FAA included the additional MU–2B variable operating cost of $900 per hour, which is based on a cost study of the Mitsubishi Marquise conducted by Howell Enterprises. In contrast, SimCom provides recurrent training in simulators, and students at SimCom would not incur any additional MU–2B operating costs.

Training Cost Estimates

Several commenters stated that the estimates in the SFAR are unrealistic. They said the real costs for requalification training will be in excess of $20,000 and the annual recurrent training cost would be in excess of $8,000.

The estimates in the initial regulatory evaluation were the additional costs that a pilot would incur due to this rule. If a pilot has been getting recurrent training, the FAA estimated that his additional cost for recurrent training due to this rule would be $1,937. If a pilot has not been getting recurrent training, and will be forced to do so now, the FAA estimates that the cost of recurrent training for this pilot would be $9,889. Hence, the existing cost of recurrent training is approximately $8,000 ($9,889 − $1,937 = $7,952). The FAA estimated in the NPRM that the average total costs for requalification training would be $12,604. (Refer to Table 8 in the NPRM's Initial Regulatory Evaluation.) Requalification training is more expensive than recurrent training, but it is not 2.5 times the cost of recurrent training. The commenters have not provided any supporting justification to show that the cost of requalification training is really $20,000 plus.

After accounting for the increased compliance time and other revisions to the rule, the FAA estimates that the additional cost of requalification training for pilots currently getting training would be around $5,000 per pilot. (Refer to Table 8 in the Final Regulatory Evaluation of the Final Rule.)

[2] Economic Values for FAA Investment and Regulatory Decisions—A Guide, Draft Final Report, December 31, 2004.

[3] Bureau of Labor Statistics, Occupational Employment and Wages, May 2005.

Instructor Costs

A commenter stated MU–2B instructors cost $100 per hour, not $50 per hour. Also this commenter claimed there were costs associated with fuel, related airplane costs, and housing related to the training.

The FAA agrees that MU–2B instructor rates are approximately $100 per hour. However, the additional costs for pilots to attend the training program are not based on an instructor hourly rate. Instead, they are based on the costs of the training programs. (Refer to Table 3 in the Regulatory Evaluation.) As explained above, the FAA estimated total per pilot costs including training costs, MU–2B operating costs (if training is done in the airplane), lodging, food and incidental expenses, transportation to the training venue, the value of training time, and the value of travel time. The FAA estimated the MU–2B variable operating costs to be $900 per hour. This figure includes the cost of fuel, maintenance, avionics, engine reserve for overhaul and hot section, and propeller reserve. This figure does not include fixed costs and other costs such as hangar rent, crew costs, interest, or insurance costs.

The $50 per hour instructor rate used on page 24 in the Initial Regulatory Evaluation of the NPRM is the average instructor rate for an inexpensive multi-engine airplane, such as a Piper Seneca. This rate was used to estimate the costs of the proposed rule requiring pilots to log at least 100 hours of pilot-in-command (PIC) time in multi-engine airplanes. Because the operating cost of the MU–2B is $900 per hour and the rental rate for a Piper Seneca is about $200 per hour, the FAA estimated that any pilot who needed to meet the requirement of 100 hours of PIC time in multi-engine airplanes could do so in a lower cost Piper Seneca, and also pay a lower Piper Seneca instructor rate of $50 per hour.

The FAA notes that the $50 per hour instructor rate was used incorrectly in the Paperwork Reduction Act Assessment, and has made the appropriate changes to reflect the MU–2B instructor rate of $100 per hour in the PRA Assessment.

Autopilot Cost

Some commenters found the autopilot costs to be underestimated. They stated that maintaining an autopilot would cost $18,000 per 1,500 flight hours. Other commenters stated the cost of an autopilot would be between $50,000 and $120,000 per airplane. MU–2 Aircraft Owners and Pilots Association and other commenters stated the average cost of an autopilot would be $75,000. The FAA received a single comment from one operator who stated he does not have an autopilot installed.

In the Initial Regulatory Evaluation, the FAA estimated the proposed rule would impose no additional costs with regard to the purchase or maintenance of autopilots. Based on information from industry, all MU–2Bs currently had functioning autopilots, and the FAA estimated these MU–2B owners would continue to maintain their autopilots in the future. The FAA was unaware that one part 135 operator did not have an autopilot, and would need to install and maintain an autopilot in order to fly single pilot IFR. The FAA has made the appropriate changes to reflect this new information in the Final Regulatory Evaluation and in the Regulatory Flexibility Assessment using an average autopilot cost of $75,000 and maintenance costs of $18,000 per 1,500 flight hours. The FAA also states that this operator still has the option of flying with two MU–2B pilots or not flying single pilot IFR or night VFR.

One commenter (a part 135 operator) stated that the FAA did not include an economic impact analysis of the cost (and weight penalty) of a second crewmember.

Under the existing part 135 regulations, a second crewmember is required for passenger-carrying operations. In contrast, only one crewmember is required to carry cargo. This new rule would require that an airplane flown under part 135 regulations have an autopilot, which is less expensive than the cost of a second crewmember. A part 135 operator may choose to have a second crewmember for a cargo operation, but the FAA is not requiring it.

Other commenters stated autopilots and parts will not be supported by the manufacturer for much longer, certain parts are in short supply, and a replacement autopilot is very expensive.

The FAA believes if the supply of replacement parts for autopilots were to become extremely scarce, a new company would produce replacement parts to meet the increased demand.

Some commenters stated that without being able to use existing MEL relief when autopilots must be deferred, the associated additional costs could easily make continued operation of these aircraft economically unfeasible.

The FAA is clarifying that MU–2B owner/operators will still have the ability to MEL the autopilot.

Discounting Method

One commenter stated the 7% discounting method used in the SFAR economic impact analysis does not work in the real world where companies adjust their cost for inflation.

The Office of Management and Budget (OMB) permits benefit-cost analyses to be conducted in either nominal/current dollars or in constant dollars of a particular year.[4] Effects of inflation are excluded by choosing either nominal/current dollars or constant dollars and avoiding mixing-up both in the same analysis and by using a nominal discount rate if the analysis is conducted in nominal dollars and a real discount rate if the analysis is conducted in constant dollars. OMB implies a preference for the use of constant dollars unless most of the underlying values are initially available in nominal dollars. Because we use constant dollars in this Regulatory Evaluation, we apply a real discount rate of 7 percent (in accordance with OMB Circular A–94).

The present value methodology accounts for the characteristic that benefits and costs occur over a number of years. It explicitly recognizes that otherwise equal benefits or costs which occur at different points in time will not be equal when viewed from a common point in time. Generally, the present value of a benefit will be worth more the sooner it is received, and the present value of a cost will be less the longer it is deferred.

Part 135 Checks (§§ 135.293, 135.297, and 135.299)

One commenter stated that the 135 pilot qualified in a single aircraft type receives a minimum of 3 hours of in-flight testing a year, and the number of hours of training as needed. Part 135 operations require one § 135.293 aircraft competency check within the preceding 12 months, two § 135.297 instrument proficiency checks in a 12-month period, and one § 135.299 line check within the preceding 12 months. Credit for the successful completion of the § 135.293 check is not allowed in the proposed rule (although § 135.351(c) allows it to satisfy the recurrent flight training requirement). This creates an unnecessary economic burden for businesses that make their living flying the MU–2B.

The FAA agrees with the commenter and will allow checks for §§ 135.293, 135.297, and 135.299 to count also for the corresponding requirements under this SFAR. Up to 3 hours can be double-counted as training under this SFAR. However, the checker must sign those elements of the MU–2B Final Phase

[4] ''OMB Circular A–94'' (Revised—October 29, 1992) p. 8.

Check in accordance with the training program requirements in order for those hours to count. In addition, the pilot must still meet all of the other training requirements under this SFAR, even if that pilot exceeds the minimum number of training hours required.

Simultaneous Training and Checking

Several commenters wanted the FAA to allow for simultaneous training and checking, and to allow all SFAR training to satisfy requirements for the biennial flight review.

The FAA will allow for simultaneous training and checking in requalification and recurrent training. Regarding the biennial flight review, SFAR training completed in an MU–2B airplane would satisfy requirements for the biennial flight review. The Regulatory Evaluation states that there are no additional costs for the flight review requirement because pilots are already required to comply with 14 CFR 61.56. Furthermore, Howell Enterprises already provides a flight review as part of the recurrent training course.

Training to Proficiency

Many commenters wanted to train to proficiency instead of training to a set number of hours of training. The commenters also noted that the number of hours proposed is too much for some pilots and too little for others.

The FAA recognizes that for current and proficient MU–2B pilots, the proposal could be more expensive than training to proficiency. However, the FAA is adopting the proposal for these reasons. (1) After carefully reviewing existing training programs and the proposed MHI training program, the FAA determined that the training program hour requirements represent the minimum number of hours required to reach an acceptable level of safety and proficiency. (2) The MU–2B training program requires that the student complete a minimum number of program hours and that the student is trained to commercial pilot practical test standards (the FAA's Commercial Pilot Practical Test Standards is used as a guide to determine pilot proficiency under the MU–2B training program). (3) The FAA has monitored the completion times for training conducted using the MHI training program since it was approved, and this monitoring validated the number of training hours proposed.

A commenter stated although he can continue to receive training in the simulator (FTD), none of the approved training providers will provide training in a self-insured aircraft. This commenter finds completion of a § 61.56 flight review in an MU–2B will impose a significant additional economic cost on self-insured operators as they will be forced either to rent a commercially insured aircraft for the flight review or to insure their aircraft in the commercial market at a cost that may well render it economically unfeasible to continue to own an MU–2B.

The FAA is not requiring that MU–2B owners/operators buy insurance. It is the MU–2B owner/operator's choice to obtain insurance or not. A self-insured MU–2B owner/operator can still obtain a § 61.56 flight review in that owner/operator's MU–2B from a flight instructor, a designated pilot examiner, a check airman, or a FAA FSDO Principal Operations Inspector that is MU–2B current. The commenter is not limited to using the services of the three training providers named in the regulatory evaluation.

New Training Program Costs

A commenter noted Reece Howell's requalification tuition is currently $4,000. SimCom's new initial course is 9 days long.

The FAA has verified this new information on the Web sites for Howell Enterprises and SimCom. The FAA also notes that Howell Enterprises is charging $7,000 for a 7-day initial training course, $3,000 for a 3-day recurrent training course, and $4,000 for a 4-day requalification course. The FAA has revised the cost estimates accordingly in the Regulatory Evaluation, and costs increased about $600,000 due to these revisions.

One commenter thinks the SFAR would have prevented approximately 4 accidents in the past 20 years, would cause an additional 2 accidents over the next 20 years, and would have a net reduction of 2 fatal accidents over the next 20 years.

The FAA disagrees. FAA safety inspectors, pilots, and mechanics examined the MU–2B accident history along with root causes and determined that 15 MU–2B accidents over 10 years could have been prevented if this SFAR had been in place.

Effect of the SFAR on the Environment

One commenter noted that each additional hour of mandated flight training would burn valuable jet fuel. A qualified MU–2B pilot can fly the new procedures in a little over 2 hours. This SFAR mandated training would mean that 600+ pilots would burn 324,000 gallons of jet fuel with accompanying jet fumes unnecessarily entering our environment. Part 91 pilots and an unknown number of MU–2B qualified check airmen could double this number. This commenter finds such a large misuse of any fuel in an age of dependency on foreign oil absurd, and believes that the FAA has not addressed this problem.

FAA Order 1050.1E identifies FAA actions that are categorically excluded from the National Environmental Policy Act for preparation of an environmental assessment or environmental impact statement in the absence of extraordinary circumstances. The FAA has reviewed paragraph 304 of this Order, Extraordinary Circumstances, before deciding to categorically exclude this rulemaking. During this review, the FAA determined that there are no extraordinary circumstances that would prevent a categorical exclusion. The FAA has determined this rulemaking action qualifies for the categorical exclusion identified in paragraphs 307a, 312d, and 312f. The FAA also notes that all part 135 operators and most part 91 operators are already receiving annual pilot training. The training required by this SFAR standardizes this training and experience requirements of those conducting the training but does not significantly increase the amount of training already being done.

Expiration Date

One commenter said the FAA should make the SFAR expire in 5 years and review the SFAR after 4 years to see if it is effective and still needed. The FAA will monitor the implementation of the SFAR and its effectiveness on a regular basis and at intervals much shorter than the 4 years proposed by the commenter.

Airworthiness Directives

Three commenters questioned whether it makes sense to add the economic costs of this training rule to the recently imposed financial burden that the MU–2B operators will incur from the 7 ADs issued in 2006. The FAA's 2005 Safety Evaluation concluded that the existing ADs were not issued to address the training and operational experience requirements that the FAA found necessary to lower the accident rate.

Comments Not Directly Related to the Proposed Rule

Several comments were submitted that did not address the proposed requirements in the NPRM. Some commenters offered suggestions that are outside the scope of the proposal and cannot be adopted without a reopening of the comment period in a new NPRM.

Mitsubishi Heavy Industries of America (MHIA) stated its opposition to descriptions of emergency procedures that compared their airplane to other

airplane models contained in the preamble of the NPRM. The final rule preamble omits this general comparison.

A commenter submitted questions about a workshop held for commercial MU–2B operators addressing implementation of the FSB report for part 135 operations. The FAA responded only to the portions of this letter that directly addressed the content of the proposed rule.

One commenter stated that the FAA should do an ''unintended consequences study'' for the proposed rule, considering such issues as devaluing the airplane, change in pilot population, forcing flights into low level VFR environment, and oversight costs. The FAA has addressed these issues within various sections of the preamble. The FAA is not aware of any unintended consequences and the commenters did not raise any. The FAA does not intend to conduct a specific study.

Economic Assessment, Regulatory Flexibility Determination, Trade Impact Assessment, and Unfunded Mandates Assessment

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 (Pub. L. 96–354) requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (Pub. L. 96–39) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, this Trade Act requires agencies to consider international standards and, where appropriate, that they be the basis of U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of $100 million or more annually (adjusted for inflation with base year of 1995). This portion of the preamble summarizes the FAA's analysis of the economic impacts of this final rule. We suggest readers seeking greater detail read the full final regulatory evaluation, a copy of which we have placed in the rules docket for this rulemaking (FAA–2006–24981).

In conducting these analyses, FAA has determined that this final rule: (1) Has benefits that justify its costs, (2) is not an economically ''significant regulatory action'' as defined in section 3(f) of Executive Order 12866, (3) is not ''significant'' for the OMB but is ''significant'' for the DOT because of its impact on small entities; (4) will have a significant economic impact on a substantial number of small entities; (5) will not have a significant effect on international trade; and (6) will not impose an unfunded mandate on state, local, or tribal governments, or on the private sector by exceeding the threshold identified above. These analyses are summarized below.

Total Costs and Benefits of This Rule

The estimated cost of this final rule is about $25.9 million ($17.4 million in present value terms), and the estimated benefit is about $76.0 million ($49.3 million in present value terms). More detailed benefit and cost information is provided below.

Who Is Potentially Affected by This Rule

All pilots and operators of the Mitsubishi MU–2B are affected by this rulemaking. (This also includes flight instructors, designated pilot examiners, training center evaluators, and check airmen.)

Assumptions:

- Discount rate—7%. Sensitivity analysis was performed on 3% and 7%.
- Period of Analysis—2008 through 2017.

Benefits of This Rule

We estimate the final rule will provide benefits of $76.0 million ($49.3 million in present value) from 2008 through 2017. In the absence of the requirements contained in this final rule, future accidents will occur on MU–2B airplanes in a manner similar to what has happened in the past. A key benefit of the final rule will be the avoidance of these accidents. Details of the benefit analysis are found in Section V of the Final Regulatory Evaluation in Rules Docket FAA–2006–24981.

Costs of This Rule

The FAA estimates the compliance costs of this final rule to be about $25.9 million ($17.4 million in present value). The table below shows a breakdown of these total costs by category.

Category	Total
Pilot Training Costs	$24,978,000
Aeronautical Experience	755,000
Instruction, Checking and Evaluating	0
Currency Requirements and Flight Review	0
Operating Requirements	157,000
Grand Total Costs (undiscounted)	25,890,000

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (Public Law 96–354) (RFA) establishes ''as a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration.'' The RFA covers a wide-range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a rule will have a significant economic impact on a substantial number of small entities. If the agency determines that it will, the agency must prepare a final regulatory flexibility analysis.

The FAA believes that this final rule will result in a significant economic impact on a substantial number of small entities. The purpose of this analysis is to provide the reasoning underlying the FAA determination.

Under Section 604 of the RFA, each final regulatory flexibility analysis (FRFA) shall contain:

(1) A succinct statement of the need for, and objectives of, the rule;

(2) A summary of the significant issues raised by the public comments in response to the initial regulatory flexibility analysis, a summary of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments;

(3) A description of and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available;

(4) A description of the projected reporting, recordkeeping and other compliance requirements of the rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record; and

(5) A description of the steps the agency has taken to minimize the

significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.

In accordance with section 604, we address each component for this FRFA.

(1) *A succinct statement of the need for, and objectives of, the rule*

Under Title 49 of the United States Code, the FAA Administrator is required to consider the following matters, among others, as being in the public interest:

- Assigning, maintaining, and enhancing safety and security as the highest priorities in air commerce. [See 49 U.S.C. 40101(d)(1).]
- Promoting the safe flight of civil aircraft in air commerce by prescribing regulations that are necessary for safety. [See 49 U.S.C. 44701(a)(5).]
- Additionally, it is the FAA Administrator's statutory duty to carry out his or her responsibilities ''in a way that best tends to reduce or eliminate the possibility or recurrence of accidents in air transportation.'' [See 49 U.S.C. 44701(c).]

This Special Federal Aviation Regulation (SFAR) creates new pilot training, experience, and operating requirements for persons operating the Mitsubishi MU–2B series airplane (MU–2B). These requirements follow an increased accident and incident rate in the MU–2B and are based on a Federal Aviation Administration safety evaluation of the MU–2B. This SFAR mandates additional training, experience, and operating requirements to improve the level of operational safety for the MU–2B.

(2) *A summary of the significant issues raised by the public comments in response to the initial regulatory flexibility analysis, a summary of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments*

1. Almost all commenters stated that the proposed compliance date of 180 days after the effective date of the final rule would adversely impact all pilots and training providers, and requested that the compliance date be extended to one year from the date of the final rule.

The FAA agrees and has made the appropriate changes in the final rule. A one-year compliance date provides a substantially longer transition period for both pilots and training providers, which reduces compliance costs.

2. One commenter stated that the FAA will kill the value of the MU–2B, and that he could not afford to walk away from a $400,000 investment that he could not use or sell. In related comments, other people stated that the loss of value could be more than $100,000 per airplane.

The commenter's concern would be completely valid if the FAA grounded the MU–2B because of the high accident rate. While that was seriously considered, we concluded that the training program will solve the accident problem.

The training program contained in this final rule includes ground and flight training for four different categories: Initial/transition, requalification, recurrent, and differences training. The estimated cost for Initial/transition training is approximately $25,000. Requalification cost for pilots currently getting training is roughly $5,000, and $13,000 for pilots not currently getting training. The recurrent training is about $2,000 per year additional for pilots currently getting training or $10,000 per year for pilots not currently getting training. Such an expense is very small compared with a $400,000 airplane and the accident rates that accompany the current deficiencies.

Lastly, the MU–2B price was falling before the rule was proposed. Several factors including the MU–2B safety record, higher maintenance costs, less availability of parts, and newer products with better capabilities may help explain the falling price of MU–2Bs.

3. A commenter indicated that the fleet value dropped significantly and that the MU–2Bs are a standalone division of the company. If the MU–2B division can not turn a profit, the business division will be shut down. Pilots and mechanics will be let go.

Again, the training costs are substantially lower than the value of the aircraft. The decision to shut down a certain division is a business decision that is not based solely on the value of the MU–2B. Although the value of a piece of capital equipment is useful in determining the assets of a business, the value of existing capital equipment is not relevant in a firm's decision to continue operations. The FAA does not believe this rule will force companies out of business.

4. A commenter stated that although we can continue to receive training in the simulator (FTD), none of the approved training providers will provide training in a self-insured aircraft. Requiring completion of a § 61.56 flight review in a MU–2B will, at best, impose a significant additional economic cost on self-insured operators as they will be forced either to rent a commercially insured aircraft for the flight review or to insure their aircraft in the commercial market at a cost that may well render it economically unfeasible to continue to own an MU–2B.

The FAA is not requiring that MU–2B owner/operators get insurance. It is the MU–2B owner/operator's choice to get insurance or not. A self-insured MU–2B owner/operator can still obtain a § 61.56 flight review in that owner/operator's MU–2B from a flight instructor, a designated pilot examiner, a check airman, or a FAA FSDO Principal Operations Inspector that is MU–2B current.

(3) *A description of and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available*

In conducting this final regulatory flexibility analysis we incorporate the most recent data from the aircraft registry (December, 2007). The size standards from the Small Business Administration for Air Transportation and Aircraft Manufacturing, specifies companies as small entities if they have fewer than 1,500 employees.

In conducting our analysis, we considered the economic impact on small-business entities. While there are no scheduled commercial operators (part 121) of the MU–2B airplane, there are small business owners of MU–2Bs who operate under part 91 or 135.

The part 91 operations of the MU–2B are either as a personal-use airplane or are for companies that operate them where aviation is not their primary business. Part 91 operations are not for hire or flown for profit. Part 135 operations are commuter or ''on demand'' operations.

In many cases employee data for owners and operators of aircraft (especially the aircraft operated in part 91), affected by this rule is not public.

Using publicly available data, there are 14 U.S. MU–2B operators, with less than 1,500 employees, who operate 61 airplanes. This equates to roughly 4 aircraft per operator.

Corporations are the registered owners of 306 MU–2Bs. Based upon the publicly available data, the total number of affected small entities ranges from 77 (4 airplanes/firm) to 245. The majority of the corporations operate the MU–2B in part 91 service, meaning aviation is not the primary business, and the airplane is not for hire. Publicly available information is scarce about these corporations. For this analysis we

assume the worst case scenario that each of these firms are small businesses and will incur compliance costs as a result of this final rule.

In addition to the owners of the affected aircraft, companies that train pilots will themselves have to train their current MU–2B instructors to this new standard. The FAA has determined that it is essential that all flight training be conducted per a single standardized training program that reflects piloting procedures as found in the MU–2B training program. Based on our discussions with MU–2B pilot training centers we established that they will continue providing their MU–2B instructors with the latest training available. We believe that most MU–2B pilot training centers are small businesses but this final rule will result in offsetting training revenue exceeding their training costs.

(4) *A description of the projected reporting, recordkeeping and other compliance requirements of the rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record*

Reporting & Recordkeeping Requirements: A flight instructor must complete the form ''Training Course Final Phase Check'' at the end of each training course. The FAA estimates that it will take an instructor five minutes per pilot to complete the form.

An instructor must endorse a MU–2B pilot's logbook upon successful completion of training. The FAA estimates that it will take an instructor five minutes per pilot to endorse a pilot's logbook.

A copy of the airplane checklist must be accessible during each flight at the pilot station. The FAA estimates that the cost of a checklist will be about $200 and that the checklist will be ordered over a 2-year period.

Training Requirements: Depending on a pilot's current training, the rule will require a training program that includes ground and flight training in different categories. The following table summarizes potential per pilot costs and the associated categories:

Pilot category	Initial training cost	Requalification training cost	Recurrent cost per year
Additional Costs for MU–2 pilots with training		$4,930	$1,875
Costs for MU–2 pilots without training		12,882	9,826
Costs for Initial/Transition pilots	$25,376		9,826

(5) *A description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected*

We considered the following alternatives:

Alternative One: This alternative would prohibit all operations of the MU–2B series airplane within the National Airspace System. Although legislation requiring this alternative was not passed, it was an alternative explored by Congress. Upon our examination, we have determined that there is not sufficient justification to ground the airplane if the requirements contained in the rule become final. The airplane meets its original type certification basis as found in three type certification analyses (Special Certification Reviews conducted in 1984, 1997, and the Safety Evaluation of 2005 that found that the airplane complies with the applicable certification regulations).

Alternative Two: This alternative would have kept the requirements contained in the final rule, except that it would require an aircraft type rating for the MU–2B, but remove requalification training. This alternative would not fully accomplish our safety objective and would not meet the FAA's goal of ensuring that all MU–2B pilots receive continued training in the accepted procedures for normal, abnormal, and emergency operations.

Alternative Three: This alternative would have kept the proposed SFAR, and in addition, require a second pilot. Requiring a second pilot for all MU–2B airplanes would be a substantially more costly option than the SFAR training and autopilot requirements (single-pilot IFR operations and night VFR operations will be required to have a functioning autopilot). In addition, the FAA has determined that use of an autopilot provides a level of safety comparable to a two-pilot crew and therefore does not propose requiring a second crew member. An operator has the option of running a two-pilot crew to enhance safety, but the FAA will not require it.

International Trade Impact Assessment

The Trade Agreements Act of 1979 (Pub. L. 96–39) prohibits Federal agencies from establishing any standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Legitimate domestic objectives, such as safety, are not considered unnecessary obstacles. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards. The FAA has assessed the potential effect of this final rule and determined that it responds to a domestic safety objective and is not considered an unnecessary barrier to trade.

Unfunded Mandates Assessment

Title II of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in an expenditure of $100 million or more (adjusted annually for inflation with the base year 1995) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a ''significant regulatory action.'' The FAA currently uses an inflation-adjusted value of $128.1 million in lieu of $100 million.

One commenter stated that ''taken as a whole'' the requirements of Title II of the Unfunded Mandates Reform Act of 1995 did apply. The FAA disagrees because the rule involves a value less than $128.1 million. This final rule does not contain such a mandate; therefore, the requirements of Title II do not apply.

Paperwork Reduction Act

As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)), the FAA has submitted a copy of the new (or amended) information collection requirements(s) in this final rule to the Office of Management and Budget for its review. Affected parties, however, do not have to comply with the information collection requirements until the FAA publishes in the **Federal Register** the control number assigned by

the Office of Management and Budget (OMB) for these information collection requirements. Publication of the control number notifies the public that OMB has approved these information collection requirements under the Paperwork Reduction Act of 1995.

• A certificated flight instruction (CFI) must complete the form ''Training Course Final Phase Check'' at the end of each training course. The FAA estimates that it will take a CFI 5 minutes per pilot to complete the form. Since there are about 600 MU–2B pilots, this will take a total of 50 hours per year. At an average MU–2B CFI hourly rate of $100 and an average value of time at $36.06 per hour, the total yearly cost of this requirement is $6,806 (600 pilots × 5/60 hours × ($100 per hour + $36.06 value of time per hour) = $6,806).

• A CFI must endorse an MU–2B pilot's logbook upon successful completion of training. The FAA estimates that it will take a CFI 5 minutes per pilot to endorse a pilot's logbook. Since there are about 600 MU–2B pilots, this will take a total of 50 hours per year. At an average MU–2B CFI hourly rate of $100 and an average value of time at $36.06 per hour, the total yearly cost of this requirement is $6,806 (600 pilots × 5/60 hours × ($100 per hour + $36.06 value of time per hour) = $6,806).

• A copy of the airplane checklist must be accessible during each flight at the pilot station. The FAA estimates that the cost of a checklist will be about $200 and that the checklist will be ordered over a 2-year period. We assume it takes an operator 10 minutes to order a checklist, and the cost of the checklist will be about $64,069 (311 MU–2B airplanes × $200/checklist × ($36.06 hourly value of time × 10/60 hours)). Annually, this cost would be $32,031 ($64,069 ÷ 2 years).

Total PRA Results for the Final Rule:

Average Total Annual Cost Burden: Approximately $45,641.

Average Total Annual Hour Burden: Approximately 101 hours.

An agency may not collect or sponsor the collection of information, nor may it impose an information collection requirement unless it displays a currently valid Office of Management and Budget (OMB) control number.

Executive Order 13132, Federalism

The FAA has analyzed this final rule under the principles and criteria of Executive Order 13132, Federalism. We determined that this action would not have a substantial direct effect on the States, on the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government, and therefore would not have federalism implications.

Regulations Affecting Intrastate Aviation in Alaska

Section 1205 of the FAA Reauthorization Act of 1996 (110 Stat. 3213) requires the FAA, when changing regulations in title 14 of the CFR in manner affecting intrastate aviation in Alaska, to consider the extent to which Alaska is not served by transportation modes other than aviation, and to establish such regulatory distinctions as he or she considers appropriate. The FAA received no comments specific to Alaska.

Environmental Analysis

FAA Order 1050.1E identifies FAA actions that are categorically excluded from preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act in the absence of extraordinary circumstances. The FAA has determined this rulemaking action qualifies for the categorical exclusion identified in paragraph 312f of the Order and involves no extraordinary circumstances.

Regulations That Significantly Affect Energy Supply, Distribution, or Use

The FAA has analyzed this final rule under Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use (May 18, 2001). We have determined that it is not a ''significant energy action'' under the executive order because it is not a ''significant regulatory action'' under Executive Order 12866, and it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

Availability of Rulemaking Documents

You can get an electronic copy of rulemaking documents using the Internet by—

1. Searching the Federal eRulemaking Portal (*http://www.regulations.gov*);

2. Visiting the FAA's Regulations and Policies Web page at *http://www.faa.gov/regulations_policies/*; or

3. Accessing the Government Printing Office's Web page at *http://www.gpoaccess.gov/fr/index.html*.

You can also get a copy by sending a request to the Federal Aviation Administration, Office of Rulemaking, ARM–1, 800 Independence Avenue, SW., Washington, DC 20591, or by calling (202) 267–9680. Make sure to identify the amendment number or docket number of this rulemaking.

Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78) or you may visit *http://DocketsInfo.dot.gov*.

Small Business Regulatory Enforcement Fairness Act

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 requires the FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. If you are a small entity and you have a question regarding this document, you may contact a local FAA official, or the person listed under **FOR FURTHER INFORMATION CONTACT**. You can find out more about SBREFA on the Internet at: *http://www.faa.gov/regulations_policies/rulemaking/sbre_act/*.

List of Subjects

14 CFR Part 61

Aircraft, Airmen, Aviation Safety, Incorporation by reference, Reporting and recordkeeping requirements, Safety measures.

14 CFR Part 91

Aircraft, Airmen, Airports, Aviation safety, Freight, Incorporation by reference, Reporting and recordkeeping requirements.

14 CFR Part 135

Air taxis, Aircraft, Airmen, Aviation safety, Incorporation by reference, Reporting and recordkeeping requirements.

The Amendment

■ In consideration of the foregoing, the Federal Aviation Administration amends chapter I of title 14, Code of Federal Regulations, as follows:

PART 61—CERTIFICATION: PILOTS, FLIGHT INSTRUCTORS, AND GROUND INSTRUCTORS

■ 1. The authority citation for part 61 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701–44703, 44707, 44709–44711, 45102–45103, 45301–45302.

■ 2. Add SFAR No. 108 to part 61 to read as follows: Special Federal Aviation Regulation No 108.

Note: For the text of the SFAR No. 108, see part 91 of this chapter.

PART 91—GENERAL OPERATING AND FLIGHT RULES

■ 3. The authority citation for part 91 continues to read as follows:

Authority: 49 U.S.C. 106(g), 1155, 40103, 40113, 40120, 44101, 44111, 44701, 44704, 44709, 44711, 44712, 44715, 44716, 44717, 44722, 46306, 46315, 46316, 46504, 46506–46507, 47122, 47508, 47528–47531, articles 12 and 29 of the Convention on International Civil Aviation (61 stat. 1180).

■ 4. Amend part 91 by adding SFAR No. 108.

Special Federal Aviation Regulation (SFAR) No. 108—Mitsubishi MU–2B Series Special Training, Experience, and Operating Requirements

1. *Applicability.* After February 5, 2009, this Special Federal Aviation Regulation (SFAR) applies to all persons who operate the Mitsubishi MU–2B series airplane including those who act as pilot-in-command, act as second-in-command, or other persons who manipulate the controls while under the supervision of a pilot-in-command. This SFAR also applies to those persons who provide pilot training for the Mitsubishi MU–2B series airplane. The requirements in this SFAR are in addition to the requirements of 14 CFR parts 61, 91, and 135 of this chapter.

2. *Compliance and Eligibility.* (a) Except as provided in paragraph (b) of this section, no person may manipulate the controls, act as pilot-in-command, act as second-in-command, or provide pilot training for the Mitsubishi MU–2B series airplane unless that person meets the applicable requirements of this SFAR.

(b) A person, who does not meet the requirements of this SFAR, may manipulate the controls of the Mitsubishi MU–2B series airplane if a pilot-in-command meeting the applicable requirements of this SFAR is occupying a pilot station, and the flight is being conducted for one of the following reasons—

(1) The pilot-in-command is providing pilot training to the manipulator of the controls, and no passengers or cargo are carried on board the airplane;

(2) The pilot-in-command is conducting a maintenance test flight with a second pilot or certificated mechanic, and no passengers or cargo are carried on board the airplane; or

(3) The pilot-in-command is conducting simulated instrument flight and is using a safety pilot other than the pilot-in-command who manipulates the controls for the purposes of 14 CFR 91.109(b), and no passengers or cargo are carried on board the airplane.

(c) A person is required to complete *Initial/transition training* if that person has fewer than—

(1) 50 hours of documented flight time manipulating the controls while serving as pilot-in-command of a Mitsubishi MU–2B series airplane in the preceding 24 months; or

(2) 500 hours of documented flight time manipulating the controls while serving as pilot-in-command of a Mitsubishi MU–2B series airplane.

(d) A person is eligible to receive *Requalification training* in lieu of Initial/transition training if that person has at least—

(1) 50 hours of documented flight time manipulating the controls while serving as pilot-in-command of a Mitsubishi MU–2B series airplane in the preceding 24 months; or

(2) 500 hours of documented flight time manipulating the controls while serving as pilot-in-command of a Mitsubishi MU–2B series airplane.

(e) A person is required to complete *Recurrent training* within the preceding 12 months. Successful completion of Initial/transition or Requalification training within the preceding 12 months satisfies the requirement of Recurrent training. A person must successfully complete Initial/transition training or Requalification training before being eligible to receive Recurrent training.

(f) Successful completion of Initial/transition training or Requalification training is a one-time requirement. A person may elect to retake Initial/transition training or Requalification training in lieu of Recurrent training.

(g) A person is required to complete Differences training if that person operates more than one MU–2B model. Differences training between the K and M models of the MU–2B airplane, and the J and L models of the MU–2B airplane, may be accomplished with Level A training. All other Differences training must be accomplished with Level B training. Persons that are operating two models of the MU–2B airplane are required to receive 1.5 hours of Differences training. Persons that are operating three or more models of the MU–2B airplane are required to receive 3.0 hours of Differences training. An additional 1.5 hours of Differences training is required for each model added at a later date. Differences Training is not a recurring annual requirement. Once a person has received Differences training between the applicable different models, no additional Differences training between those models is required.

3. *Required Pilot Training.* (a) Except as provided in section 2 paragraph (b) of this SFAR, no person may manipulate the controls, act as pilot-in-command, or act as second-in-command of a Mitsubishi MU–2B series airplane for the purpose of flight unless—

(1) The applicable requirements for ground and flight training on Initial/transition, Requalification, Recurrent, and Differences training have been completed, as specified in this SFAR, including Appendices A through D of this SFAR; and

(2) That person's logbook has been endorsed in accordance with paragraph (f) of this section.

(b) No person may manipulate the controls, act as pilot-in-command, or act as second-in-command, of a Mitsubishi MU–2B series airplane for the purpose of flight unless—

(1) That person satisfactorily completes, if applicable, annual Recurrent pilot training on the *Special Emphasis Items,* and all items listed in the *Training Course Final Phase Check* as specified in Appendix C of this SFAR; and

(2) That person's logbook has been endorsed in accordance with paragraph (f) of this section.

(c) Satisfactory completion of the competency check required by 14 CFR 135.293 within the preceding 12 calendar months may not be substituted for the Mitsubishi MU–2B series airplane annual recurrent flight training of this section.

(d) Satisfactory completion of a Federal Aviation Administration sponsored pilot proficiency award program, as described in 14 CFR 61.56(e) may not be substituted for the Mitsubishi MU–2B series airplane annual recurrent flight training of this section.

(e) If a person complies with the requirements of paragraph (a) or (b) of this section in the calendar month before or the calendar month after the month in which compliance with these paragraphs are required, that person is considered to have accomplished the training requirement in the month the training is due.

(f) The endorsement required under paragraph (a) and (b) of this section must be made by—

(1) A certificated flight instructor meeting the qualifications of section 5 of this SFAR; or

(2) For persons operating the Mitsubishi MU–2B series airplane for a part 119 certificate holder within the last 12 calendar months, the 14 CFR part 119 certificate holder's flight instructor if authorized by the FAA and if that

flight instructor meets the requirements of section 5 of this SFAR.

(g) All training conducted for the Mitsubishi MU–2B series airplane must be completed in accordance with the applicable MU–2B series checklist listed in table 1 of this SFAR or an MU–2B series airplane checklist that has been accepted by the Federal Aviation Administration's MU–2B Flight Standardization Board.

TABLE 1 TO SFAR 108.—MU–2B SERIES AIRPLANE MANUFACTURER'S CHECKLISTS

Model	Type certificate	Cockpit checklist	Date the checklist was accepted by the FSB
		MHI document No.	
MU–2B–60	A10SW	YET06220C	2/12/2007
MU–2B–40	A10SW	YET06256A	2/12/2007
MU–2B–36A	A10SW	YET06257B	2/12/2007
MU–2B–36	A2PC	YET06252B	2/12/2007
MU–2B–35	A2PC	YET06251B	2/12/2007
MU–2B–30	A2PC	YET06250A	3/2/2007
MU–2B–26A	A10SW	YET06255A	2/12/2007
MU–2B–26	A2PC	YET06249A	3/2/2007
MU–2B–26	A10SW	YET06254A	3/2/2007
MU–2B–25	A10SW	YET06253A	3/2/2007
MU–2B–25	A2PC	YET06248A	3/2/2007
MU–2B–20	A2PC	YET06247A	2/12/2007
MU–2B–15	A2PC	YET06246A	3/2/2007
MU–2B–10	A2PC	YET06245A	3/2/2007
MU–2B	A2PC	YET06244A	3/2/2007

4. *Aeronautical Experience.* No person may act as pilot-in-command of a Mitsubishi MU–2B series airplane for the purpose of flight unless that person holds an airplane category and multi-engine land class rating, and has logged a minimum of 100 flight hours of pilot-in-command time in multi-engine airplanes.

5. *Instruction, Checking and Evaluation.* (a) *Flight Instructor (Airplane).* No flight instructor may provide instruction or conduct a flight review in a Mitsubishi MU–2B series airplane unless that flight instructor meets the requirements of this paragraph.

(1) Each flight instructor who provides flight training in the Mitsubishi MU–2B series airplane must meet the pilot training and documentation requirements of section 3 of this SFAR before giving flight instruction in the Mitsubishi MU–2B series airplane.

(2) Each flight instructor who provides flight training in the Mitsubishi MU–2B series airplane must meet the currency requirements of paragraphs (a) and (c) of section 6 of this SFAR before giving flight instruction in the Mitsubishi MU–2B series airplane.

(3) Each flight instructor who provides flight training in the Mitsubishi MU–2B series airplane must have a minimum total pilot time of 2,000 pilot-in-command hours, 800 pilot-in-command hours in multiengine airplanes.

(4) Each flight instructor who provides flight training in the Mitsubishi MU–2B series airplane must have—

(i) 300 pilot-in-command hours in the Mitsubishi MU–2B series airplane, 50 hours of which must have been within the preceding 12 months; or

(ii) 100 pilot-in-command hours in the Mitsubishi MU–2B series airplane, 25 hours of which must have been within the preceding 12 months, and 300 hours providing instruction in a FAA-approved Mitsubishi MU–2B simulator or FAA-approved Mitsubishi MU–2B flight training device, 25 hours of which must have been within the preceding 12 months.

(b) *Flight Instructor (Simulator/ Flight Training Device).* No flight instructor may provide instruction for the Mitsubishi MU–2B series airplane unless that instructor meets the requirements of this paragraph.

(1) Each flight instructor who provides flight training for the Mitsubishi MU–2B series airplane must meet the pilot training and documentation requirements of section 3 of this SFAR before giving flight instruction for the Mitsubishi MU–2B series airplane.

(2) Each flight instructor who provides flight training for the Mitsubishi MU–2B series airplane must meet the currency requirements of paragraph (c) of section 6 of this SFAR before giving flight instruction for the Mitsubishi MU–2B series airplane.

(3) Each flight instructor who provides flight training for the Mitsubishi MU–2B series airplane must have—

(i) A minimum total pilot time of 2000 pilot-in-command hours and 800 pilot-in-command hours in multiengine airplanes; and

(ii) Within the preceding 12 months, either 50 hours of Mitsubishi MU–2B series airplane pilot-in-command experience or 50 hours providing simulator or flight training device instruction for the Mitsubishi MU–2B.

(c) *Checking and Evaluation.* No person may provide checking or evaluation for the Mitsubishi MU–2B series airplane unless that person meets the requirements of this paragraph.

(1) For the purpose of checking, designated pilot examiners, training center evaluators, and check airmen must have completed the appropriate training in the Mitsubishi MU–2B series airplane in accordance with section 3 of this SFAR.

(2) For checking conducted in the Mitsubishi MU–2B series airplane, each designated pilot examiner and check airman must have 100 hours pilot-in-command flight time in the Mitsubishi MU–2B series airplane and maintain currency in accordance with section 6 of this SFAR.

6. *Currency Requirements and Flight Review.* (a) The takeoff and landing currency requirements of 14 CFR 61.57 must be maintained in the Mitsubishi MU–2B series airplane. Takeoff and landings in other multiengine airplanes do not meet the takeoff landing currency requirements for the Mitsubishi MU–2B series airplane. Takeoff and landings in either the short-body or long-body Mitsubishi MU–2B model airplane may be credited toward takeoff and landing

currency for both Mitsubishi MU–2B model groups.

(b) Instrument experience obtained in other category and class of aircraft may be used to satisfy the instrument currency requirements of 14 CFR 61.57 for the Mitsubishi MU–2B series airplane.

(c) Satisfactory completion of a flight review to satisfy the requirements of 14 CFR 61.56 is valid for operation of a Mitsubishi MU–2B series airplane only if that flight review is conducted in a Mitsubishi MU–2B series airplane. The flight review for Mitsubishi MU–2B series airplanes must include the *Special Emphasis Items,* and all items listed in the *Training Course Final Phase Check* of Appendix C of this SFAR.

(d) A person who successfully completes the Initial/transition, Requalification, or Recurrent training requirements, as described in section 3 of this SFAR, also meets the requirements of 14 CFR 61.56 and need not accomplish a separate flight review provided that at least 1 hour of the flight training was conducted in the Mitsubishi MU–2B series airplane.

7. *Operating Requirements.* (a) Except as provided in paragraph (b) of this section, no person may operate a Mitsubishi MU–2B airplane in single pilot operations unless that airplane has a functional autopilot.

(b) A person may operate a Mitsubishi MU–2B airplane in single pilot operations without a functional autopilot when—

(1) Operating under day visual flight rule requirements; or

(2) Authorized under a FAA approved minimum equipment list for that airplane, operating under instrument flight rule requirements in daytime visual meteorological conditions.

(c) No person may operate a Mitsubishi MU–2B series airplane unless a copy of the appropriate Mitsubishi Heavy Industries MU–2B Airplane Flight Manual is carried on board the airplane and is accessible during each flight at the pilot station.

(d) No person may operate a Mitsubishi MU–2B series airplane unless an MU–2B series airplane checklist, appropriate for the model being operated and accepted by the Federal Aviation Administration MU–2B Flight Standardization Board, is accessible for each flight at the pilot station and is used by the flight crewmembers when operating the airplane.

(e) No person may operate a Mitsubishi MU–2B series airplane contrary to the MU–2B training program in the Appendices of this SFAR.

(f) If there are any differences between the training and operating requirements of this SFAR and the MU–2B Airplane Flight Manual's procedures sections (Normal, Abnormal, and Emergency) and the MU–2B airplane series checklist specified in section 3(g), table 1, the person operating the airplane must operate the airplane in accordance with the training specified in section 3(g), table 1.

8. *Credit for Prior Training.* Initial/transition or requalification training conducted between July 27, 2006, and April 7, 2008, using Mitsubishi Heavy Industries MU–2B Training Program, Part number YET 05301, Revision Original, dated July 27, 2006, or Revision 1, dated September 19, 2006, is considered to be compliant with this SFAR, if the student met the eligibility requirements for the applicable category of training and the student's instructor met the experience requirements of this SFAR.

9. *Incorporation by Reference.* You must proceed in accordance with the Mitsubishi Heavy Industries MU–2B Checklists as listed in Table 1 of this SFAR which are incorporated by reference. The Director of the Federal Register approved this incorporation by reference in accordance with 5 U.S.C. section 552(a) and 1 CFR part 51. The Mitsubishi Heavy Industries MU–2B Checklists are distributed by Turbine Aircraft Services, Inc. You may obtain a copy from Turbine Aircraft Services Inc., 4550 Jimmy Doolittle Drive, Addison, Texas 75001, USA. You may inspect a copy at U.S. Department of Transportation, Docket Management Facility, Room W 12–140, West Building Ground Floor, 1200 New Jersey Ave., SE., Washington, DC 20590–0001, or at the National Archives and Records Administration at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

10. *Expiration.* This SFAR will remain in effect until further notice.

Appendix A to SFAR 108—MU–2B General Training Requirements

(a) The Mitsubishi MU–2B Training Program consists of both ground and flight training. The minimum pilot training requirement hours are shown in Table 1 of this appendix for ground instruction and Table 2 of this appendix for flight instruction. An additional ground training requirement for Differences Training is shown in Table 3.

(b) The MU–2B is certificated by the Federal Aviation Administration (FAA) as a single pilot airplane. No training credit is given for second in command (SIC) training and no credit is given for right seat time under this program. Only the sole manipulator of the controls of the MU–2B airplane, Flight Training Device (FTD), or Level C or D simulator can receive training credit under this program.

(c) The training program references the applicable MU–2B airplane flight manual (AFM) in several sections. There may be differences between sequencing of procedures found in the AFM's procedures sections and the checklists, procedures, and techniques found within this training program. The FAA's Mitsubishi MU–2B SFAR requires that if there are any differences between the AFM's procedures sections (Normal, Abnormal, and Emergency) and the training and operating requirements of the Mitsubishi MU–2B SFAR, the person operating the airplane must operate the airplane in accordance with the training specified in the SFAR and this MU–2B training program.

(d) Minimum Programmed Training Hours

TABLE 1 TO APPENDIX A OF SFAR 108

Ground instruction		
Initial/transition	Requalificaton	Recurrent
20 hours	12 hours	8 hours.

TABLE 2 TO APPENDIX A OF SFAR 108

Flight instruction		
Initial/transition	Requalification	Recurrent
12 hours with a minimum of 6 hours at Level E	8 hours Level C or Level E	4 hours at Level E, or 6 hours at Level C.

TABLE 3 TO APPENDIX A OF SFAR 108

Differences training	
2 models currently	1.5 hours at Level A or B.
More than 2 models currently	3 hours at Level A or B.
Each additional model added	1.5 hours at Level A or B.

(e) Definitions of Levels of Training as Used in This Appendix

(1) LEVEL A Training—Training that is conducted through self instruction by the pilot.

(2) LEVEL B Training—Training that is conducted in the classroom environment with the aid of a qualified instructor who meets the requirements of this SFAR.

(3) LEVEL C Training—Training that is accomplished in an FAA-approved Level 5, 6, or 7 Flight Training Device (FTD). In addition to the basic FTD requirements, the FTD must be representative of the MU–2B cockpit controls and be specifically approved by the FAA for the MU–2B airplane.

(4) LEVEL E Training—Training that must be accomplished in the MU–2B airplane, Level C simulator, or Level D simulator.

Appendix B to SFAR 108—MU–2B Ground Training Curriculum Contents

All items in the ground training curriculum must be covered. The order of presentation is at the discretion of the instructor. The student must satisfactorily complete a written or oral exam given by the training provider based on this MU–2B Training Program.

I. Aircraft General
- A. Introduction
- B. Airplane (Structures/Aerodynamics/Engines) Overview
- 1. Fuselage
- 2. Wing
- 3. Empennage
- 4. Doors
- 5. Windshield and Windows
- C. Airplane Systems
- 1. Electrical Power
- 2. Lighting
- 3. Fuel System
- 4. Powerplant
- 5. Environmental
- 6. Fire Protection
- 7. Ice and Rain Protection
- 8. Landing Gear and Brakes
- 9. Flight Controls and Trim
- 10. Pilot Static System/Flight Instruments
- 11. Oxygen System
- D. Operating Limitations
- 1. Weights
- 2. Center of Gravity and Loading
- 3. Airspeeds
- 4. Maneuvering Load Factors
- 5. Takeoff And Landing Operations
- 6. Enroute Operations
- E. Required Placards
- F. Instrument Markings
- G. Flight Characteristics
- 1. Control System
- 2. Stability and Stall Characteristics
- 3. Single Engine Operation
- 4. Maneuvering and Trim
- 5. Takeoff and Landing

II. Electrical Power
- A. General Description
- B. DC Electrical System
- 1. DC Power Generation
- 2. DC Power Distribution
- 3. Battery System
- 4. External Power System
- C. AC Electrical System
- 1. AC Power Generation
- 2. Controls and Indicators
- 3. AC Power Distribution
- D. Limitations
- 1. General Limitations
- 2. Instrument Markings

III. Lighting
- A. Exterior Lighting System
- 1. Navigation Lights
- 2. Anti-Collision Lights
- 3. Wing Inspection Lights
- 4. Taxi Lights
- 5. Landing Lights
- 6. Rotating Beacon
- 7. Operation
- B. Interior Lighting System
- 1. Flight Compartment Lights
- 2. Passenger Compartment Lights
- C. Emergency Lighting System
- 1. Cockpit Emergency Lighting
- 2. Aircraft Emergency Lighting
- D. Procedures
- 1. Normal
- 2. Abnormal
- 3. Emergency

IV. Master Caution System
- A. System Description and Operation
- 1. Master Caution Light and Reset Switch
- 2. Annunciator and Indicator Panels
- 3. Operation Lights
- 4. System Tests
- B. Procedures

V. Fuel System
- A. Fuel Storage
- 1. Refueling/Balancing
- 2. De-Fueling and Draining
- 3. Tank Vent System
- B. Fuel Distribution
- 1. Fuel Transfer
- 2. Fuel Balancing
- 3. Boost Pump Operation
- C. Fuel Indicating
- 1. Fuel Quantity
- 2. Low Fuel Warning
- D. Fuel System Limitations
- 1. Approved Fuels
- 2. Fuel Anti-Icing Additives
- 3. Fuel Temperature Limitations
- 4. Fuel Transfer and Fuel Imbalance
- 5. Fuel Pumps
- 6. Refueling
- 7. Capacity
- 8. Unusable Fuel

VI. Powerplant
- A. Engine Description
- 1. Major Sections
- 2. Cockpit Controls
- 3. Instrumentation
- 4. Operation
- B. Engine Systems
- 1. Lubrication
- 2. Fuel
- 3. Ignition
- 4. Engine Starting
- 5. Anti-Ice
- C. Propeller System
- 1. Ground Operations
- 2. In-Flight Operations
- 3. Synchronization
- 4. De-Ice
- D. Ground Checks
- 1. Overspeed Governor
- 2. SRL and Delta P/P
- 3. NTS and Feather Valve
- 4. Supplementary NTS
- E. In Flight Post Maintenance Checks
- 1. NTS In-Flight
- 2. Flight Idle Fuel Flow
- F. Limitations
- 1. Powerplant
- 2. Engine Starting Conditions
- 3. Airstart Envelope
- 4. Engine Starting
- 5. Oil
- 6. Fuel
- 7. Starter/Generator
- 8. External Power
- 9. Instrument Markings (as applicable)
- a. TPE331–10–511M
- b. TPE331–5/6–252/251M
- c. TPE331–1–151M
- G. Engine Malfunctions and Failures
- 1. Propeller Coupling
- 2. Torque Sensor
- 3. Engine Overspeed
- 4. Fuel Control Spline

VII. Fire Protection
- A. Introduction
- B. Engine Fire Detection
- 1. System Description

2. Annunciator
C. Portable Fire Extinguishers
VIII. Pneumatics
A. System Description
B. System Operation
1. Air Sources
2. Limitations
C. Wing and Tail De-Ice
1. System Description
2. Controls
D. Entrance and Baggage Door Seal
1. Air Source
2. Operation
IX. Ice and Rain Protection
A. General Description
B. Wing De-Ice
1. System Description
2. Operation
3. Controls and Indications
C. Engine Anti-Ice
1. System Description
2. Operation
3. Controls and Indications
D. Window Defog
1. Controls
2. Operation
E. Tail De-Ice
1. Horizontal Stabilizer De-Ice
2. Vertical Stabilizer De-Ice
F. Pitot Static System Anti-Icing
1. Pitot Tube Heating
2. Static Port Heating
3. AOA Transmitter Heating
G. Windshield De-Ice/Anti-Ice
1. System Description
2. Controls and Indications
H. Windshield Wiper
1. System Description
2. Control and Operation
I. Propeller De-Ice
1. System Description
2. Controls and Indications
J. Ice Detector
1. System Description
2. Controls and Indications
3. Operation
K. Limitations
1. Temperatures
2. Cycling
X. Air Conditioning
A. System Description and Operation
1. Refrigeration Unit (ACM)
2. Air Distribution
3. Ventilation
4. Temperature Control
5. Water Separator
B. Limitations
XI. Pressurization
A. General
B. Component Description
1. Cabin Pressure Controller
2. Altitude Pressure Regulator
3. Ram Air
4. Outflow Safety Valves
5. Air Filters
6. Manual Control Valve
7. Pneumatic Relays
8. Venturi
C. System Operation
1. Ground Operation
2. Takeoff Mode
3. In-Flight Operation
4. Landing Operation
D. Emergency Operation
1. High Altitude
2. Low Altitude
E. Limitations
1. Maximum Differential
2. Landing Limitations
XII. Landing Gear and Brakes
A. General Description
1. Landing Gear Doors
2. Controls and Indicators
3. Warning Systems
4. Emergency Extension
B. Nosewheel Steering
C. Landing Gear/Brakes/Tires
D. Limitations
1. Airspeed (with flaps)
2. Emergency Extension
3. Tire Speed
4. Brake Energy
XIII. Flight Controls
A. Primary Flight Controls (Elevator/Rudder/Spoilers)
1. Description
2. Operations
B. Trim Systems
1. System Description
2. Roll Trim
a. Normal Operation
b. Emergency Operation
3. Rudder Trim
4. Pitch Trim
a. General
b. Operations
c. Trim-in-Motion Alert System
C. Secondary Flight Controls
1. System Description
2. Flaps
D. Limitations
1. Instrument Markings
2. Placards
E. Flight Characteristics
1. Control Systems
2. Stability and Stall Characteristics
3. Single Engine Operation
5. Maneuvering and Trim
6. Takeoff and Landing
XIV. Avionics
A. Pitot-Static System
1. System Description
2. Pilot's System
3. Co-Pilot's System
4. Alternate Static
B. Air Data Computer
C. Attitude Instrument Displays (EFIS and Standard)
1. EADI
2. Standard Attitude Gyro
D. AHRS
1. System Description
2. Controls and Indications
E. Navigation
1. Nav Systems Descriptions
2. Compass System Descriptions
3. Display Systems
4. Terrain Awareness System
5. Traffic Avoidance System
F. Communications
1. VHF Communications Systems
2. Audio Control
G. Standby Flight Instruments
1. System Description
2. Controls and Indications
H. Automatic Flight Control System
1. Controls and Indications
2. Yaw Damper
3. Trim-in-Motion Alert System
4. Autopilot Automatic Disconnect
5. Aural Alert System
I. Angle of Attack (AOA) System
1. System Description
2. Controls and Indications
J. Limitations
XV. Oxygen System
A. System Description
B. Crew Oxygen
1. Oxygen Cylinder Assembly
2. Pressure Gauge
3. Outlet Valves
4. Duration
C. Passenger Oxygen
1. System Description
2. Duration
D. Limitations
XVI. Performance and Planning
A. Takeoff Performance Charts
1. Runway Requirements
2. Normal and with One Engine Inoperative
B. Climb Performance
1. Normal and with One Engine Inoperative
2. Obstacle Clearance
3. Power Assurance Charts
C. Cruise Performance
1. Power Charts
2. Maximum Practical Altitude
3. Cruise Speeds/Engine Health
4. Buffet Boundary
D. Landing Performance
1. Runway Requirements
a. Dry Runway
b. Wet Runway
2. Go-Around
a. One Engine Inoperative
b. All Engines
XVII. Weight and Balance
A. Aircraft Loading Procedures
B. Limitations
1. Weight Limits
2. C.G. Limits
C. Plotter
1. Description
2. Use
D. Calculations
1. AFM Procedures
2. Examples
XVIII. General Subjects
A. Controlled Flight into Terrain Awareness
B. CRM/SPRM
1. Crew Resource Management
2. Single Pilot Resource Management
C. MU–2B Flight Standardization Board Report

Appendix C to SFAR 108—MU–2B Final Phase Check and Flight Training Requirements

(I) MU–2B Final Phase Check Requirements

(A) Completion of the MU–2B Training Program in this appendix requires successful completion of a final phase check taken in the MU–2B airplane or a Level C or D simulator for Initial/Transition training. The final phase check for Requalification or Recurrent Training may be taken in the MU–2B airplane, a Level C or D simulator, or in a Level 5, 6, or 7 FAA-approved MU–2B Flight Training Device (FTD). The final phase check must be conducted by a qualified flight instructor who meets the requirements of the MU–2B SFAR. Simultaneous training and checking is not allowed for Initial/Transition training.

(B) For pilots operating under 14 CFR part 135, checking must be done in accordance with applicable regulations. For the purpose of recurrent testing in 14 CFR 135.293(b), the MU–2B is considered a separate type of aircraft.

(C) The final phase check must be conducted using the standards contained in the FAA Commercial Pilot—Airplane Multi-Engine Land, and Instrument Rating—Airplane Practical Test Standards (PTS).

(D) The final phase check portion of the training is comprised of the following tasks for *all* airmen (instrument rated and non instrument rated). An (*) indicates those maneuvers for Initial/Transition training which must be completed in the MU–2B airplane, or a Level C or D simulator.

(1) Preflight Check.

(2) Start and Taxi Procedures.

(3) * Normal Takeoff (X-Wind) (Two Engine).

(4) * Takeoff Engine Failure.

(5) Rejected Takeoff.

(6) * Steep Turns.

(7) * Approach to Stalls (3) (must include Accelerated Stalls).

(8) * Maneuvering with One Engine Inoperative—Loss of Directional Control (V_{mc}).

(9) Abnormal and Emergency Procedures—To include MU–2B operation in icing conditions without the autopilot or without trim-in-motion or automatic autopilot disconnect.

(10) * Precision Approach (One Engine Inoperative).

(11) Go Around/Rejected Landing.

(12) Normal Landing (X-Wind).

(13) * Landing with One Engine Inoperative.

(14) * Landing with Non-Standard Flap Configuration (0 or 5 degrees).

(15) Postflight Procedures.

(E) The following additional tasks are required for those airmen who possess an instrument rating. An (*) indicates those maneuvers for Initial/Transition training which must be completed in the MU–2B airplane, or a Level C or D simulator.

(1) Preflight Check.

(2) Unusual Attitudes.

(3) Abnormal and Emergency Procedures.

(4) Basic Instrument Flight Maneuvers.

(5) Area Arrival and Departure.

(6) Holding.

(7) Precision Approach (Two Engine).

(8) * Non-Precision Approaches (2)—Must include a Non-Precision Approach with One Engine Inoperative.

(9) Missed Approach from either Precision or Non Precision Instrument Approach (Two Engine).

(10) Landing from a Straight-In or Circling Approach.

(11) Circling Approach.

(12) Postflight Procedures.

(F) A form titled ''Training Course Final Phase Check'' has been included in this appendix for use in creating a training and final check record for the student and the training provider.

(II) MU–2B Required Flight Training Tasks

(A) General Flight Training Requirements: All flight training maneuvers must be consistent with this training program and the applicable MU–2B checklist accepted by the FAA. The maneuver profiles shown in Appendix D to this SFAR No. 108 are presented to show the required training scenarios. Profiles conducted in flight require planning and care on the part of both the instructor and student in order to provide the highest level of safety possible. The maneuver profiles shown in Appendix D to this SFAR No. 108 do not account for local geographic and flight conditions. The instructor and student must consider local conditions when performing these maneuvers in flight.

(B) Special Emphasis Items: Certain aspects of pilot knowledge, skills and abilities must be emphasized and evaluated during the training and checking process of the MU–2B Training Program.

(1) Accelerated stall awareness and recovery procedures with emphasis on configuration management. Awareness of the margin to stall in all flight operations and configurations must be emphasized throughout training.

(2) V_{mc} awareness and early recognition must be trained and checked. Minimum airspeeds for one engine inoperative must be emphasized in all configurations.

(3) Airspeed management and recognition of airspeed deterioration below recommended speeds and recovery methods in this training program must be emphasized throughout training and checking.

(4) Knowledge of icing conditions and encounters must be emphasized throughout training and checking including: Equipment requirements, certification standards, minimum airspeeds, and the use of the autopilot and other applicable AFM procedures.

(5) Airplane performance characteristics with all engines operating and with one engine inoperative must be emphasized.

(C) MU–2B Flight Training Program Proficiency Standards.

(1) Each pilot, regardless of the level of pilot certificate held, must be trained to and maintain the proficiency standards described below.

(a) General VFR/IFR.

(i) Bank Angle—± 5 degrees of prescribed bank angle
(ii) Heading—± 10 degrees
(iii) Altitude—± 100 feet
(iv) Airspeed—± 10 knots

(b) Instrument Approach—Final Approach Segment.

Precision Approach

(i) Heading—± 10 degrees
(ii) Altitude—± 100 feet
(iii) Airspeed—± 10 knots prior to final
(iv) Airspeed—± 10 knots after established on final
(v) Glide Slope (GS)/Localizer Deviation—Within ¾ scale—not below GS

Non-Precision Approach

Straight In

(vi) Initial Approach Altitude—± 100 feet
(vii) Heading—± 10 degrees
(viii) Altitude (MDA)— + 100, − 0 feet
(ix) Airspeed— + 10 knots
(x) Course Deviation Indicator—Within ¾ scale or ± 10 degrees on RMI

Circling Approach

(xi) Maximum Bank—30 degrees
(xii) Heading—Within 10 degrees
(xiii) Altitude— +100, − 0 feet
(xiv) Airspeed—Within 10 knots but not less than V_{ref}

(c) In all cases, a pilot must show complete mastery of the aircraft with the outcome of each maneuver or procedure never seriously in doubt.

(D) Maneuvers and Procedures. All flight training maneuvers and procedures must be conducted as they are applicable to the MU–2B and each type of operations involved.

Preflight

(1) Preflight Inspection—The pilot must—

(a) Conduct an actual visual inspection of the exterior and interior of the airplane, locating each item and explaining briefly the purpose of inspecting it; and

(b) Demonstrate the use of the appropriate checklist, appropriate control system checks, starting procedures, radio and electronic equipment checks, and the selection of proper navigation and communications radio facilities and frequencies prior to flight.

(2) Taxiing—this maneuver includes taxiing in compliance with instructions issued by the appropriate ATC facility or by the person conducting the check.

(3) Pre-Takeoff Checks—The pilot must satisfactorily complete all pre-takeoff aircraft systems and powerplant checks before takeoff.

Takeoff and Departure

(1) Normal—One normal takeoff, which for the purpose of this maneuver, begins when the airplane is taxied into position on the runway to be used.

(2) Instrument Takeoff—Takeoff with simulated instrument conditions at or before reaching an altitude of 200 feet above the airport elevation and visibility of 1800 RVR.

(3) Crosswind—One crosswind takeoff, if practical, under the existing meteorological, airport and traffic conditions.

(4) Powerplant Failure—One takeoff with a simulated failure of the most critical powerplant at a point after Vlof. In the MU–2B airplane, all simulated powerplant failures must only be initiated when the person conducting the training or checking determines that it is safe under the prevailing conditions. The instructor must assure that the power lever does not move beyond the flight idle gate.

(5) Rejected Takeoff—A rejected takeoff performed in an airplane during a normal takeoff run after reaching a reasonable speed determined by giving due consideration to aircraft characteristics, runway length, surface conditions, wind direction and velocity, brake heat energy, and any other pertinent factors that may adversely affect safety or the airplane.

(6) Area departure—Demonstrate adequate knowledge of departure procedures, establishing appropriate ATC communications and following clearances.

Flight Maneuvers and Procedures

(1) Steep bank turns—Each steep turn must involve a bank angle of 50 degrees with a heading change of at least 180 degrees but no more than 360 degrees.

(2) Approaches to stalls—Must be performed in each of the following configurations; takeoff, clean, and landing. One approach to a stall must be performed in either the takeoff, clean, or landing configuration while in a turn with a bank angle between 15 degrees and 30 degrees.

(3) Accelerated stalls—must be done in the flaps 20 and flaps 0 configurations.

(4) Recovery procedures must be initiated at the first indication of a stall.

Normal and Abnormal Procedures and Operations

(1) Runway trim.

(2) Normal and abnormal operations of the following systems:

(a) Pressurization.

(b) Pneumatic.

(c) Air conditioning.

(d) Fuel.

(e) Electrical.

(f) Flight control.

(g) Anti-icing and de-icing.

(h) Autopilot.

(i) Stall warning devices, as applicable.

(j) Airborne radar and weather detection devices.

(k) Other systems, devices or aids available.

(l) Electrical, flight control and flight instrument system malfunction or failure.

(m) Landing gear and flap system malfunction or failure.

(n) Failure of navigation or communications equipment.

Flight Emergency Procedures

(1) Powerplant failure.

(2) Powerplant, cabin, flight deck, wing and electrical fires.

(3) Smoke control.

(4) Fuel jettisoning, as applicable.

(5) Any other emergency procedures outlined in the appropriate AFM or FAA-accepted checklist.

Instrument Procedures

(1) Area departure.

(2) Use of navigation systems including adherence to assigned course and/or radial.

(3) Holding procedures.

(4) Aircraft approach category airspeeds.

(5) Approach procedures: Each instrument approach must be performed according to all procedures and limitations approved for that facility. An instrument approach procedure begins when the airplane is over the initial approach fix for the approach procedure being used and ends when the airplane touches down on the runway or when transition to missed approach configuration is completed.

(a) ILS, ILS/DME, approach.

(i) A manually controlled ILS with a powerplant inoperative; occurring before initiating the final approach course and continuing to full stop or through the missed approach procedure.

(ii) A manually controlled ILS utilizing raw data to 200 feet or decision height (DH).

(iii) An ILS with the autopilot coupled.

(b) Non-precision approaches.

(i) NDB, NDB/DME approach, straight in or circle.

(ii) VOR, VOR/DME, straight in or circle.

(iii) LOC, LOC/DME, LOC backcourse.

(iv) GPS approach (If the aircraft/FTD/flight simulator has a GPS installed, the applicant must demonstrate GPS approach proficiency.)

(v) ASR approach.

(c) Missed approach procedure: One missed approach procedure must be a complete approved missed approach procedure as published or as assigned by ATC.

(i) From a precision approach.

(ii) From a non-precision approach.

(iii) With a simulated powerplant failure.

(d) Circling approach.

(i) The circling approach must be made to the authorized MDA and followed by a change in heading and the necessary maneuvering (by visual reference) to maintain a flight path that permits a normal landing on the runway.

(ii) The circling approach must be performed without excessive maneuvering and without exceeding the normal operating limits of the airplane and the angle of bank must not exceed 30°.

Landings and Approaches to Landings

(1) Airport orientation.

(2) Normal landings with stabilized approach.

(3) Crosswind landings.

(4) From a precision instrument approach.

(5) From a precision instrument approach with a powerplant inoperative.

(6) From a non-precision instrument approach.

(7) From a non-precision instrument approach with a powerplant inoperative.

(8) From a circling approach or VFR traffic pattern.

(9) Go Around/Rejected landings—a normal missed approach procedure or a visual go-around after the landing is rejected. The landing should be rejected at approximately 50 feet and approximately over the runway threshold.

(10) Zero flap landing.

(a) Runway requirements.

(b) Airspeeds.

TRAINING COURSE FINAL PHASE CHECK				
NAME OF AIRMAN *(last, first, middle initial)*		GRADE OF CERTIFICATE	CERTIFICATE NUMBER	
DATE OF CHECK	LOCATION OF CHECK	TYPE OF CHECK	MU-2B MODEL	FTD MODEL
SCHOOL NAME	INSTRUCTOR NAME	CFI NUMBER	EXPIRES	
FLIGHT MANEUVERS GRADE *(S-Satisfactory U-Unsatisfactory)*				

MANEUVERS REQUIRED FOR ALL AIRMEN	A/C	FTD
PREFLIGHT CHECK		
START AND TAXI PROCEDURES		
*NORMAL TAKEOFF (X WIND) (TWO ENGINE)		
*TAKEOFF ENGINE FAILURE		
REJECTED TAKEOFF		
*STEEP TURNS		
*APPROACH TO STALL (3)		
*MANEUVERING WITH ONE ENGINE INOP (VMC)		
ABNORMAL AND EMERGENCY PROCEDURES - TO INCLUDE THE MU-2 OPERATIOIN IN ICING CONDITIONS WITHOUT THE AUTOPILOT OR WITHOUT TRIM-IN-MOTION/AUTOMATIC AUTOPILOT DISCONNECT.		
*PRECISION APROACH (ONE ENGINE INOPERATIVE)		
GO AROUND / REJECTED LANDING		
NORMAL LANDING (X WIND)		
*LANDING WITH ONE ENGINE INOPERATIVE		
*LANDING WITH NON-STANDARD FLAP CONFIG		
POST FLIGHT PROCEDURES		
ADDITIONAL MANEUVERS REQUIRED FOR INSTRUMENT RATED AIRMEN	A/C	FTD
PREFLIGHT CHECK		
UNUSUAL ATTITUDES		
ABNORMAL AND EMERGENCY PROCEDURES		
BASIC INSTRUMENT FLIGHT MANEUVERS		
AREA ARRIVAL AND DEPARTURE		
HOLDING		
PRECISION APPROACH (TWO ENGINE)		
*NON-PRECISION APPROACHES (2)		
MISSED APPROACH FROM EITHER PRECISION OR NON-PRECISION APPROACH (TWO ENGINE) MUST INCLUDE AN APPROACH WITH ONE ENGINE INOP		
LANDING FROM A STRAIGHT-IN/CIRCLING APPROACH		
CIRCLING APPROACH		
POST FLIGHT PROCEDURES		

RESULTS OF CHECK	SATISFACTORY		FLIGHT TIMES	AIRCRAFT	FTD
	UNSATISFACTORY				
INSTRUCTOR SIGNATURE			AIRMAN SIGNATURE		

Appendix D to SFAR 108—MU–2B Maneuver Profiles

(A) The Maneuver Profiles are provided to develop pilot proficiency with the procedures and techniques contained within this MU–2B Flight Training Program.

(B) Though constructed for use in the airplane they may also be used in the Flight Training Device (FTD). When an FTD is used, a maneuver may be performed at lower altitudes or carried to its completion. When training is conducted in the MU–2B airplane, all maneuvers must be performed in a manner sufficient to evaluate the performance of the student while never jeopardizing the safety of the flight.

(C) The maneuvers profiles are broken down into three sections by similar aircraft model groups. The three sections of this program are:

(1) Marquise (−60), Solitaire (–40), N (–36A), P (–26A)—Figures A–1 through A–28

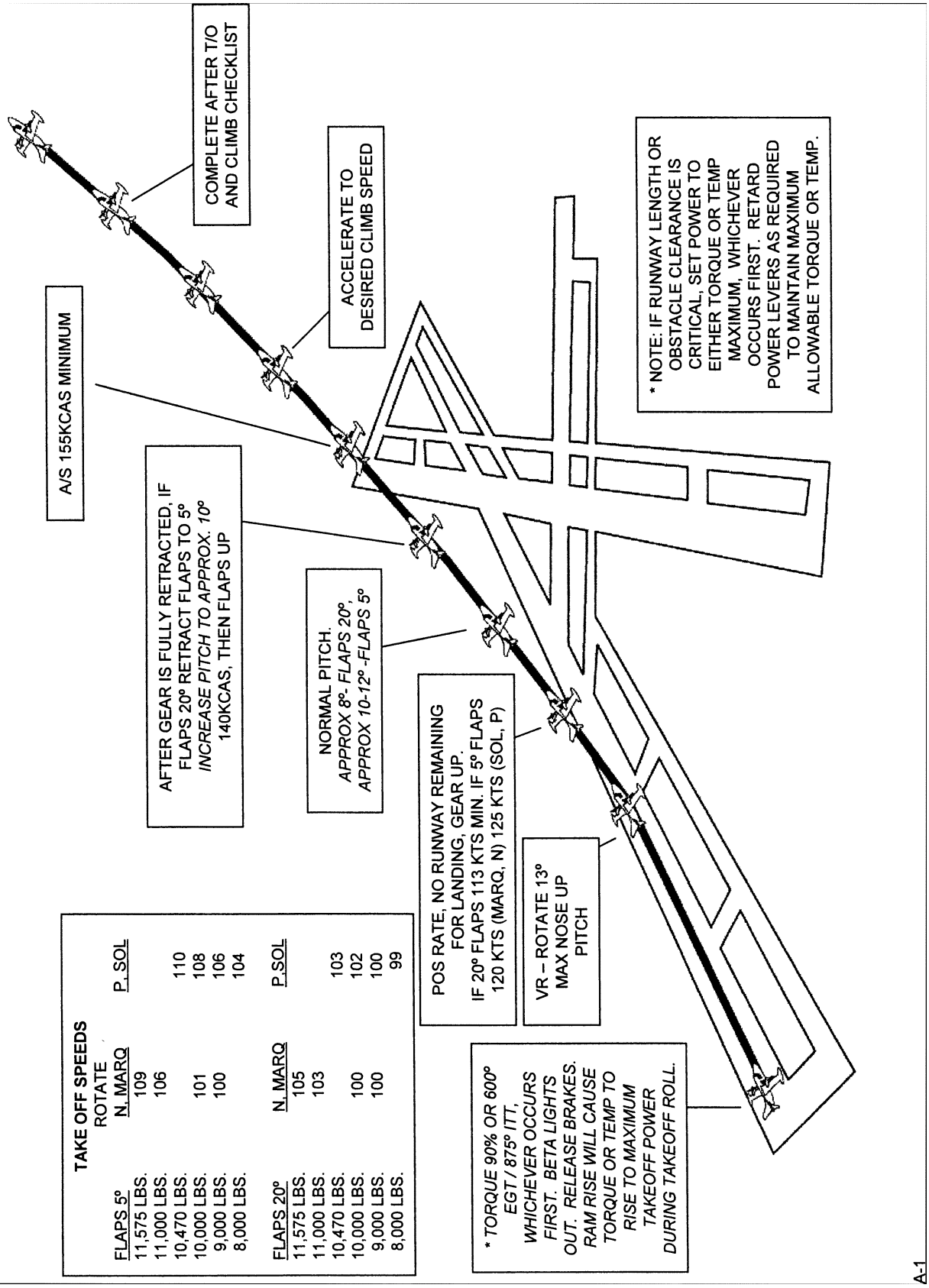
(2) J (–35), K (–25), L (–;36), M (–26)—Figures B–1 through B–28

(3) B, D (–10), F (–20), G (–30)—Figures C–1 through C–28

BILLING CODE 4910–13–P

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

NORMAL TAKE-OFF, 5° OR 20° FLAPS



TAKE OFF SPEEDS

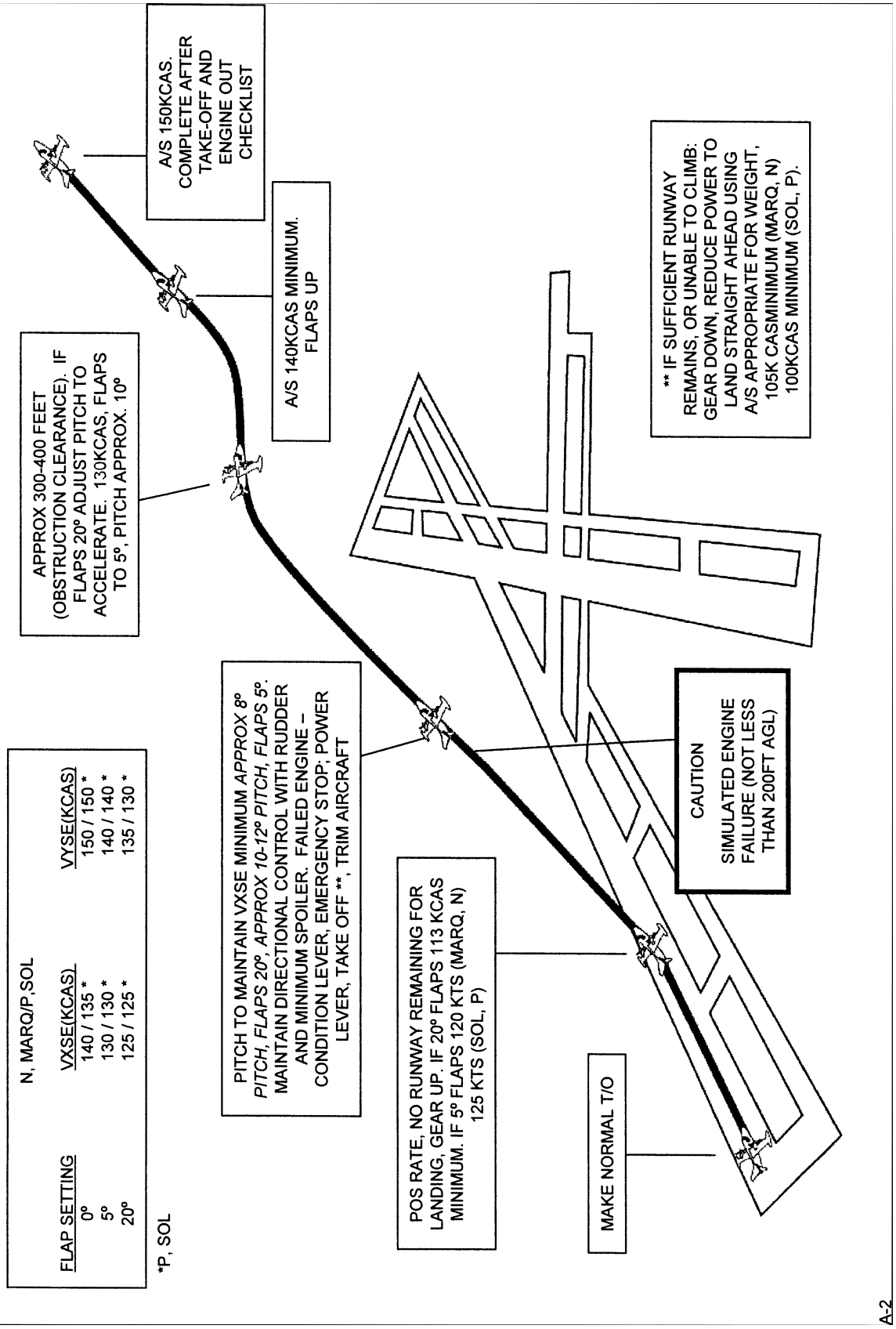
FLAPS 5°	ROTATE N. MARQ	P. SOL
11,575 LBS.	109	
11,000 LBS.	106	
10,470 LBS.		110
10,000 LBS.	101	108
9,000 LBS.	100	106
8,000 LBS.		104

FLAPS 20°	N. MARQ	P.SOL
11,575 LBS.	105	
11,000 LBS.	103	
10,470 LBS.		103
10,000 LBS.	100	102
9,000 LBS.	100	100
8,000 LBS.		99

A-1

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

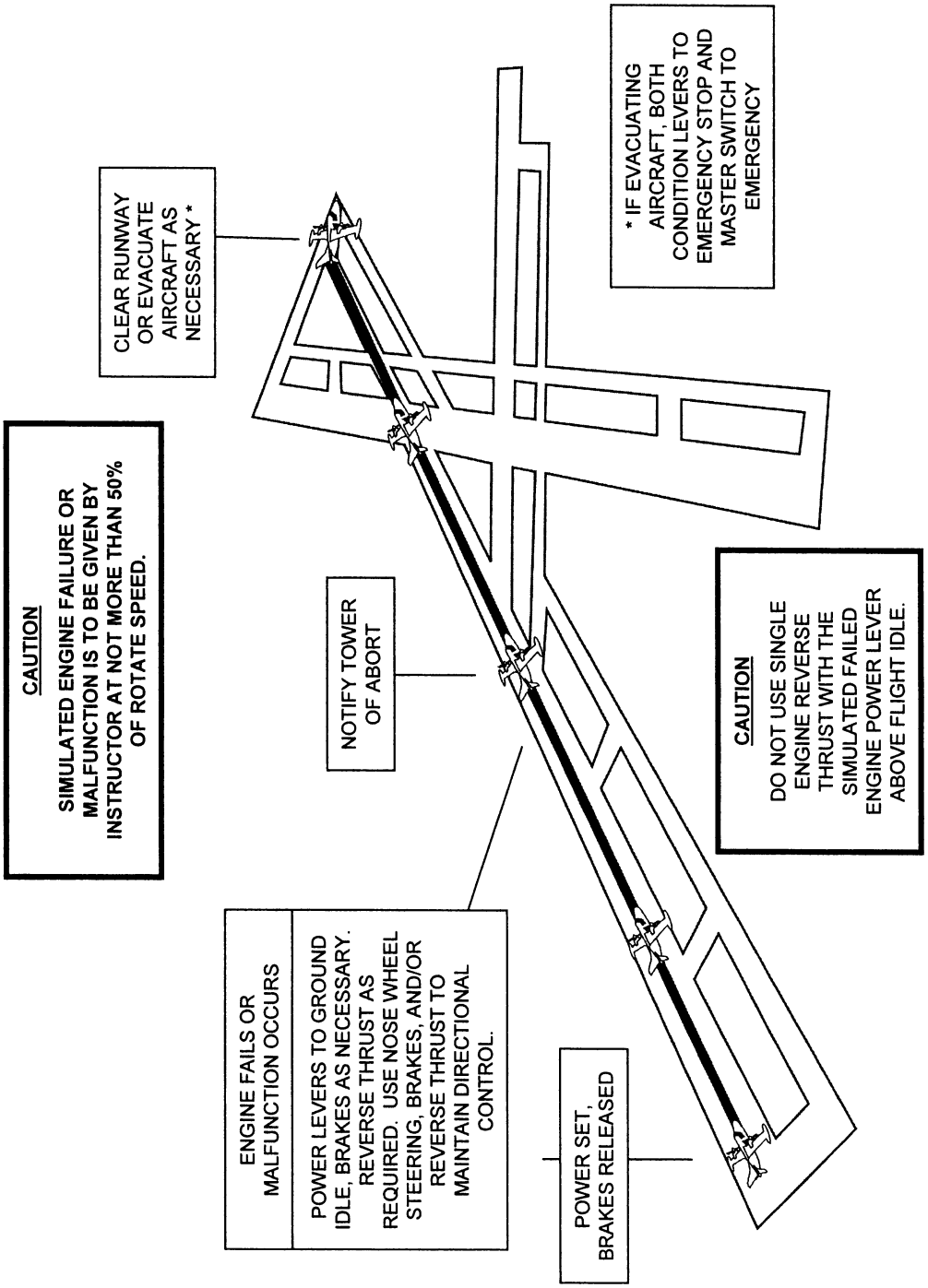
TAKE-OFF ENGINE FAILURE – FLAPS 5° OR 20°



A-2

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

TAKE-OFF ENGINE FAILURE ON RUNWAY

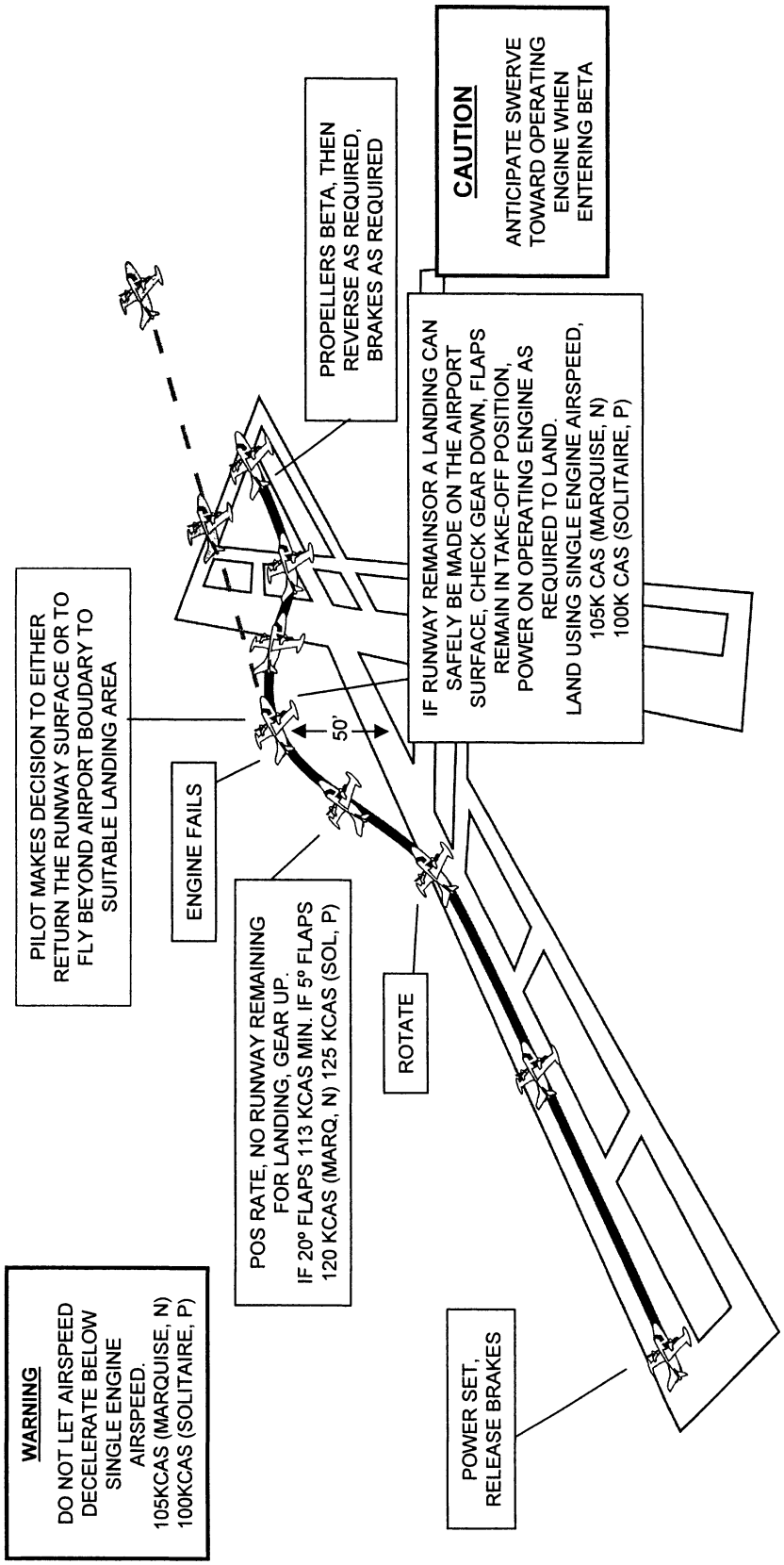


A-3

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

TAKE-OFF ENGINE FAILURE - UNABLE TO CLIMB

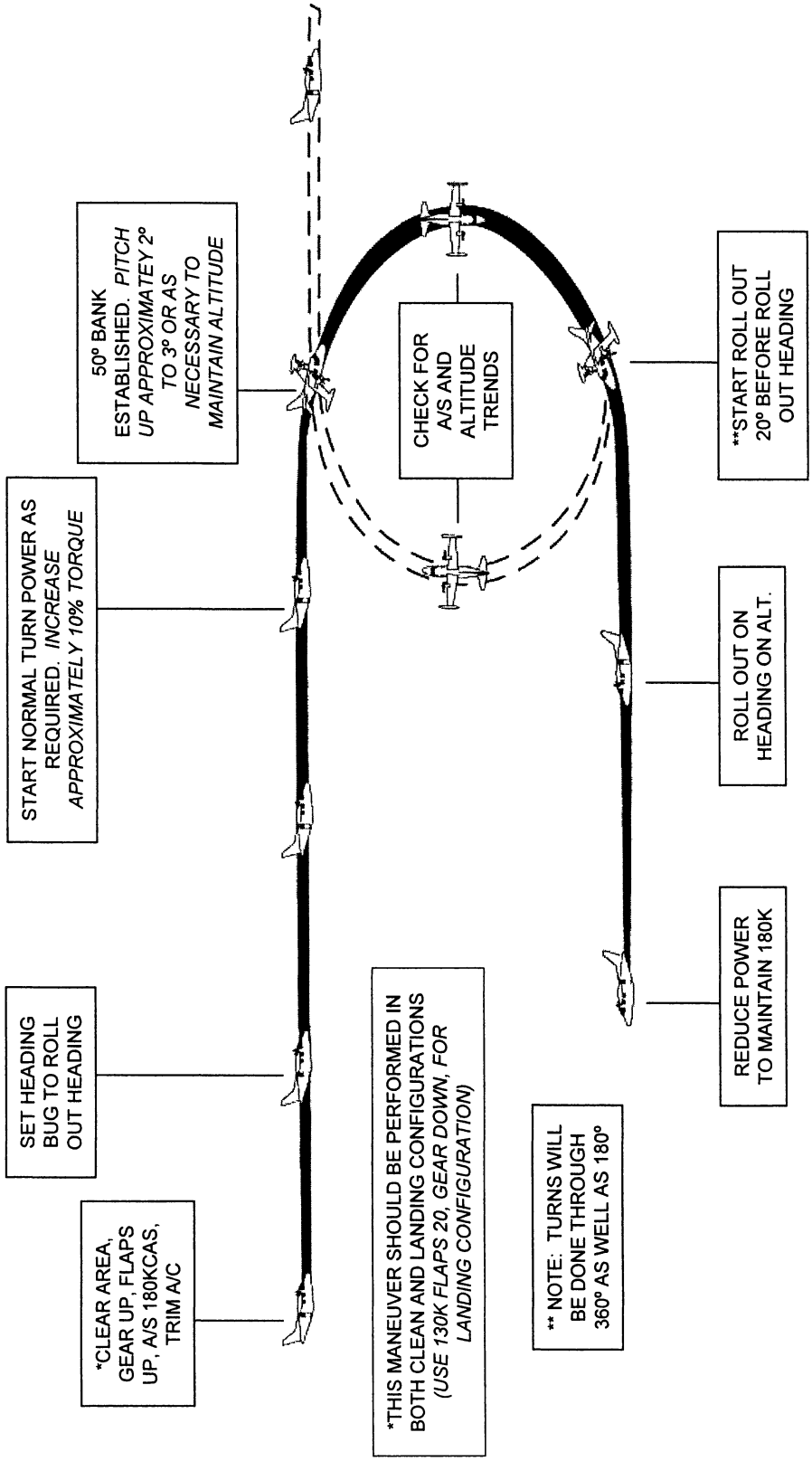
CLASSROOM DISCUSSION OR FTD USE ONLY



A-4

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

STEEP TURNS



A-5

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

SLOW FLIGHT MANEUVERING

MINIMUM CONTROLLABLE AIRSPEED

SLOW FLIGHT MANEUVERING IS CONDUCTED AS FOLLOWS:

CLEAR THE AREA PRIOR TO BEGINNING THE MANEUVER.

START WITH CLEAN CONFIGURATION AND CHANGE AIRCRAFT CONFIGURATION FROM CLEAN TO FULL FLAP AND GEAR IN STAGES. USE A MAXIMUM OF 15° BANK AND PERFORM HEADING CHANGES OF 90° LEFT AND RIGHT. CONSTANT ALTITUDE IS REQUIRED THROUGHOUT.
MAINTAIN 115KCAS IN ALL CONFIGURATIONS.

**APPROXIMATE POWER SETTINGS ARE:

CLEAN	*TORQUE*	*(35%) PER ENGINE*	*APPROX PITCH +12*
5° FLAP	*TORQUE*	*(32%) PER ENGINE*	*APPROX PITCH +8*
5° FLAP & GEAR	*TORQUE*	*(44%) PER ENGINE*	*APPROX PITCH +9*
20° FLAP & GEAR	*TORQUE*	*(42%) PER ENGINE*	*APPROX PITCH +4*
40° FLAP & GEAR	*TORQUE*	*(54%) PER ENGINE*	*APPROX PITCH 0*

** NOTE: POWER SETTINGS WILL VARY WITH AIRCRAFT WEIGHT AND ALTITUDE.

STALL SPEEDS (APPROXIMATE)
AT MAXIMUM GROSS TAKEOFF WEIGHT
N, MARQUISE / P, SOLITIARE

ANGLE OF BANK	0°	15°
FLAPS		
UP	106/104*	108/106*
5°	99/ 98*	100/ 99*
20°	87/ 88*	88/ 88*
40°	81/ 78*	83/ 79*

*P, SOL

Vmc FLAPS 5° 99K (MARQ, N), 100KCAS (SOL, P)
FLAPS 20° 99K (MARQ, N), 93KCAS (SOL, P)

CAUTION

STALL WARNING MAY ACTIVATE
4 TO 9 KCAS ABOVE STALL

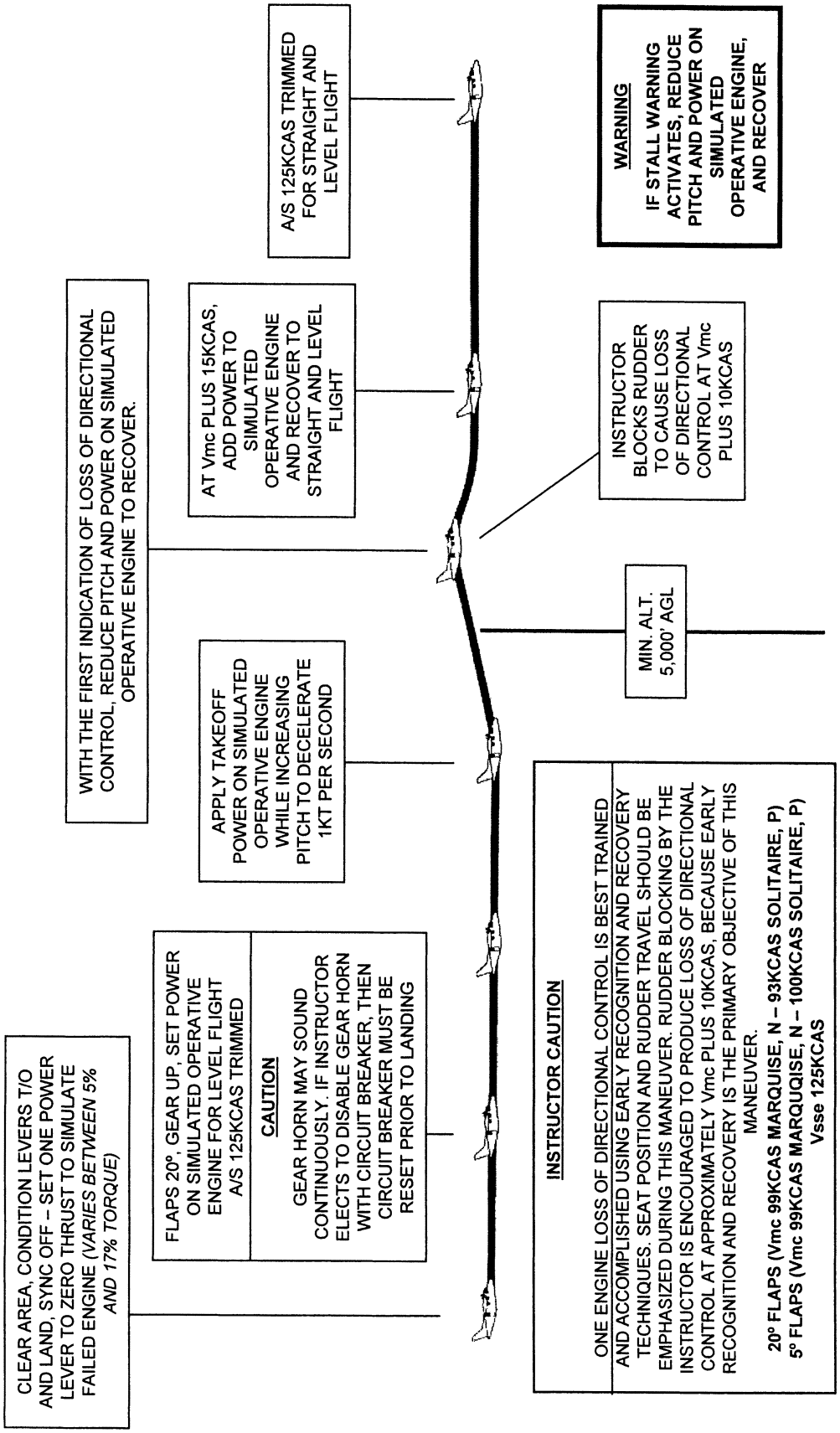
MINIMUM CONTROLLABLE AIRSPEED IS CONDUCTED AS FOLLOWS:

CLEAR THE AREA PRIOR TO BEGINNING THE MANEUVER.

THE MANEUVER MAY BE DONE IN ANY COMBINATION OF GEAR OR FLAP CONFIGURATIONS. IF BANK IS TO BE USED, IT SHOULD BE DONE AT BANK OF NOT MORE THAN 15°. BEGIN THE MANEUVER BY CONFIGURING THE AIRCRAFT IN THE DESIRED GEAR AND FLAP CONFIGURATION. SLOW THE AIRCRAFT UNTIL THE STALL WARNING (STICK SHAKER) IS ACTIVATED AND ADD POWER TO MAINTAIN ALTITUDE AND A SPEED JUST ABOVE AERODYNAMIC STALL. DO NOT ALLOW THE AIRCRAFT TO REACH AERODYNAMIC STALL BUFFET.

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

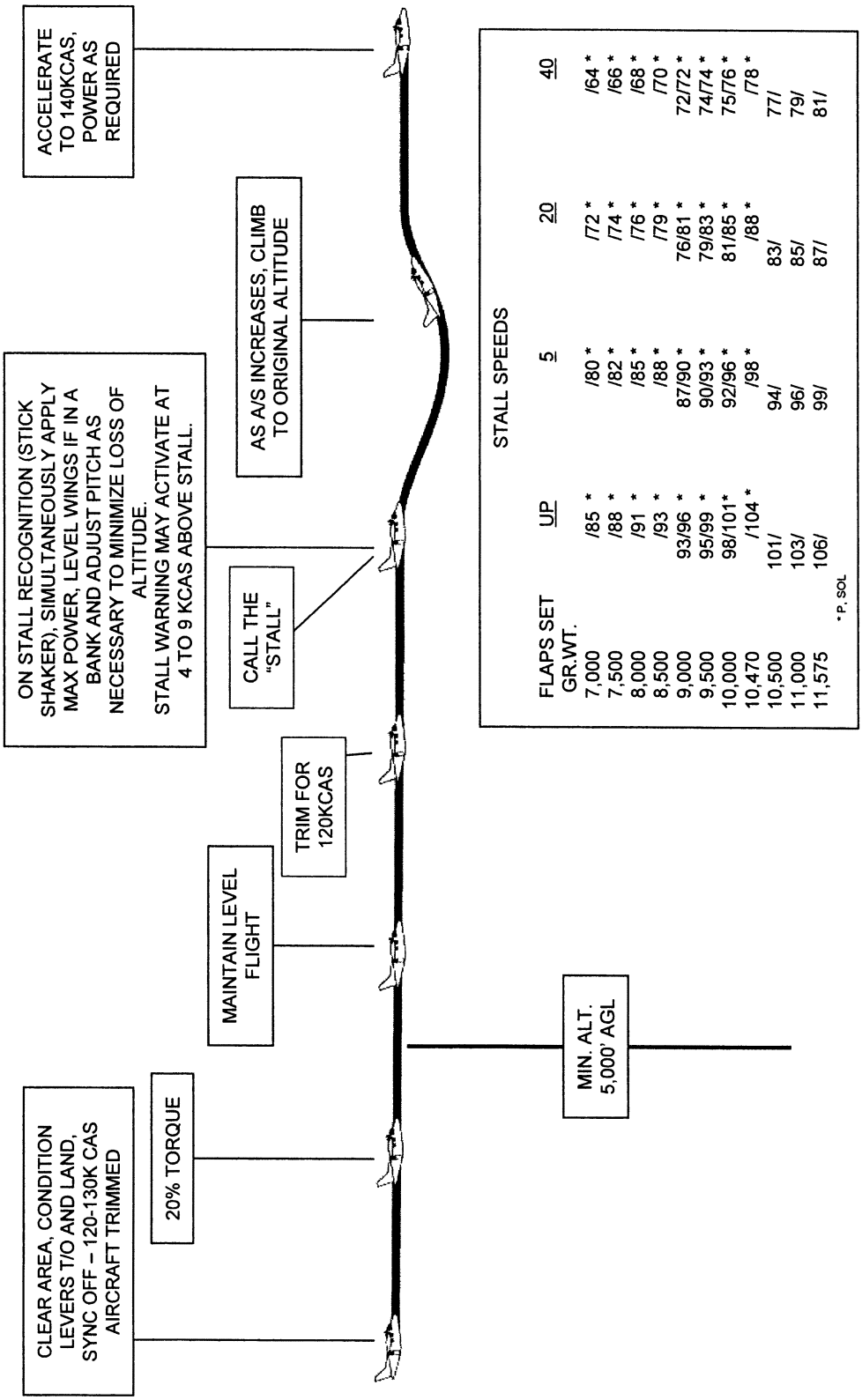
ONE ENGINE INOPERATIVE MANEUVERING LOSS OF DIRECTIONAL CONTROL



A-7

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

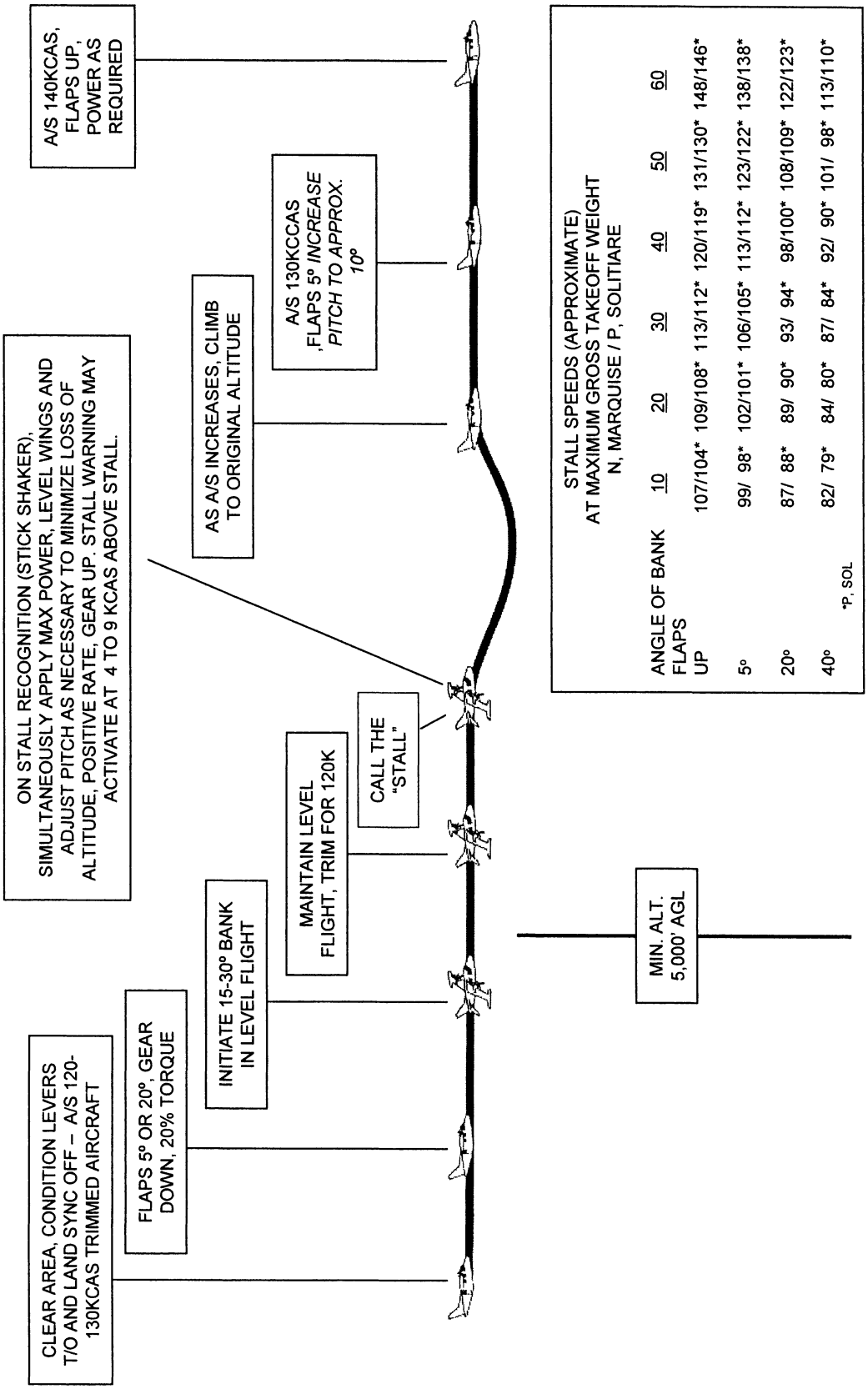
APPROACH TO STALL CLEAN CONFIGURATION / WINGS LEVEL



MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

APPROACH TO STALL

TAKEOFF CONFIGURATION 15-30° BANK

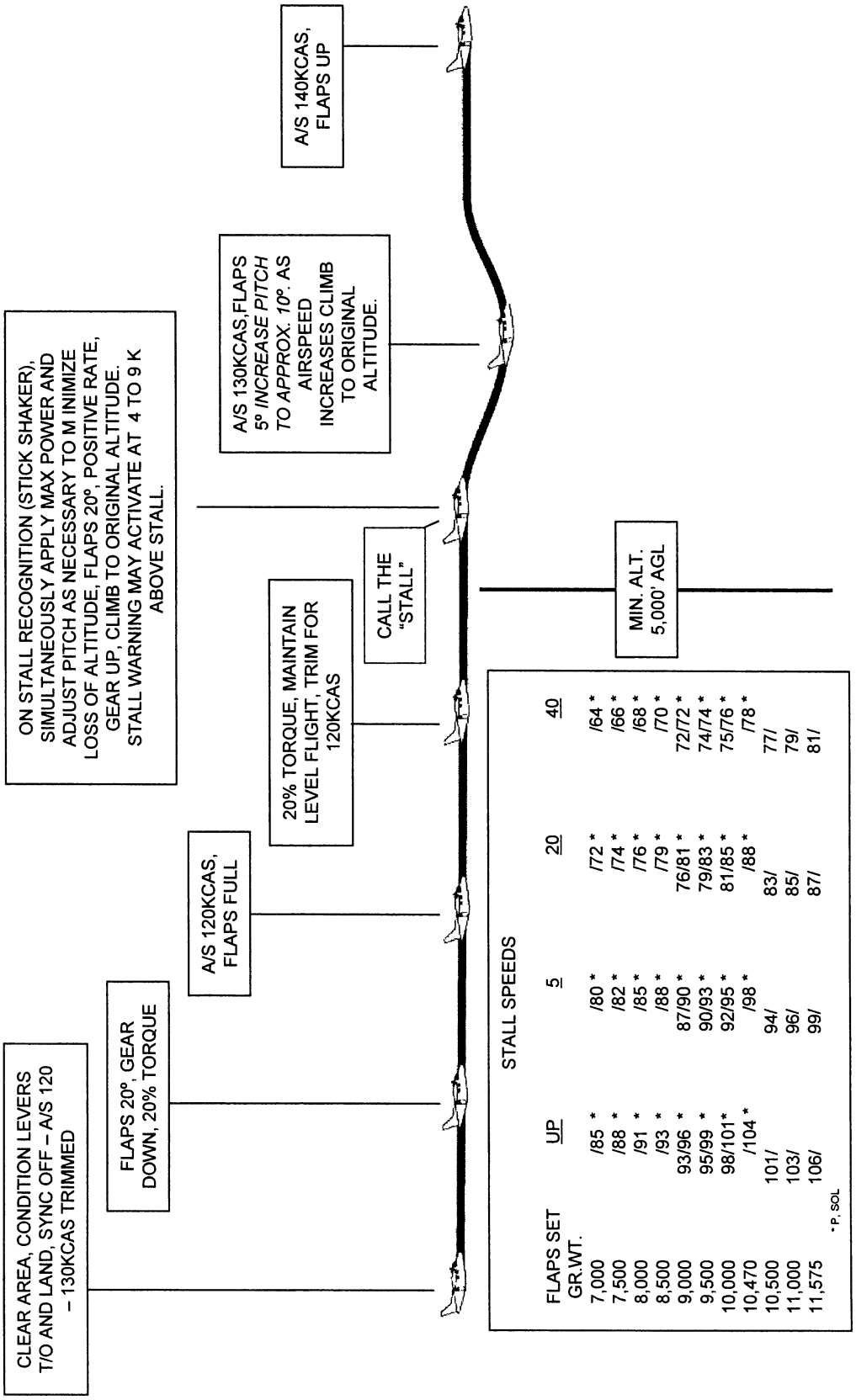


A-9

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

APPROACH TO STALL

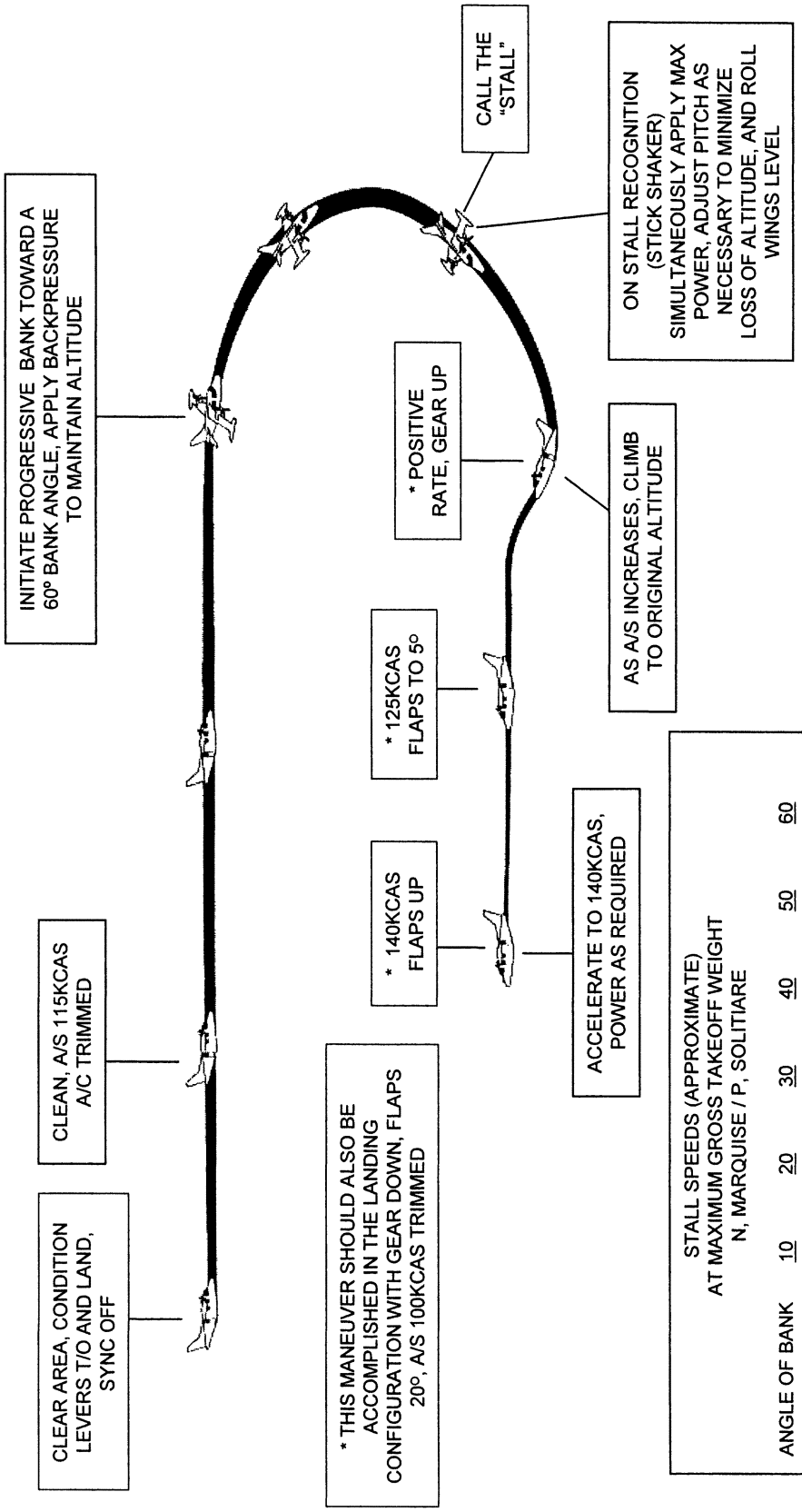
GEAR DOWN – FULL FLAPS



A-10

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

ACCELERATED STALLS



STALL SPEEDS (APPROXIMATE)
AT MAXIMUM GROSS TAKEOFF WEIGHT
N, MARQUISE / P, SOLITIARE

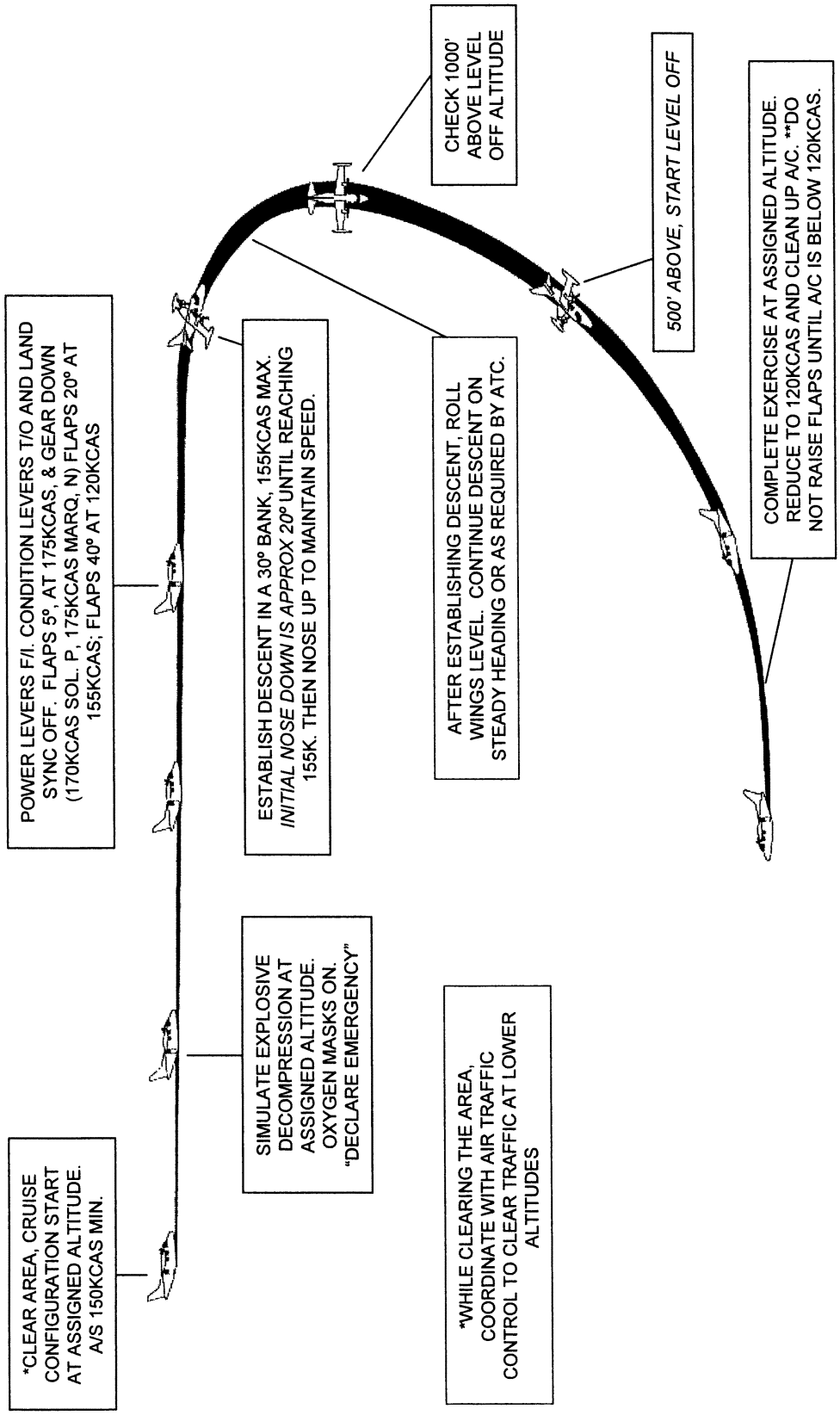
ANGLE OF BANK	10	20	30	40	50	60
FLAPS UP	107/104*	109/108*	113/112*	120/119*	131/130*	148/146*
5°	99/ 98*	102/101*	106/105*	113/112*	123/122*	138/138*
20°	87/ 88*	89/ 90*	93/ 94*	98/100*	108/109*	122/123*
40°	82/ 79*	84/ 80*	87/ 84*	92/ 90*	101/ 98*	113/110*

*P, SOL

A-11

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

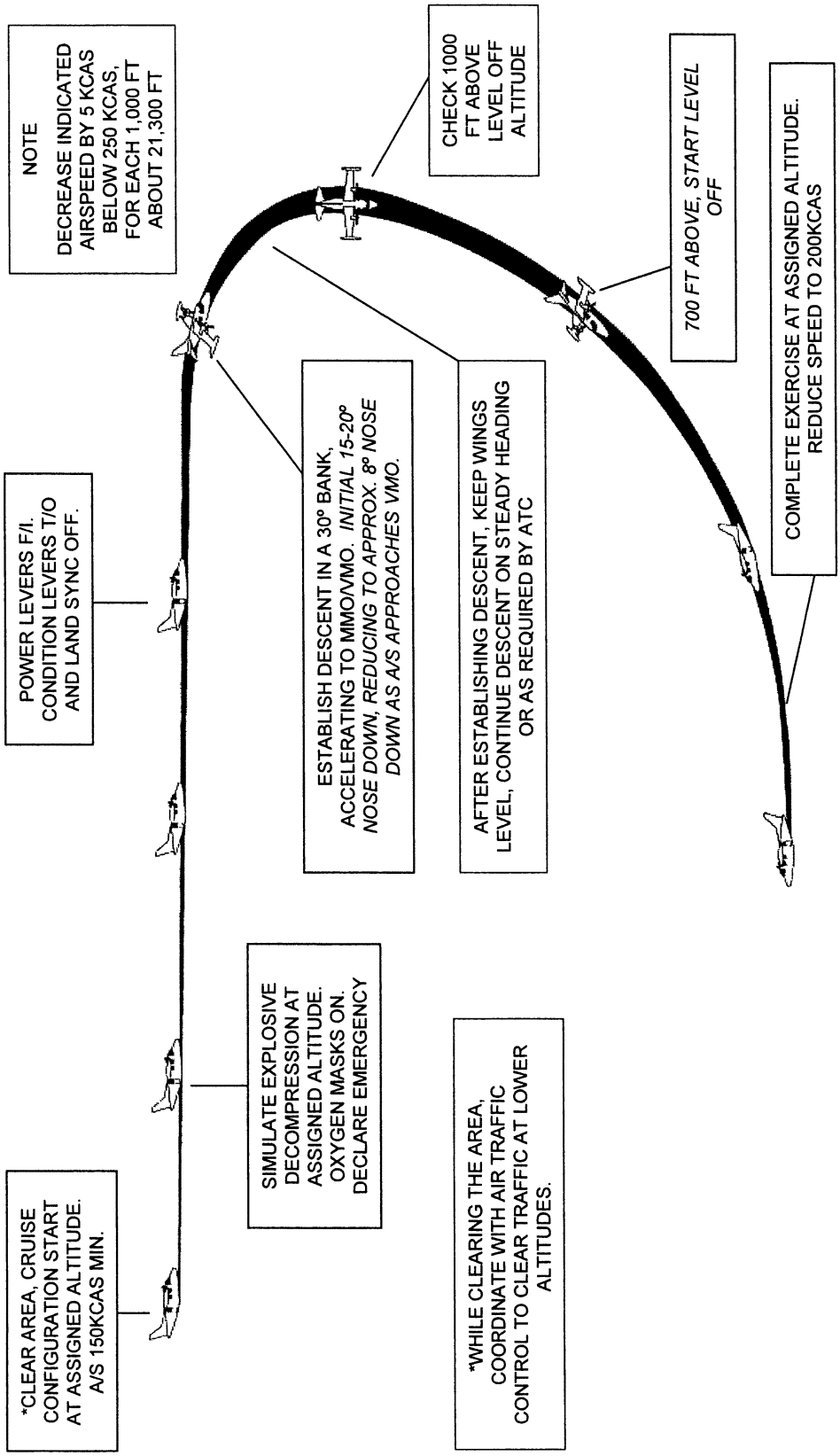
EMERGENCY DESCENT (LOW SPEED)



A-12

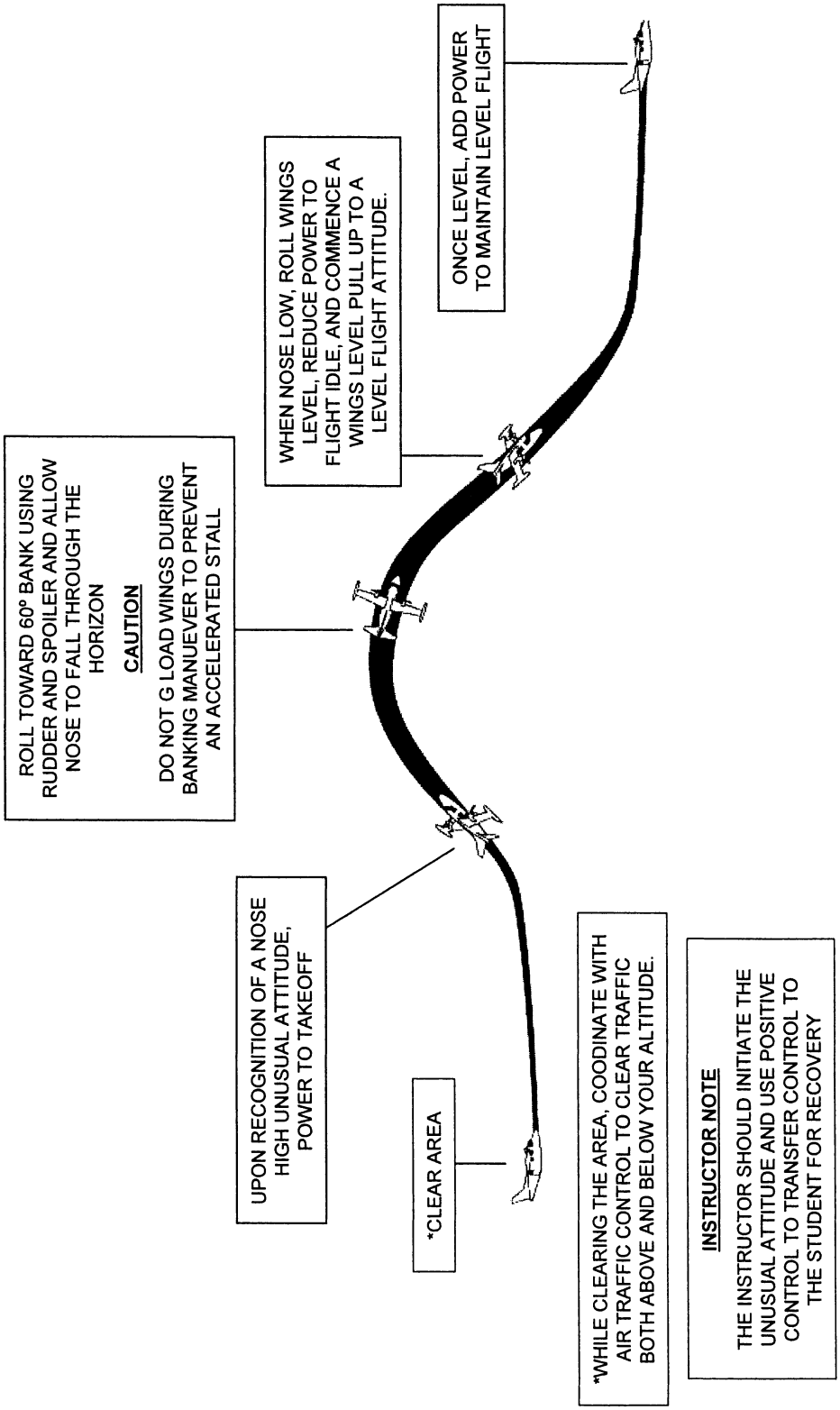
MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

EMERGENCY DESCENT (HIGH SPEED)



MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

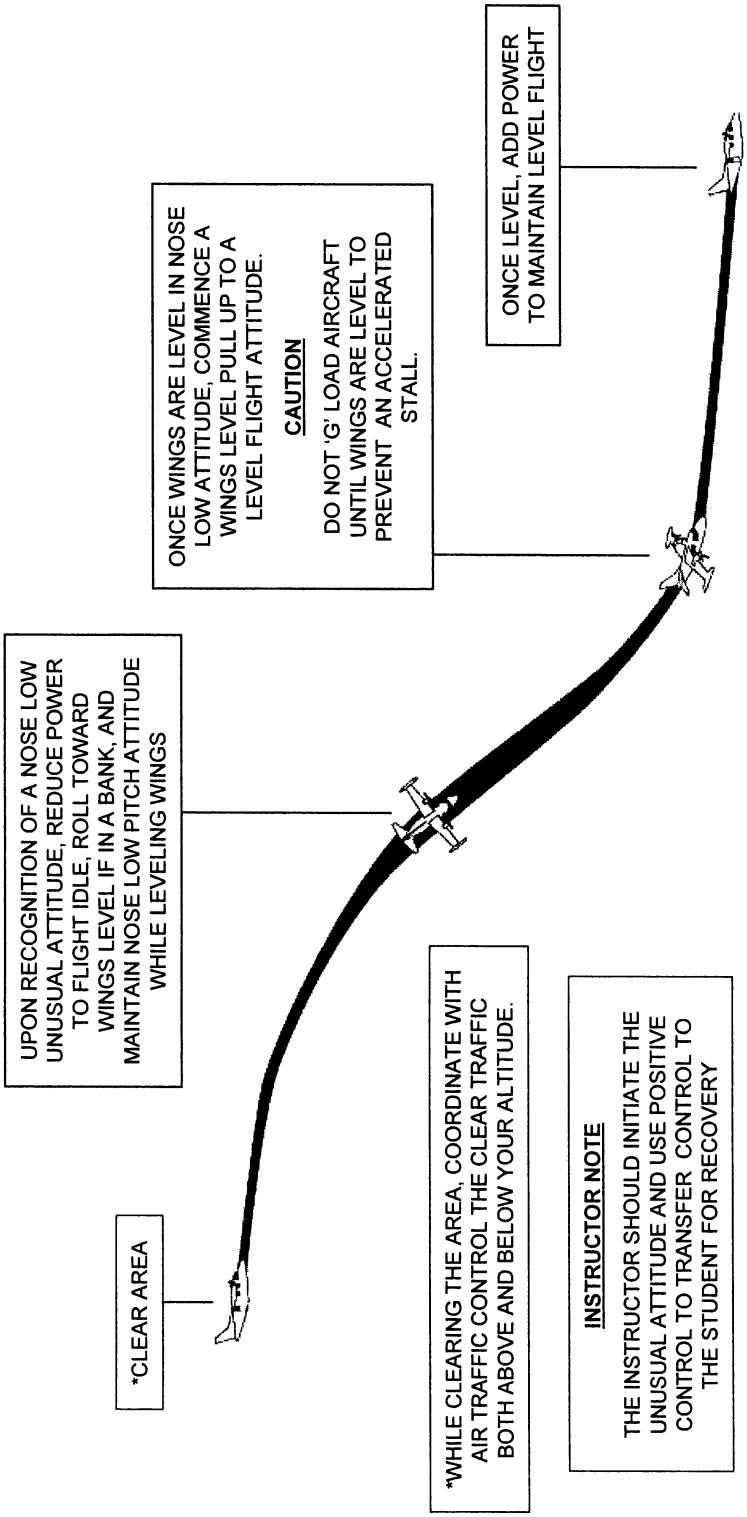
UNUSUAL ATTITUDE RECOVERY (NOSE HIGH)



A-14

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

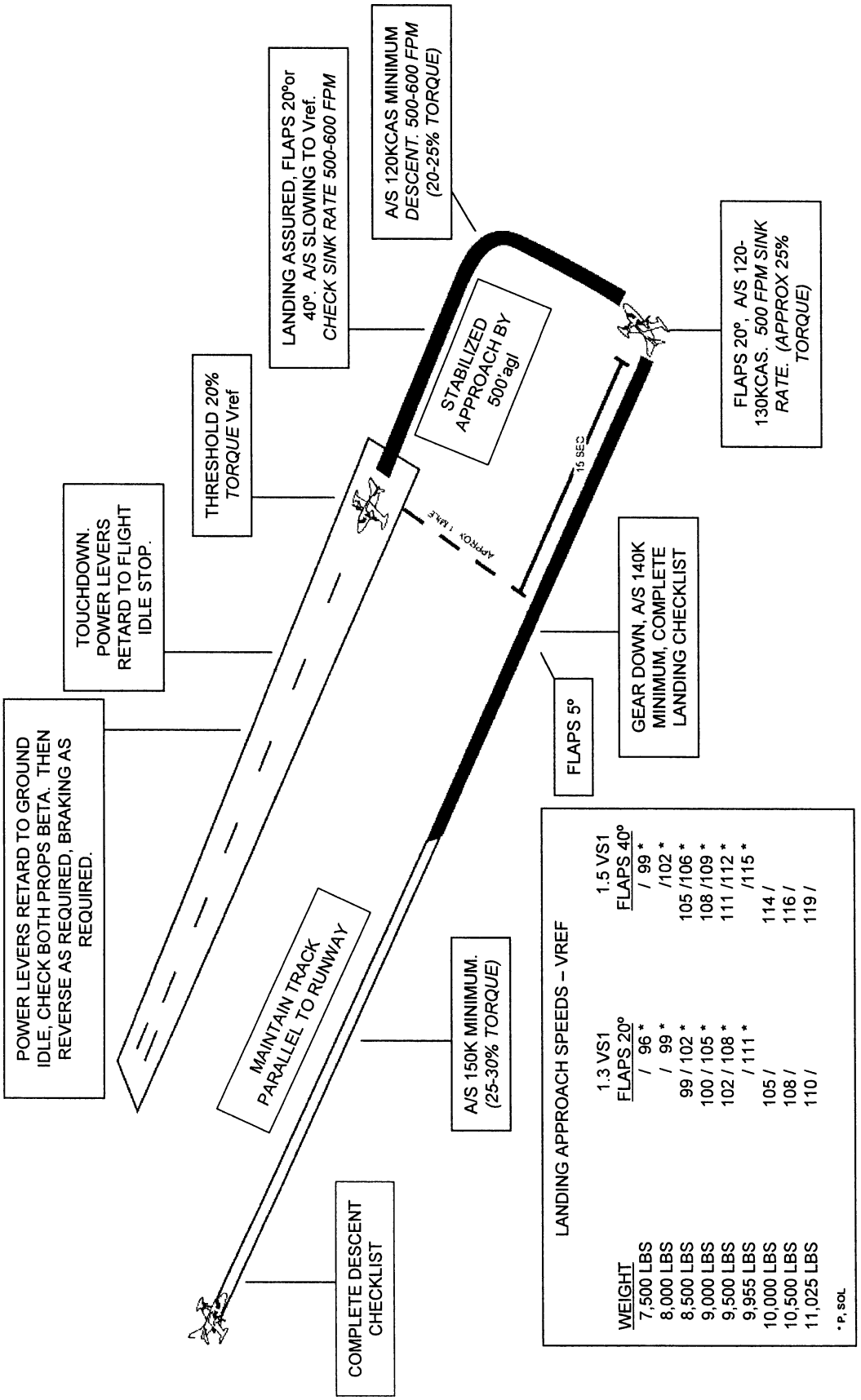
UNUSUAL ATTITUDE RECOVERY (NOSE LOW)



A-15

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

NORMAL LANDING (20° or 40° FLAPS)



LANDING APPROACH SPEEDS – VREF

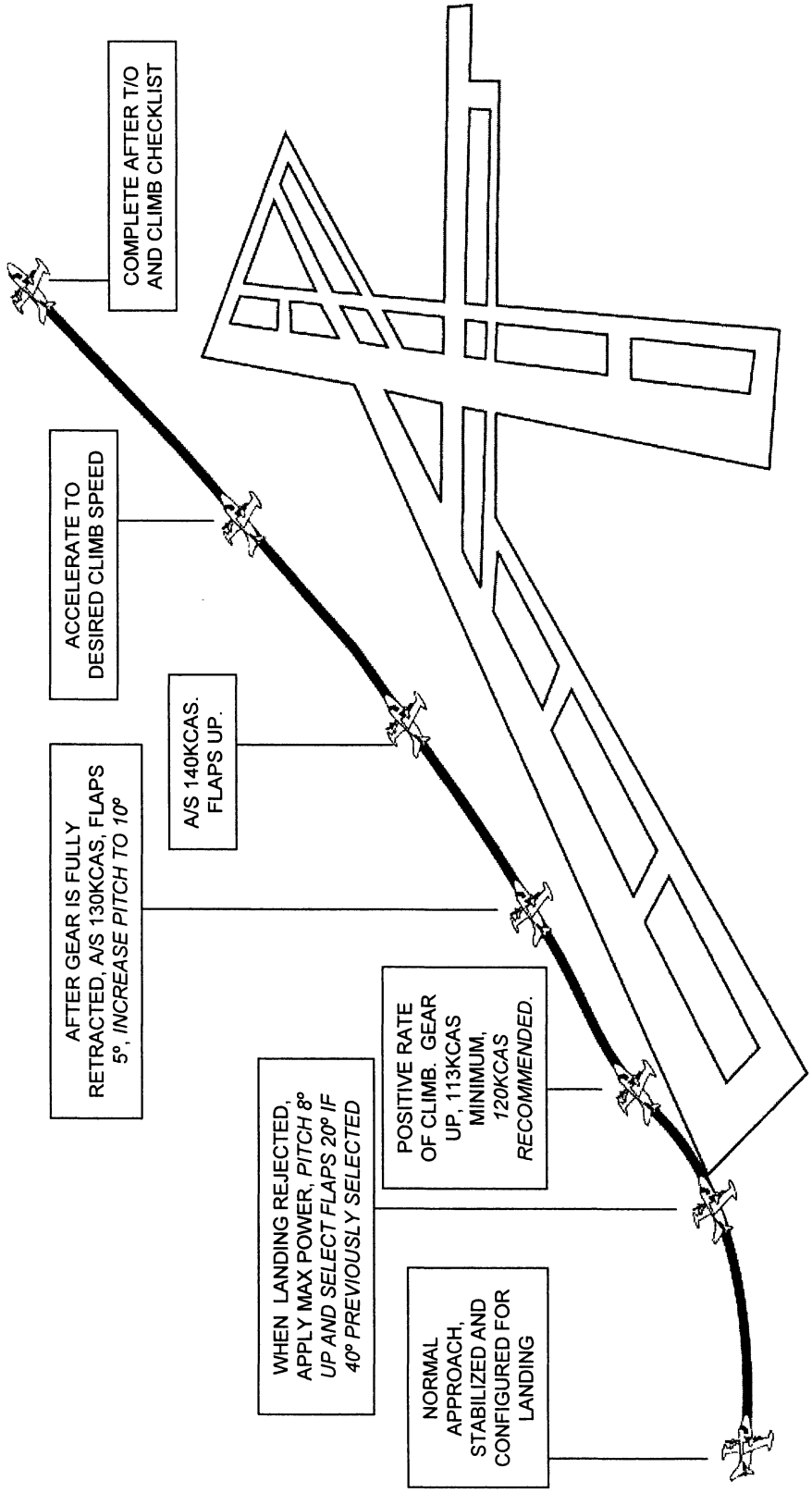
WEIGHT	1.3 VS1 FLAPS 20°	1.5 VS1 FLAPS 40°
7,500 LBS	/ 96 *	/ 99 *
8,000 LBS	/ 99 *	/102 *
8,500 LBS	99 / 102 *	105 /106 *
9,000 LBS	100 / 105 *	108 /109 *
9,500 LBS	102 / 108 *	111 /112 *
9,955 LBS	/ 111 *	/115 *
10,000 LBS	105 /	114 /
10,500 LBS	108 /	116 /
11,025 LBS	110 /	119 /

* P, SOL

A-16

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

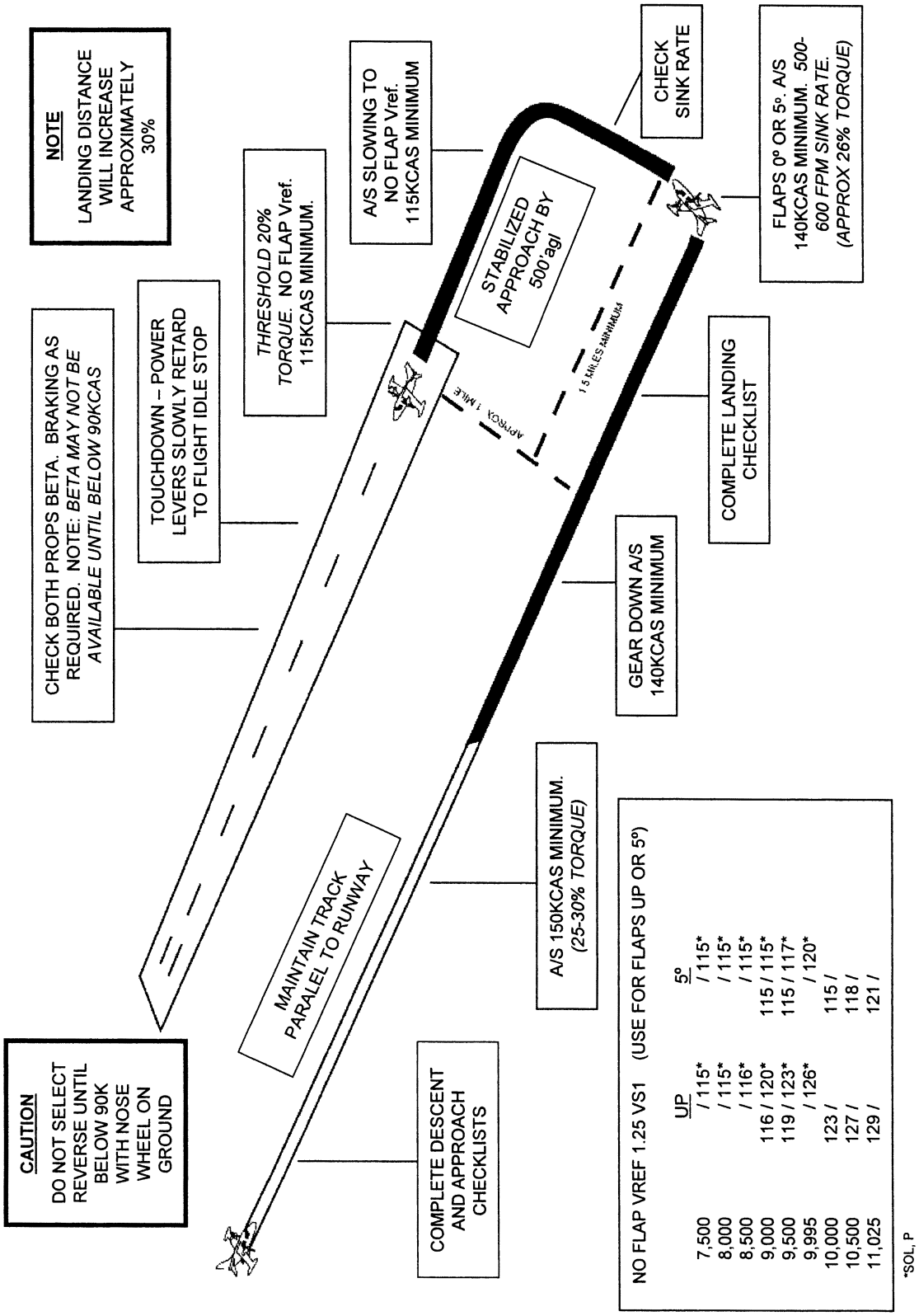
GO AROUND - REJECTED LANDING



A-17

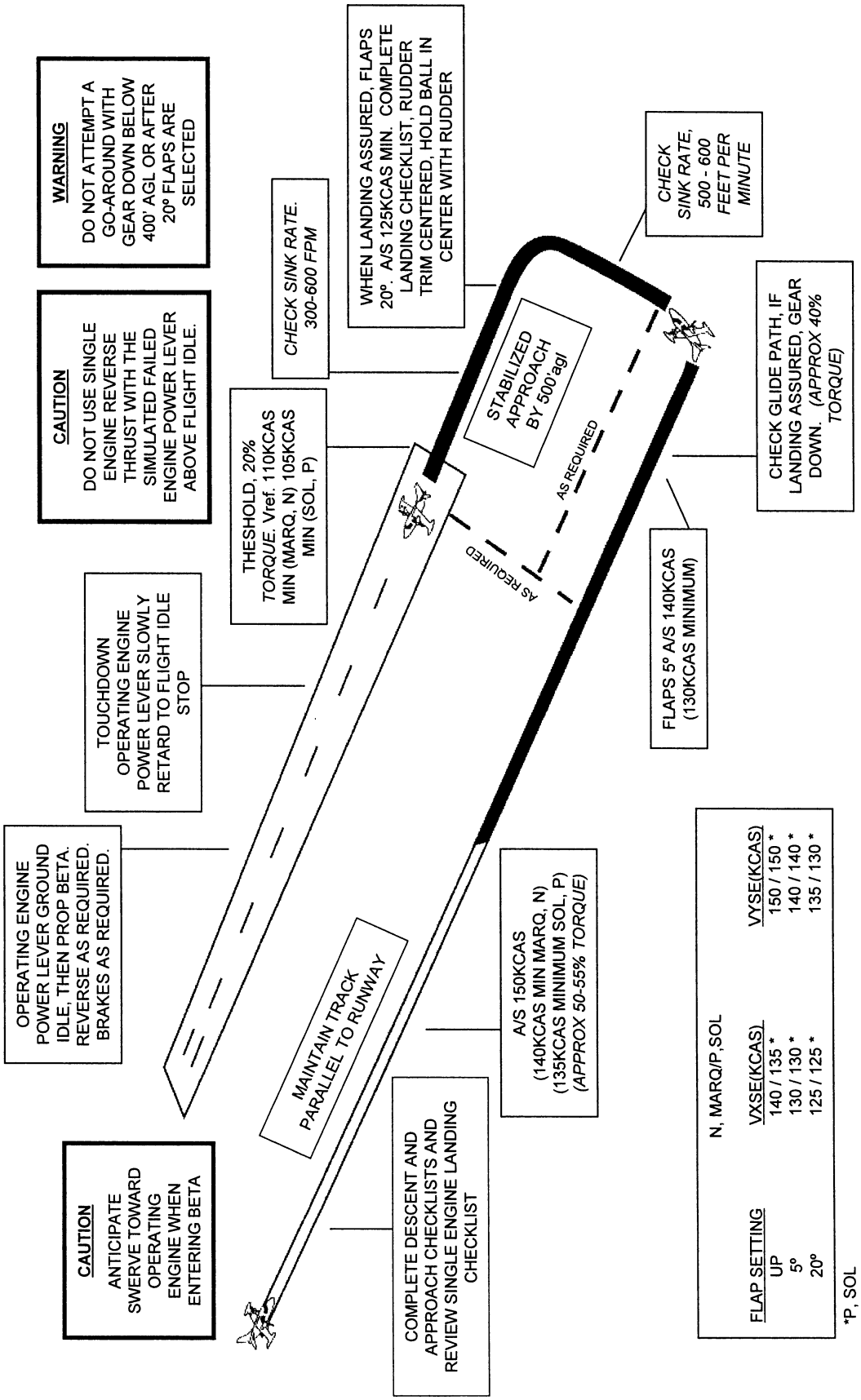
MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

NO FLAP OR 5º FLAP LANDING



MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

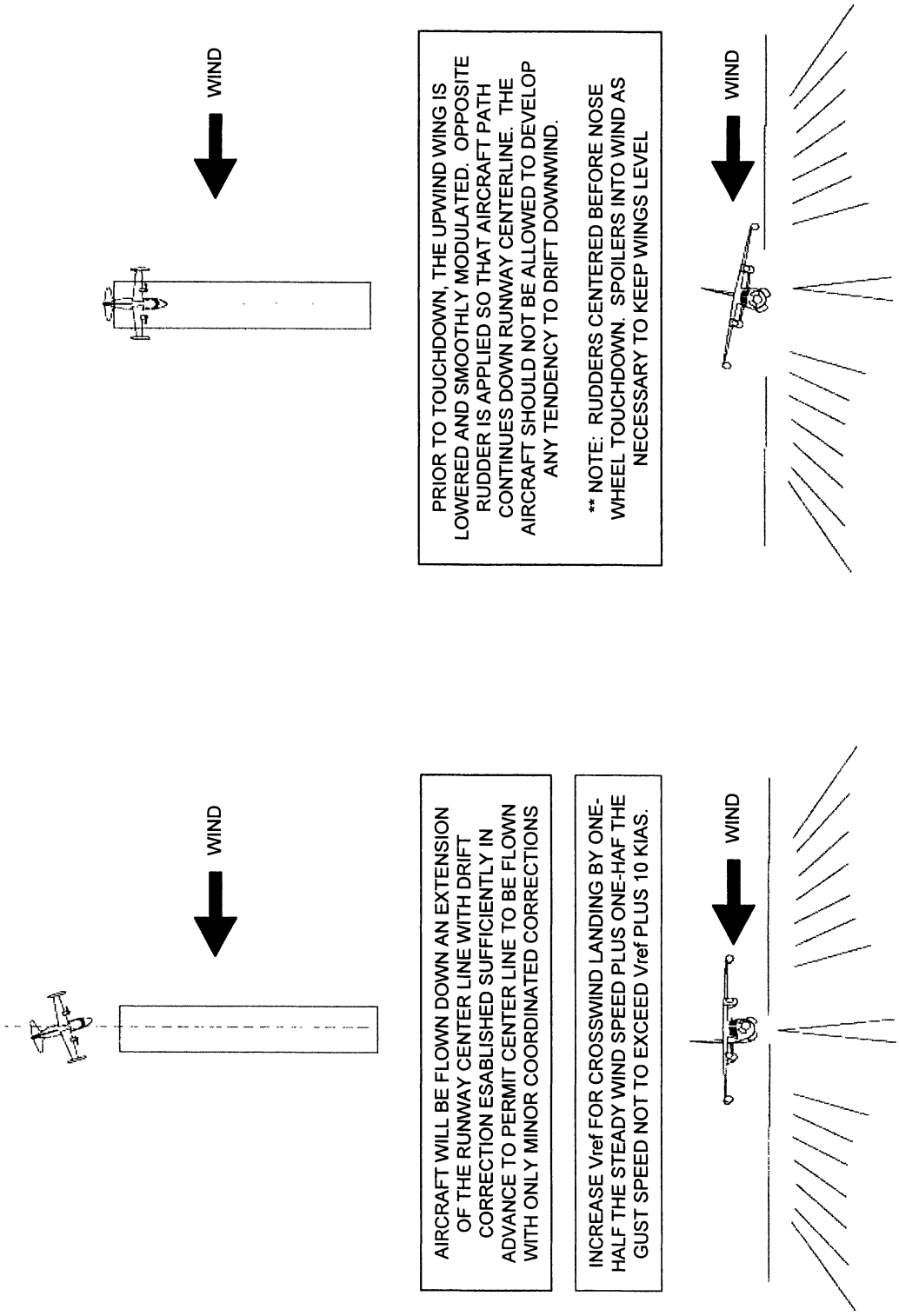
ONE ENGINE INOPERATIVE LANDING



A-19

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

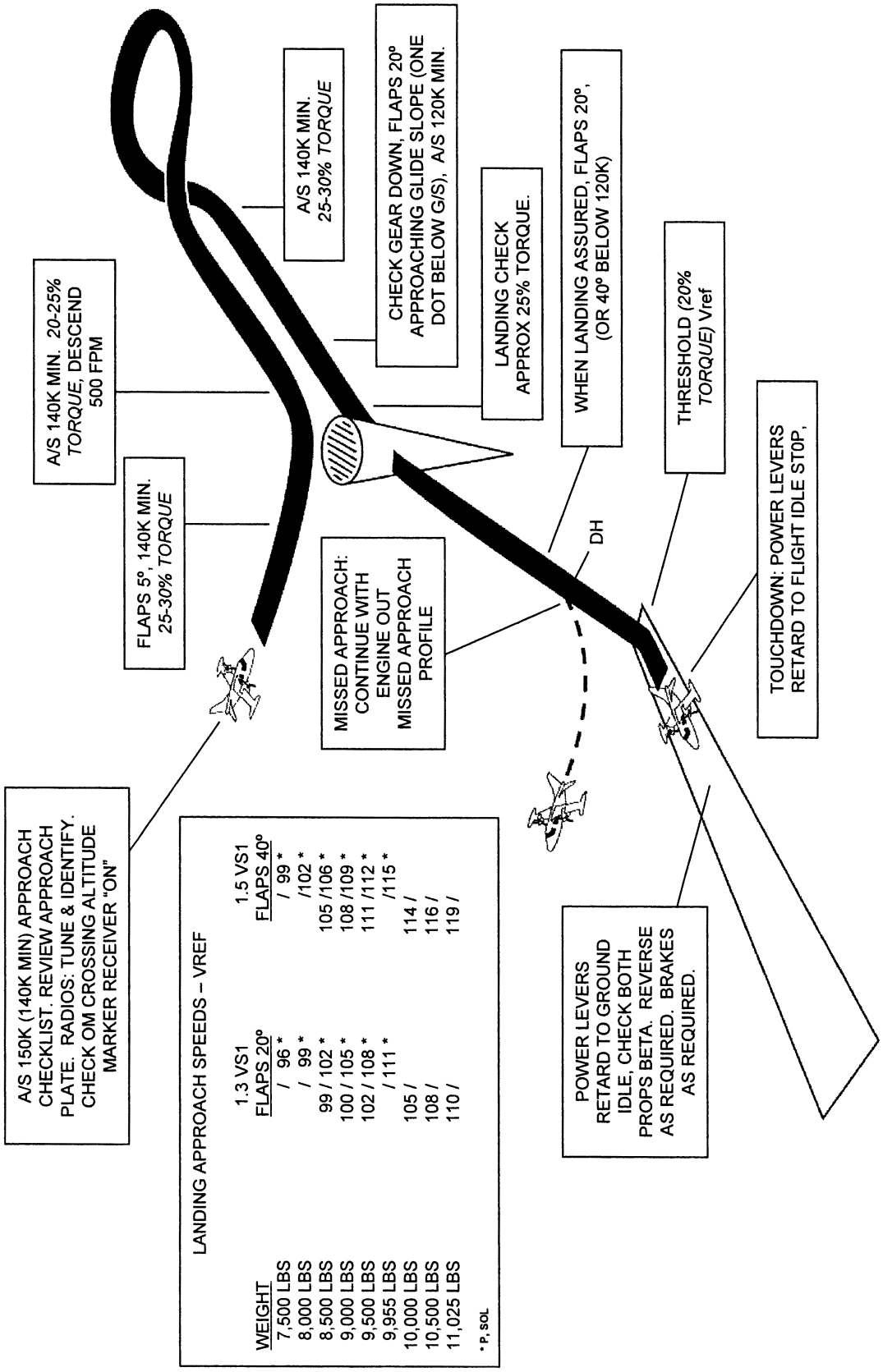
CROSSWIND LANDING



A-20

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

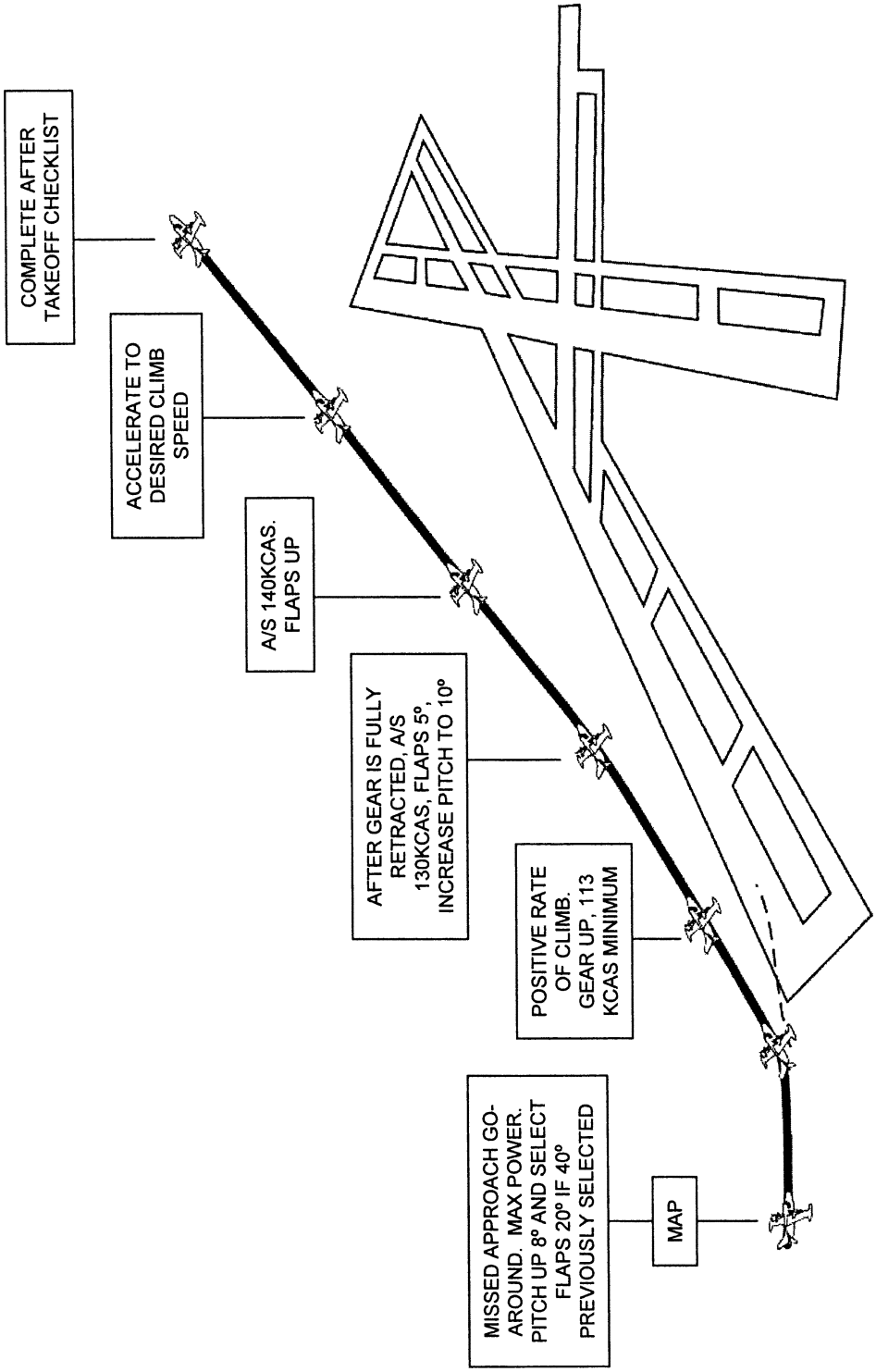
ILS AND MISSED APPROACH



A-21

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

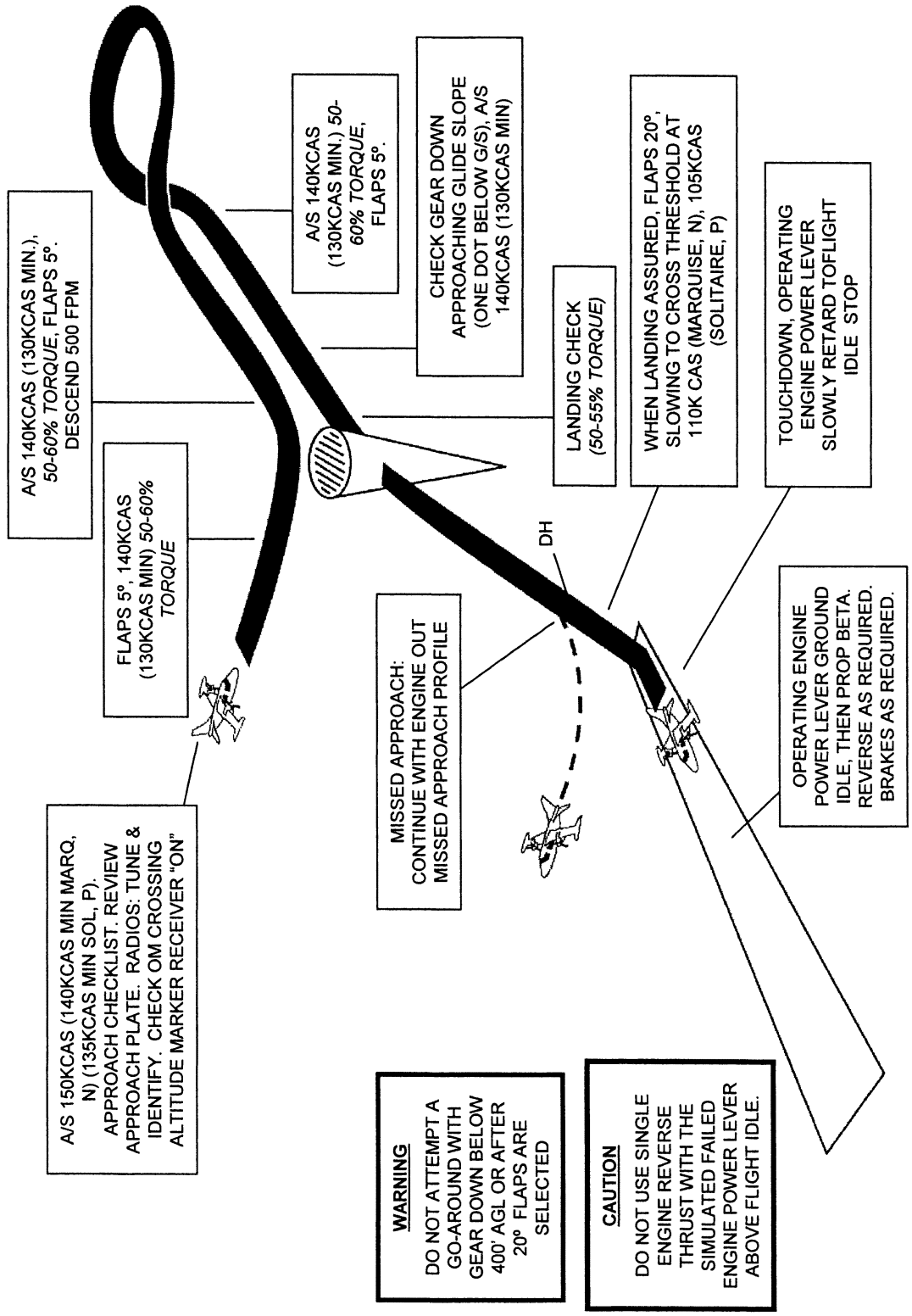
TWO ENGINE MISSED APPROACH



A-22

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

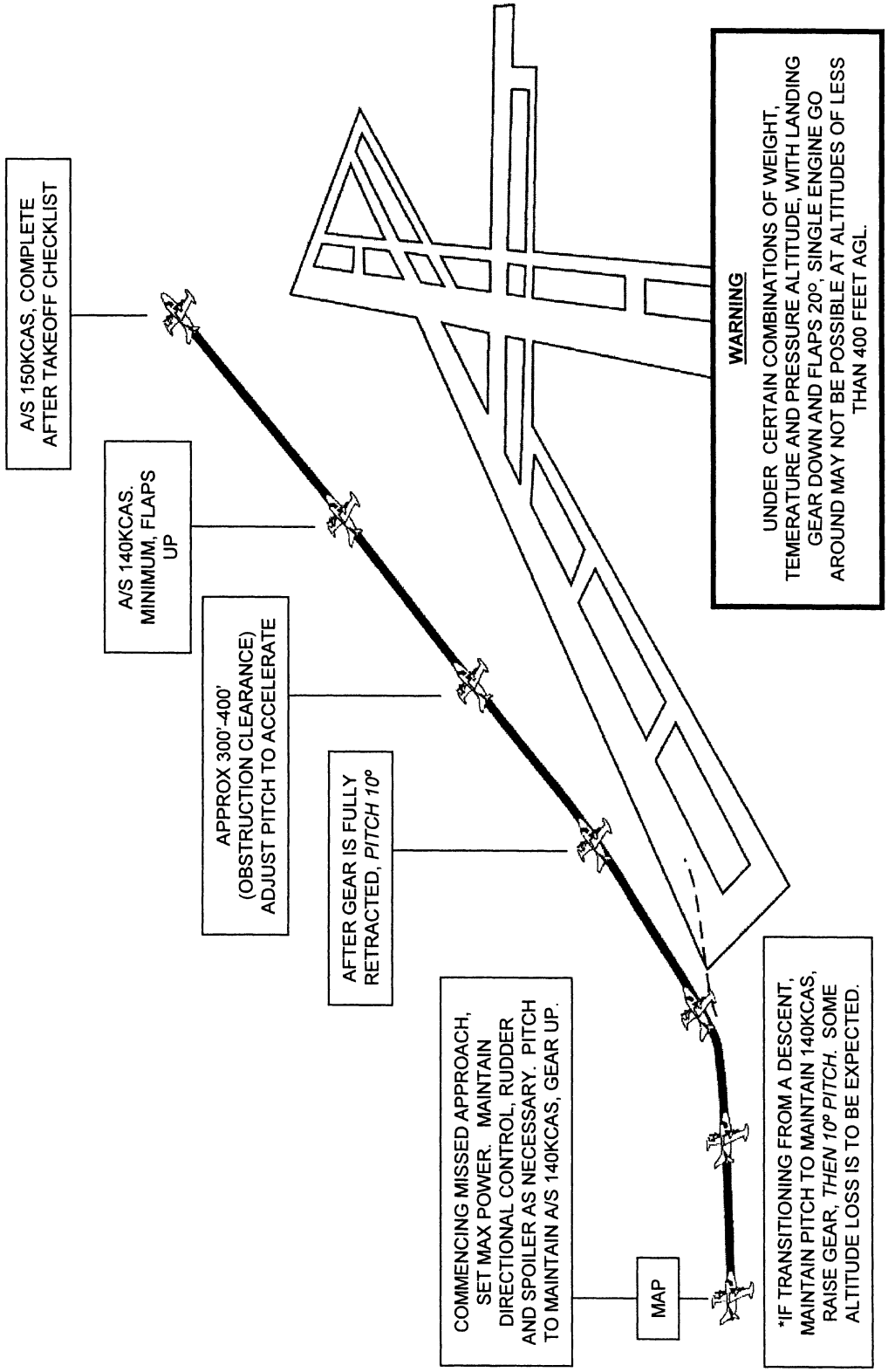
ONE ENGINE INOPERATIVE ILS AND MISSED APPROACH



A-23

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

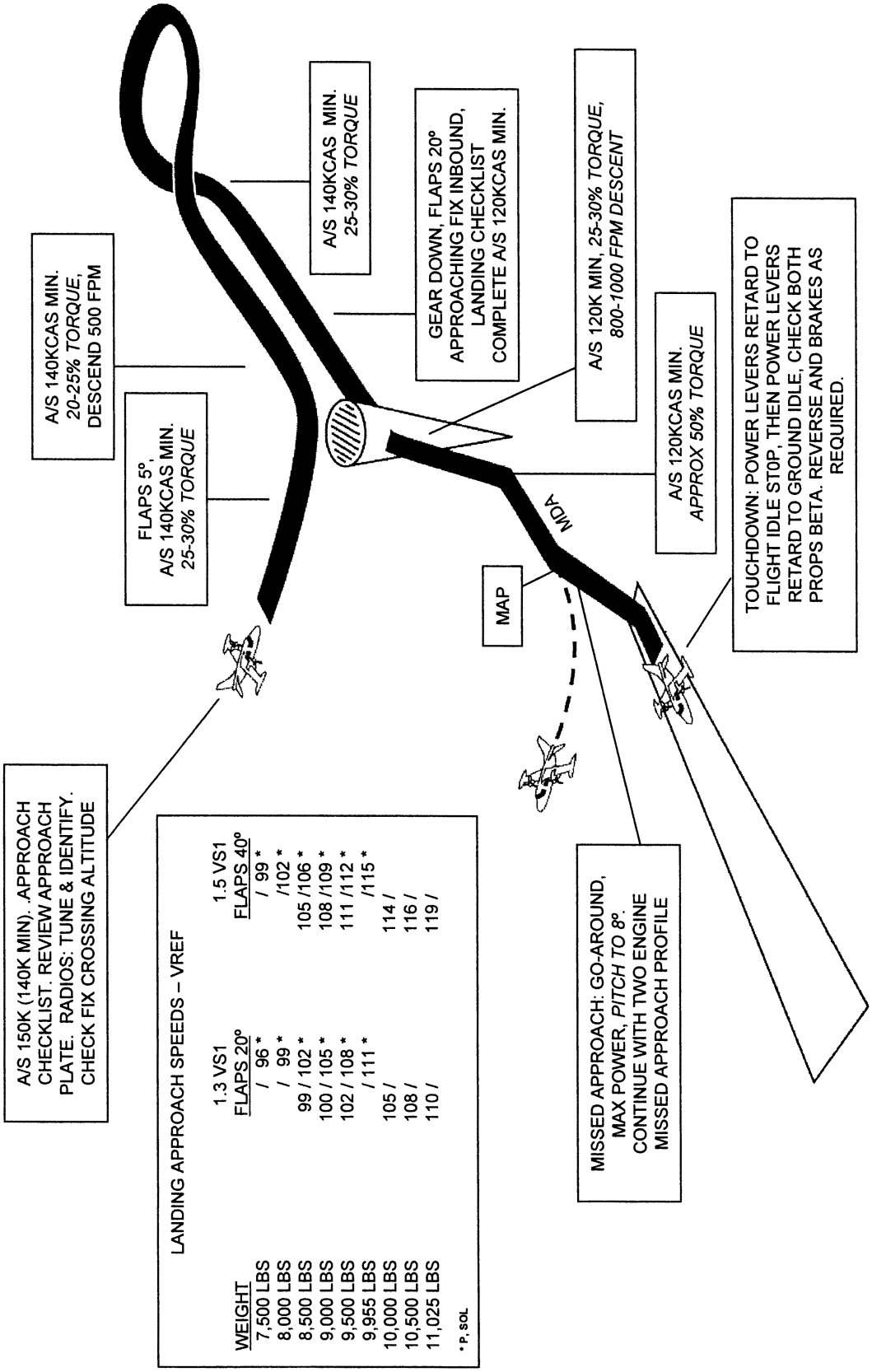
ONE ENGINE INOPERATIVE MISSED APPROACH



A-24

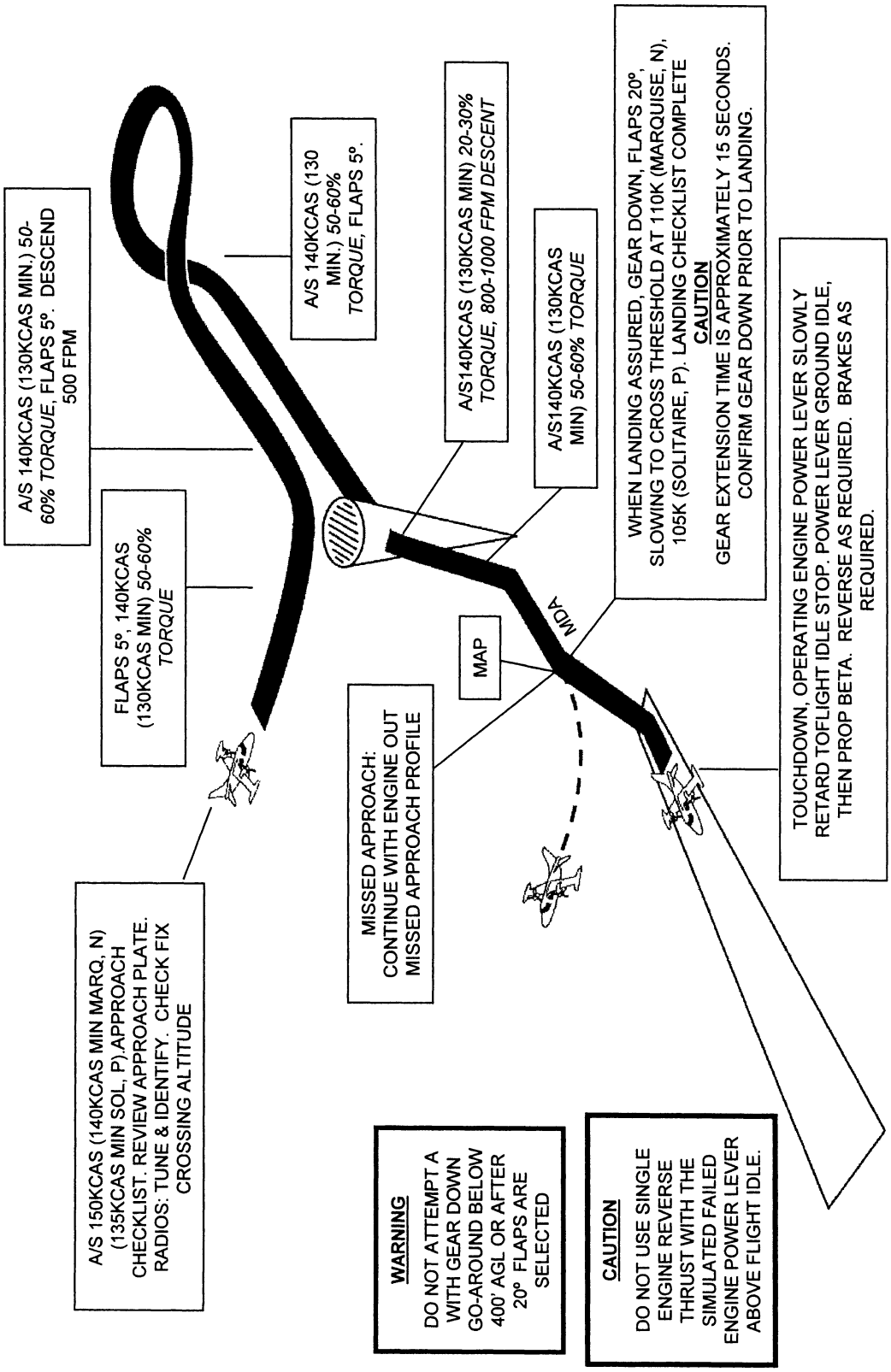
MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

NON-PRECISION AND MISSED APPROACH



MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

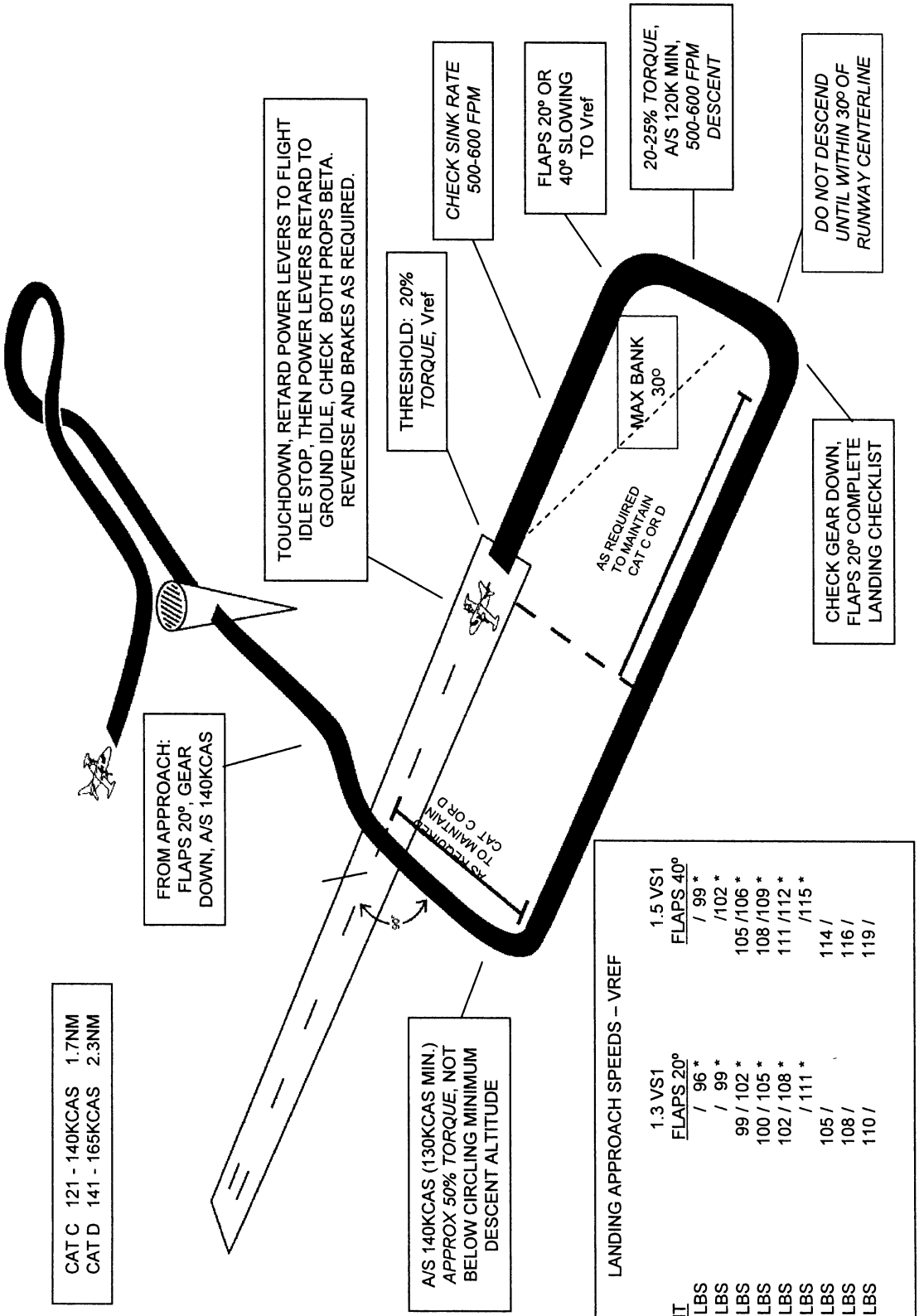
ONE ENGINE INOPERATIVE NON-PRECISION AND MISSED APPROACH



A-26

MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

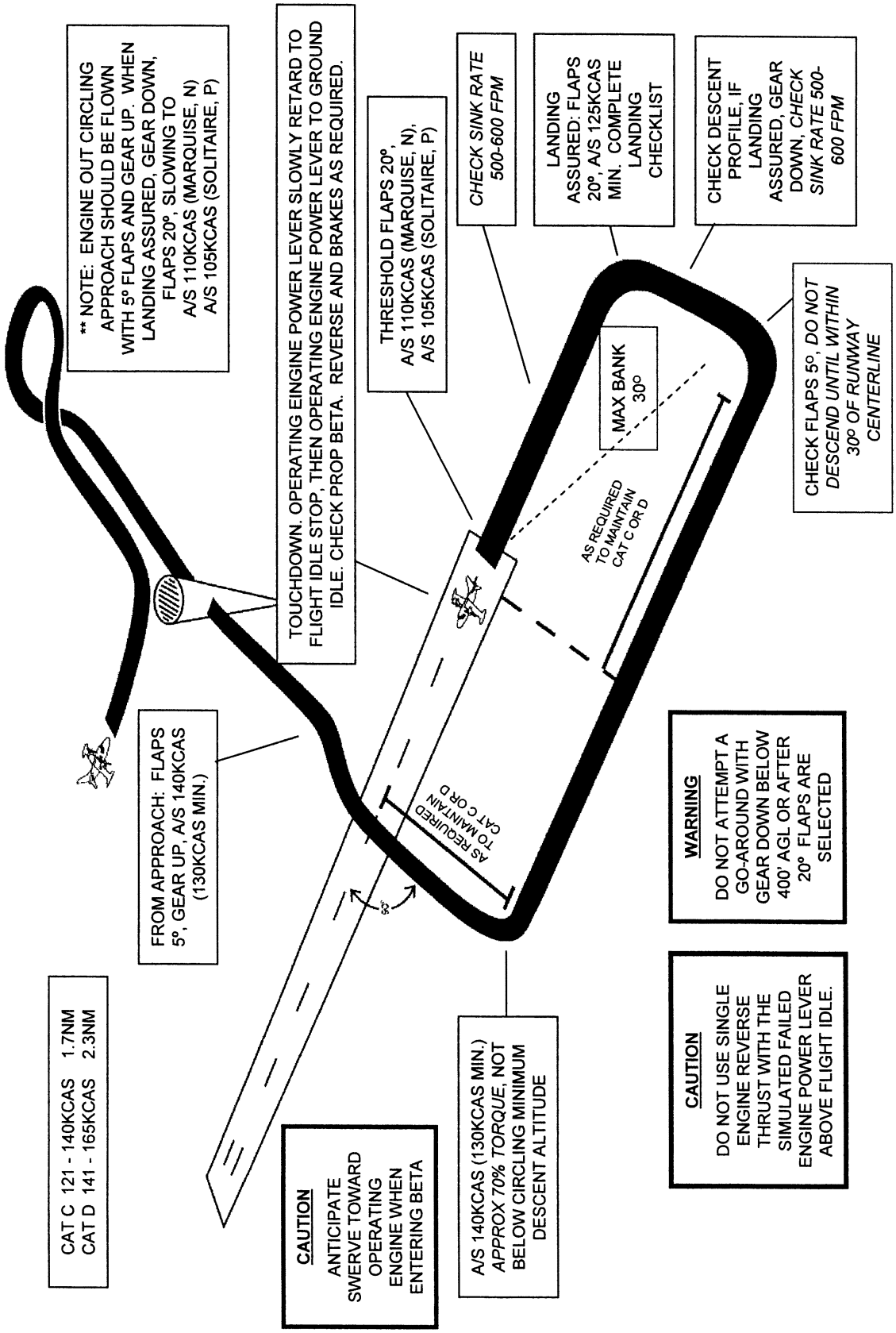
CIRCLING APPROACH AT WEATHER MINIMUMS



A-27

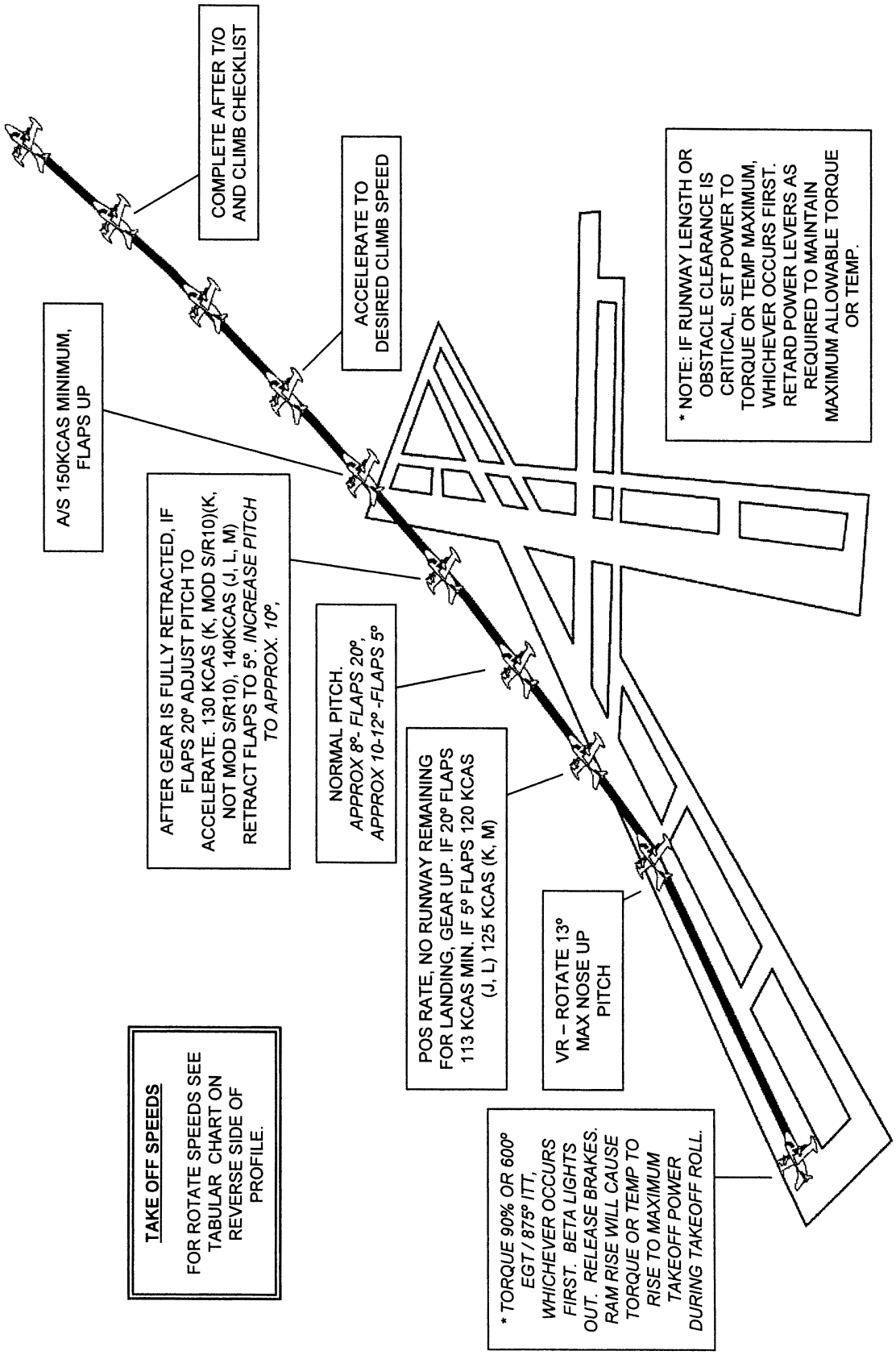
MU-2B MARQUISE (-60), SOLITAIRE (-40), N (-36A), P (-26A)

ONE ENGINE INOPERATIVE CIRCLING APPROACH AT WEATHER MINIMUMS



MU-2B J (-35), K (-25), L (-36), M (-26)

NORMAL TAKE-OFF, 5° OR 20° FLAPS



B-1

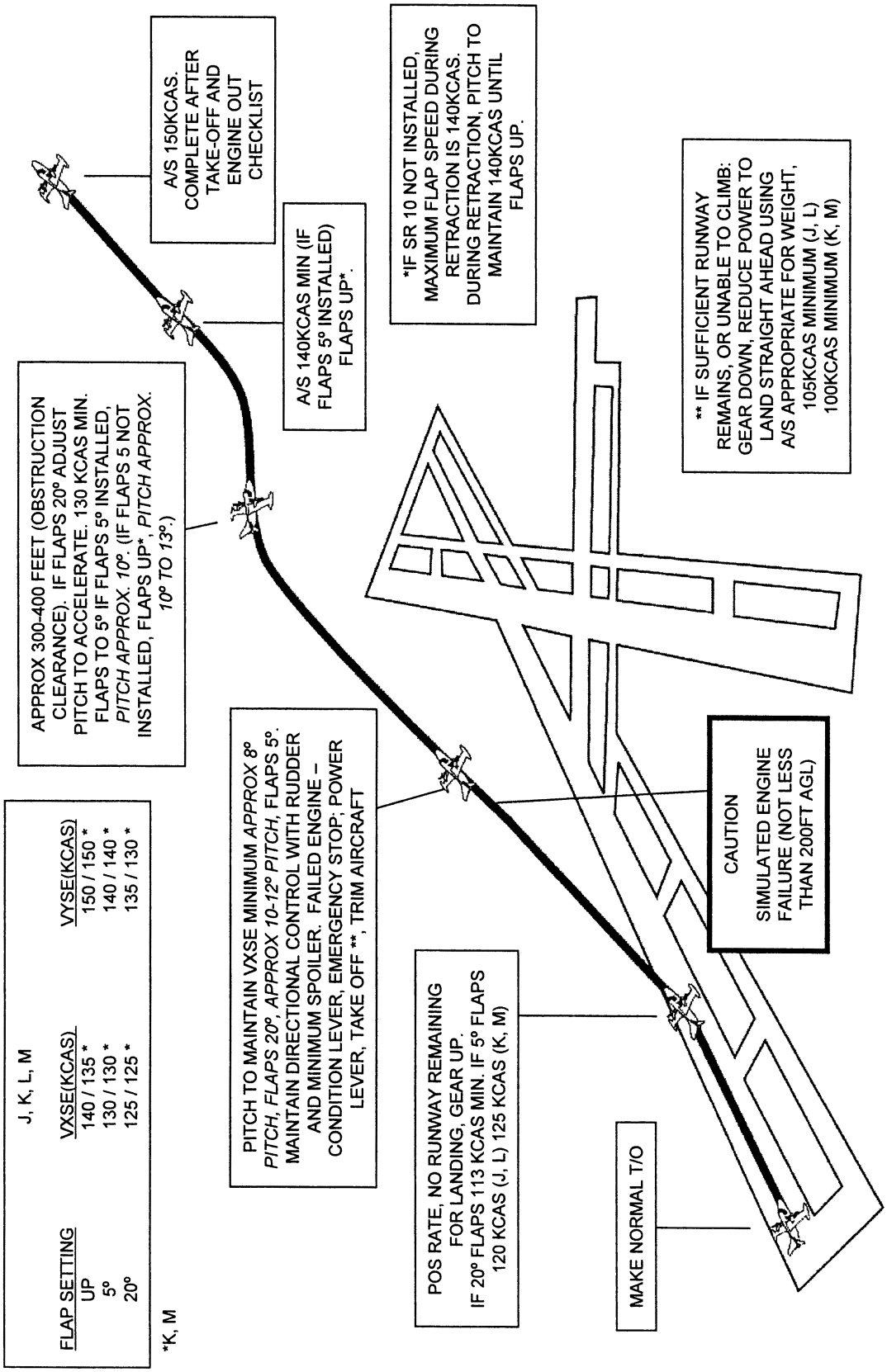
TAKE OFF SPEEDS
ROTATE

FLAPS 5°	K	M	J	L
11,575 LBS				109
11,000 LBS				106
10,800 LBS			109	105
10,470 LBS		110		104
10,000 LBS		108	105	101
9,920 LBS	108			101
9,500 LBS	107	107	103	101
9,000 LBS	106	106	101	100
8,000 LBS	104	104	100	
7,500 LBS	102			

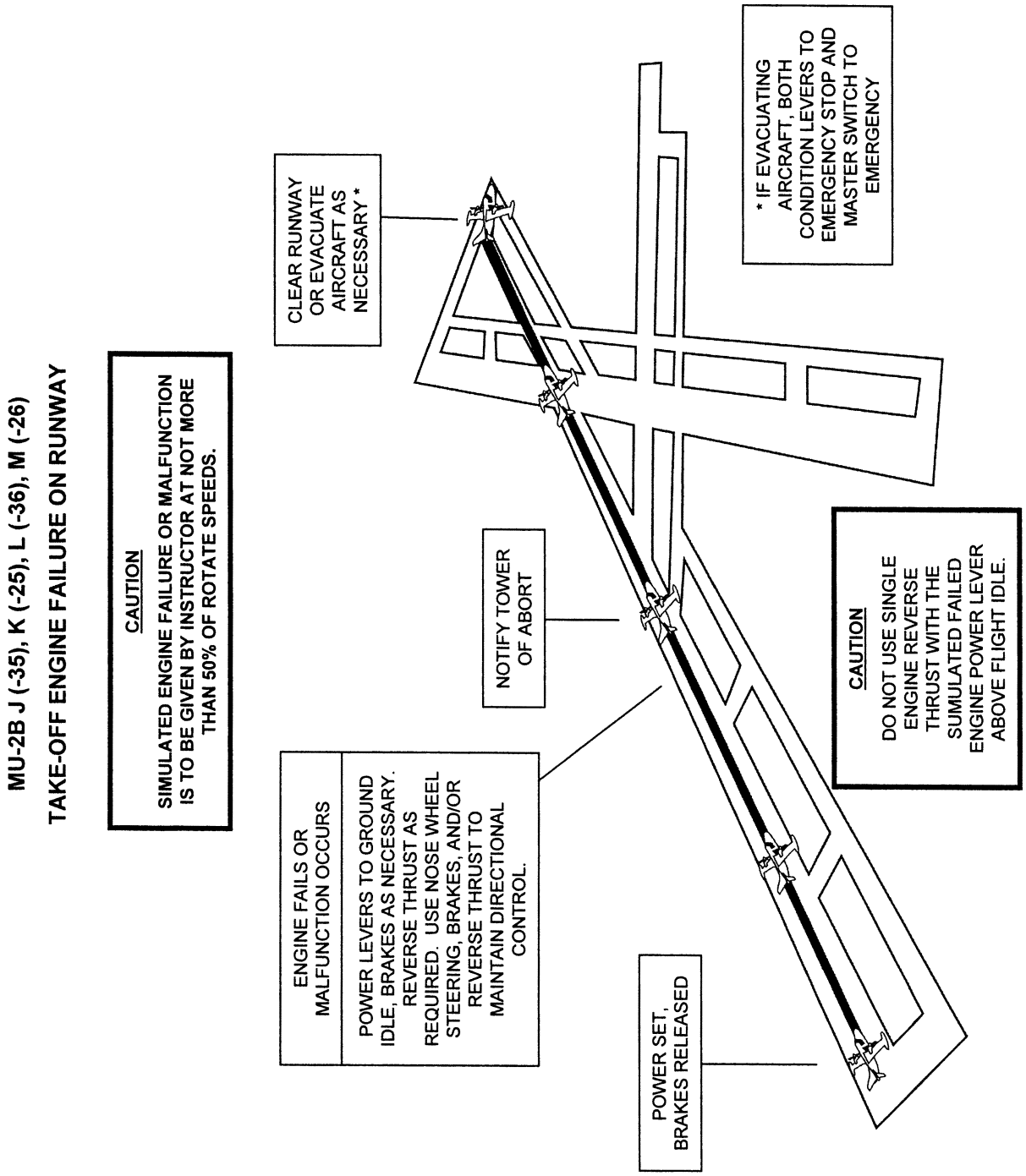
FLAPS 20°	K	M	J	L
11,575 LBS				105
11,000 LBS				103
10,800 LBS			105	
10,470 LBS		103		
10,000 LBS		102	102	100
9,920 LBS	102			
9,500 LBS	101	101	101	100
9,000 LBS	100	100	100	100
8,000 LBS	99	99	100	
7,500 LBS	98			

MU-2B J (-35), K (-25), L (-36), M (-26)

TAKE-OFF ENGINE FAILURE – FLAPS 5° OR 20°



B-2

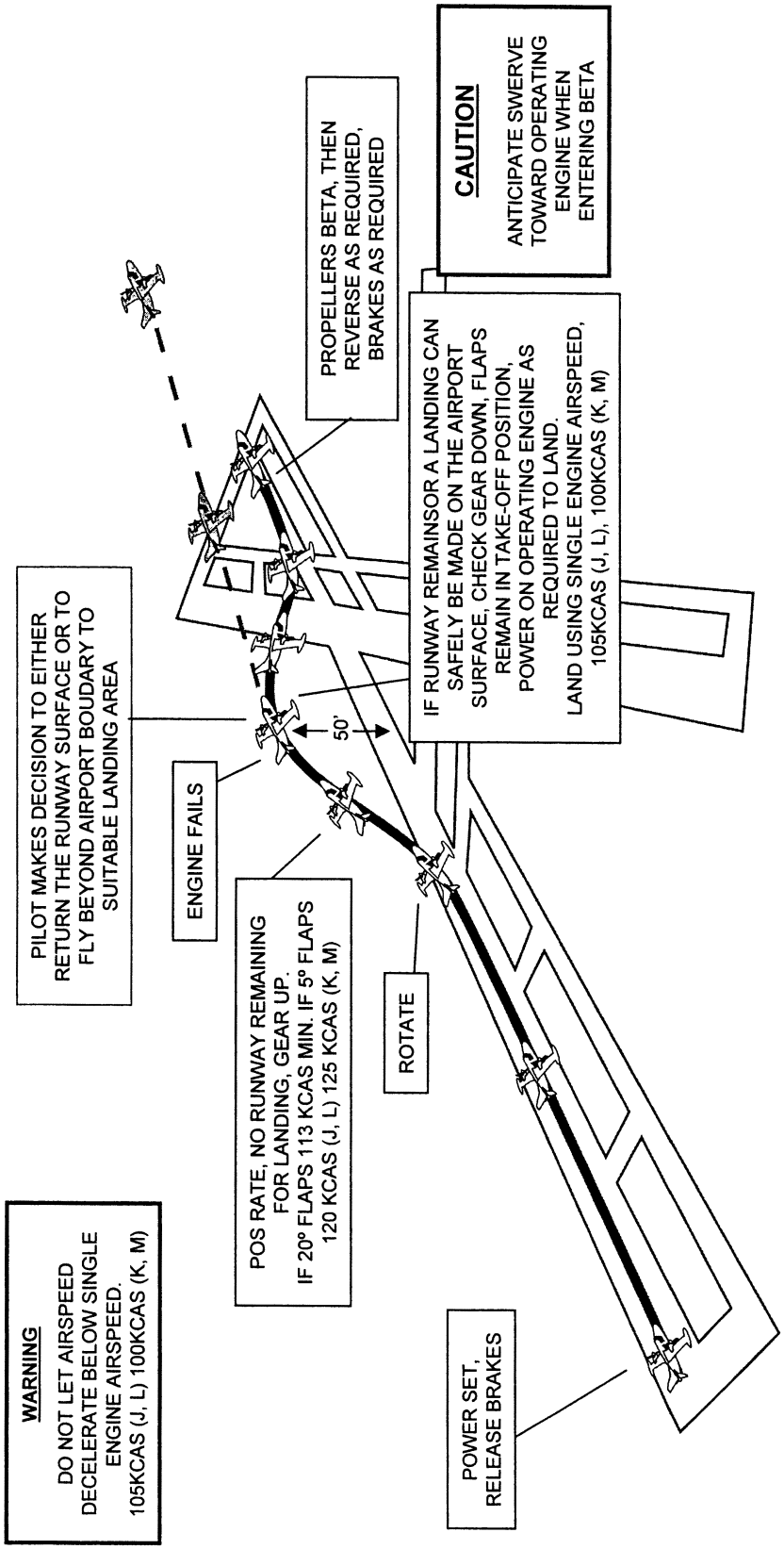

MU-2B J (-35), K (-25), L (-36), M (-26)
TAKE-OFF ENGINE FAILURE ON RUNWAY
CAUTION
SIMULATED ENGINE FAILURE OR MALFUNCTION IS TO BE GIVEN BY INSTRUCTOR AT NOT MORE THAN 50% OF ROTATE SPEEDS.
CLEAR RUNWAY OR EVACUATE AIRCRAFT AS NECESSARY *
* IF EVACUATING AIRCRAFT, BOTH CONDITION LEVERS TO EMERGENCY STOP AND MASTER SWITCH TO EMERGENCY
NOTIFY TOWER OF ABORT
ENGINE FAILS OR MALFUNCTION OCCURS
POWER LEVERS TO GROUND IDLE, BRAKES AS NECESSARY. REVERSE THRUST AS REQUIRED. USE NOSE WHEEL STEERING, BRAKES, AND/OR REVERSE THRUST TO MAINTAIN DIRECTIONAL CONTROL.
CAUTION
DO NOT USE SINGLE ENGINE REVERSE THRUST WITH THE SUMULATED FAILED ENGINE POWER LEVER ABOVE FLIGHT IDLE.
POWER SET, BRAKES RELEASED

B-3

MU-2B J (-35), K (-25), L (-36), M (-26)

TAKE-OFF ENGINE FAILURE - UNABLE TO CLIMB

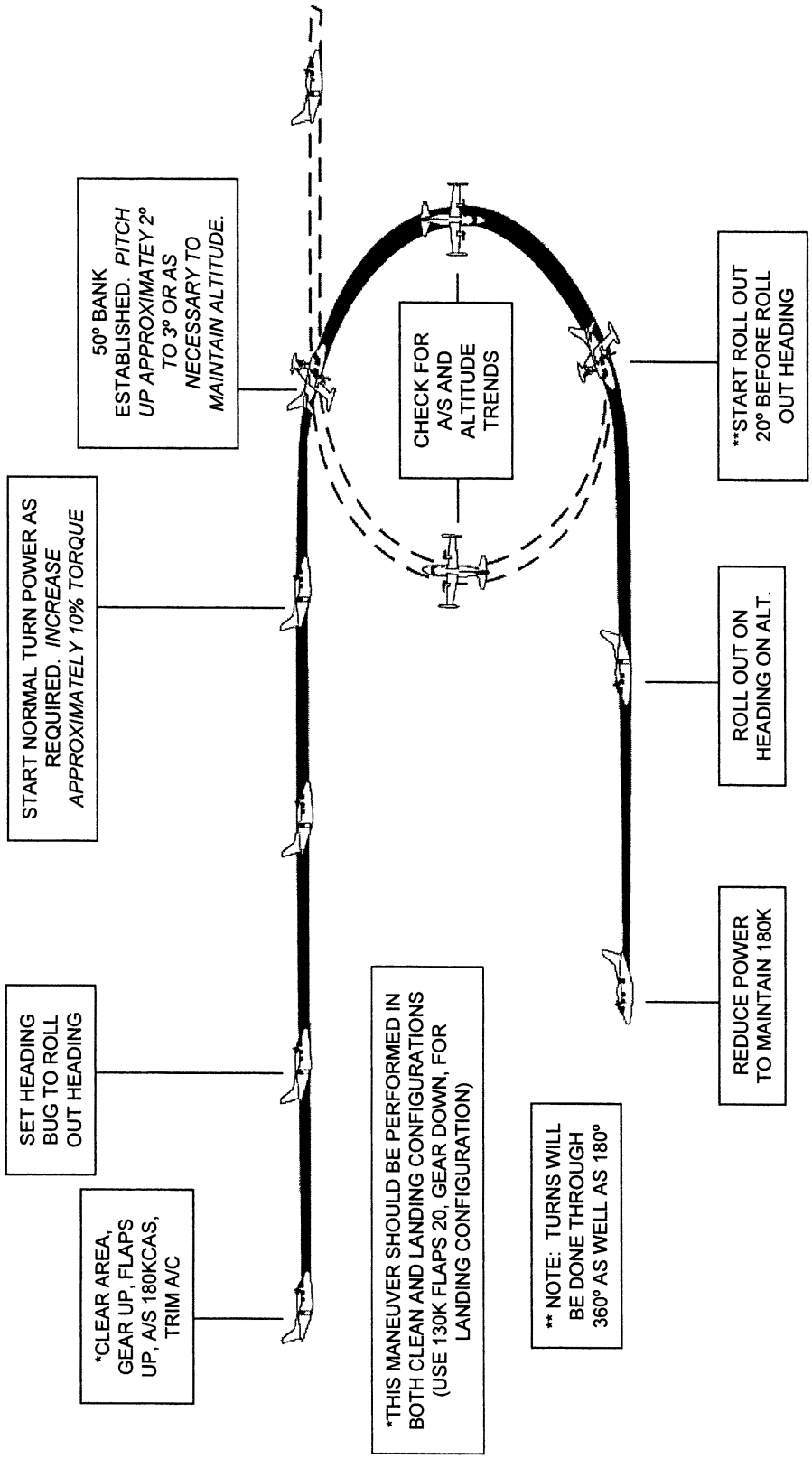
CLASSROOM DISCUSSION OR FTD USE ONLY



B-4

MU-2B J (-35), K (-25), L (-36), M (-26)

STEEP TURNS



MU-2B J (-35), K (-25), L (-36), M (-26)

SLOW FLIGHT MANEUVERING

MINIMUM CONTROLLABLE AIRSPEED

SLOW FLIGHT MANEUVERING IS CONDUCTED AS FOLLOWS:

CLEAR THE AREA PRIOR TO BEGINNING THE MANEUVER.

START WITH CLEAN CONFIGURATION AND CHANGE AIRCRAFT CONFIGURATION FROM CLEAN TO FULL FLAP AND GEAR IN STAGES. USE A MAXIMUM OF 15° BANK AND PERFORM HEADING CHANGES OF 90° LEFT AND RIGHT. CONSTANT ALTITUDE IS REQUIRED THROUGHOUT.
MAINTAIN 115KCAS IN ALL CONFIGURATIONS.

**APPROXIMATE POWER SETTINGS ARE:

CLEAN	*TORQUE*	*(35%) PER ENGINE*	*APPROX PITCH +12*
5° FLAP	*TORQUE*	*(32%) PER ENGINE*	*APPROX PITCH +8*
5° FLAP & GEAR	*TORQUE*	*(44%) PER ENGINE*	*APPROX PITCH +9*
20° FLAP & GEAR	*TORQUE*	*(42%) PER ENGINE*	*APPROX PITCH +4*
40° FLAP & GEAR	*TORQUE*	*(54%) PER ENGINE*	*APPROX PITCH 0*

** NOTE: POWER SETTINGS WILL VARY WITH AIRCRAFT WEIGHT AND ALTITUDE.

STALL SPEEDS (APPROXIMATE)
AT MAXIMUM GROSS TAKEOFF WEIGHT
J, K, L, M

ANGLE OF BANK	J / L / K / M 0°	J / L / K / M 15°
FLAPS		
UP	104/106/101/104	107/108/103/106
5°	98/ 99/ 95/ 98	100/101/ 97/100
20°	86/ 87/ 85/ 87	88/ 89/ 87/ 89
40°	79/ 81/ 76/ 78	82/ 83/ 78/ 80

Vmc FLAPS 5° 99KCAS (J, L), 100KCAS (K, M)
FLAPS 20° 90KCAS (J), 99KCAS (L), 93KCAS (K, M)

CAUTION

STALL WARNING MAY ACTIVATE
4 TO 9 KTS ABOVE STALL

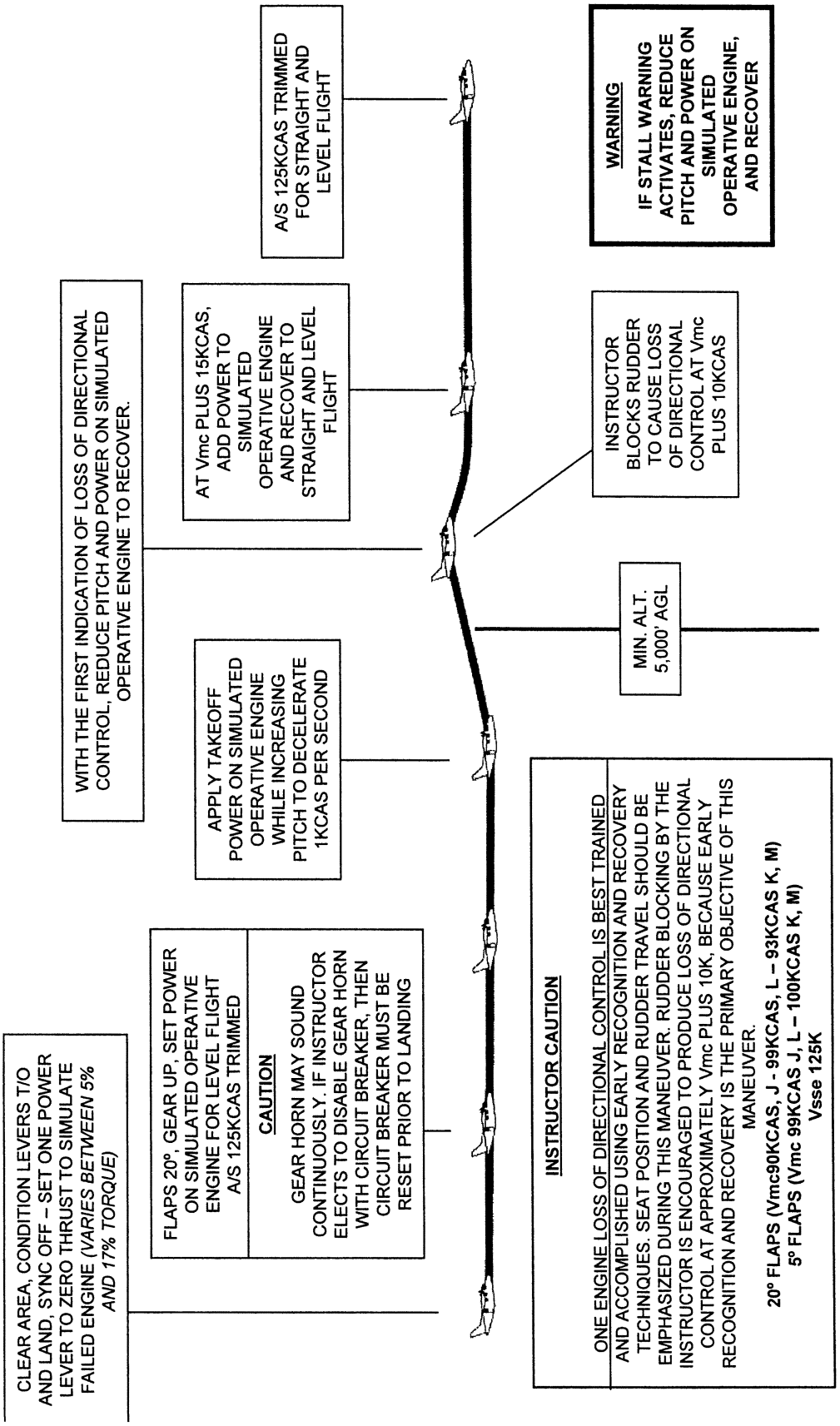
MINIMUM CONTROLLABLE AIRSPEED IS CONDUCTED AS FOLLOWS:

CLEAR THE AREA PRIOR TO BEGINNING THE MANEUVER.

THE MANEUVER MAY BE DONE IN ANY COMBINATION OF GEAR OR FLAP CONFIGURATIONS. IF BANK IS TO BE USED, IT SHOULD BE DONE AT BANK OF NOT MORE THAN 10°. BEGIN THE MANEUVER BY CONFIGURING THE AIRCRAFT IN THE DESIRED GEAR AND FLAP CONFIGURATION. SLOW THE AIRCRAFT UNTIL THE STALL WARNING (STICK SHAKER) IS ACTIVATED AND ADD POWER TO MAINTAIN ALTITUDE AND A SPEED JUST ABOVE AERODYNAMIC STALL. DO NOT ALLOW THE AIRCRAFT TO REACH AERODYNAMIC STALL BUFFET.

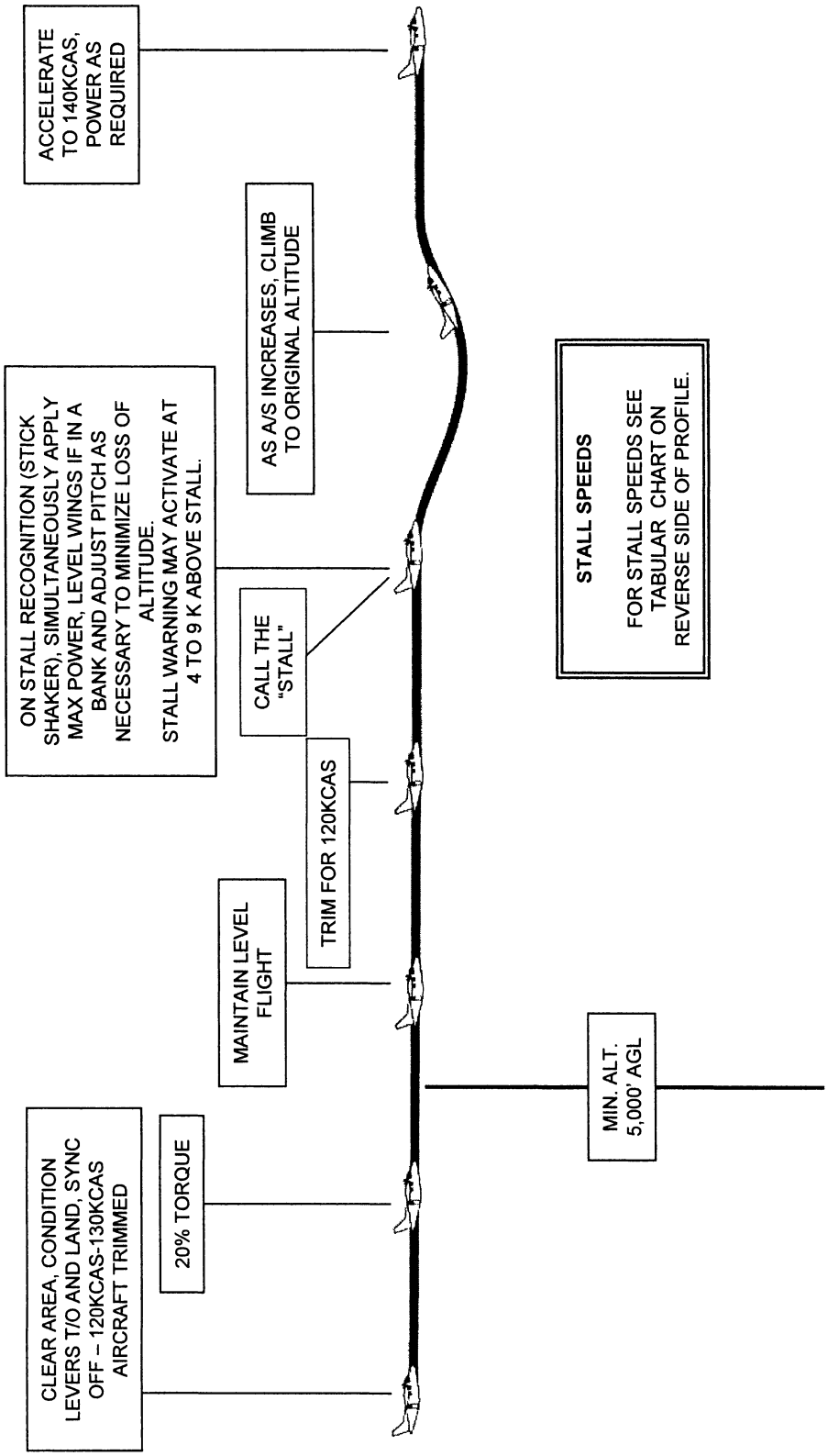
MU-2B J (-35), K (-25), L (-36), M (-26)

ONE ENGINE INOPERATIVE MANEUVERING LOSS OF DIRECTIONAL CONTROL



MU-2B J (-35), K (-25), L (-36), M (-26)

APPROACH TO STALL CLEAN CONFIGURATION / WINGS LEVEL



B–8

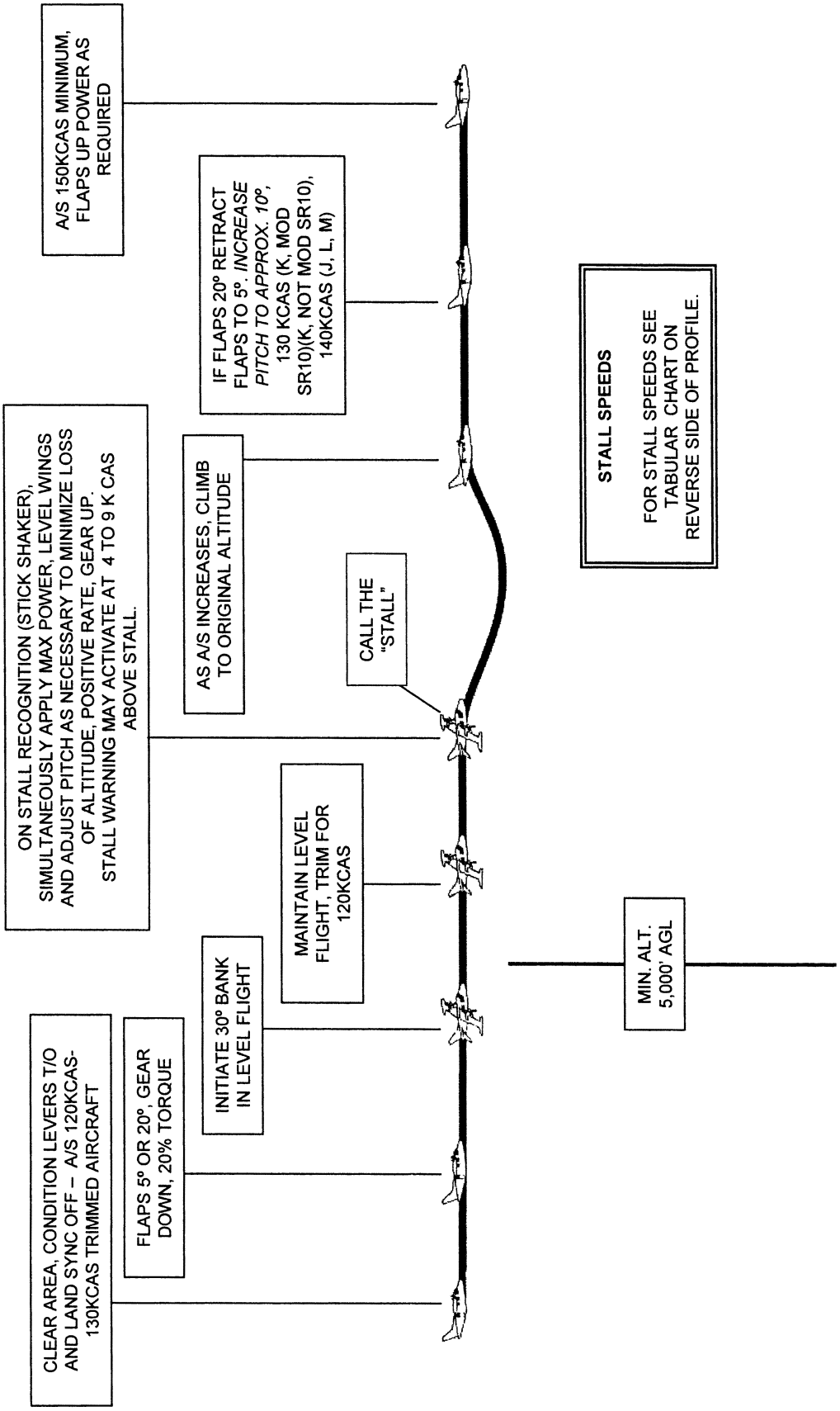
STALL SPEEDS

FLAPS SET	0	5	20	40
GR.WT.	K / M / J / L	K / M / J / L	K / M / J / L	K / M / J / L
7,000	85/ 85/	80/ 80/	72/ 72/	64/ 64/
7,500	88 / 88/	83/ 83/	74/ 75/	67/ 66/
8,000	91/ 91/ 90/	86/ 85/ 84/	77/ 77/ 74/	69/ 68/ 69
8,500	94/ 94/ 93/	89/ 88/ 87/	79/ 79/ 77/	71/ 70/ 71/
9,000	97/ 96/ 95/ 93	91/ 91/ 89/ 88	82/ 81/ 79/ 77	73/ 72/ 73/ 72
9,500	99 /99/ 98/ 96	93/ 93/ 92/ 90	84/ 83/ 81/ 79	75/ 74/ 75/ 74
9,920	101/	95/	85/	76/
10,000	/102/100/ 98	/ 96/ 94/ 92	/ 86/ 84/ 81	/ 76/ 77/ 76
10,470	/104/	/ 98/	/ 88/	/ 78/
10,500	/103/101	/ 96/ 94	/ 85/ 83	/ 79/ 77
10,800	/104/	/ 98/	/ 86/	/ 80/ 78
11,000	/103	/ 97	/ 85	/ 79
11,500	/106	/ 99	/ 87	/ 81

MU-2B J (-35), K (-25), L (-36), M (-26)

APPROACH TO STALL

TAKEOFF CONFIGURATION 15-30° BANK



B-9

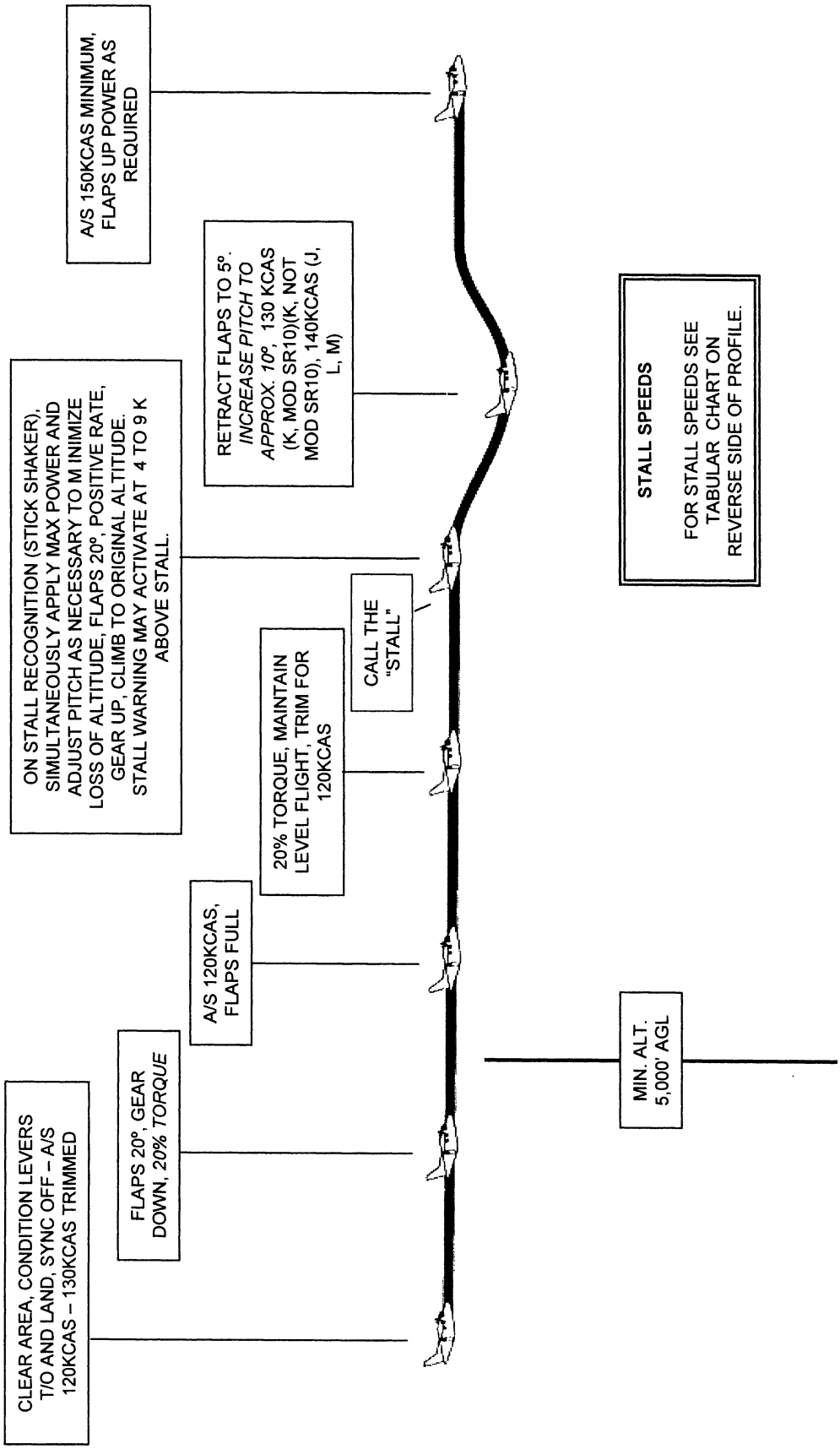
STALL SPEEDS (APPROXIMATE)
AT MAXIMUM GROSS TAKEOFF WEIGHT
J, K, L, M

BANK ANGLE	10	20	30	40	50	60
FLAPS	J / L / K / M	J / L / K / M	J / L / K / M	J / L / K / M	J / L / K / M	J / L / K / M
UP	106/107/102/105	108/109/105/108	112/114/109/112	120/121/116/120	130/132/126/130	148/150/143/147
5°	99/100/ 96/ 98	101/102/ 98/101	105/107/102/105	112/113/109/112	122/123/119/122	138/140/134/138
20°	87/ 88/ 86/ 88	89/ 90/ 88/ 90	92 /94/ 92/ 94	98/100/ 97/100	108/109/107/109	122/123/120/123
40°	81/ 82/ 77/ 79	83/ 84/ 79/ 81	86/ 87/ 82/ 84	92/ 93/ 87/ 90	100/102/ 96/ 98	112/115/108/110

MU-2B J (-35), K (-25), L (-36), M (-26)

APPROACH TO STALL

GEAR DOWN – FULL FLAPS



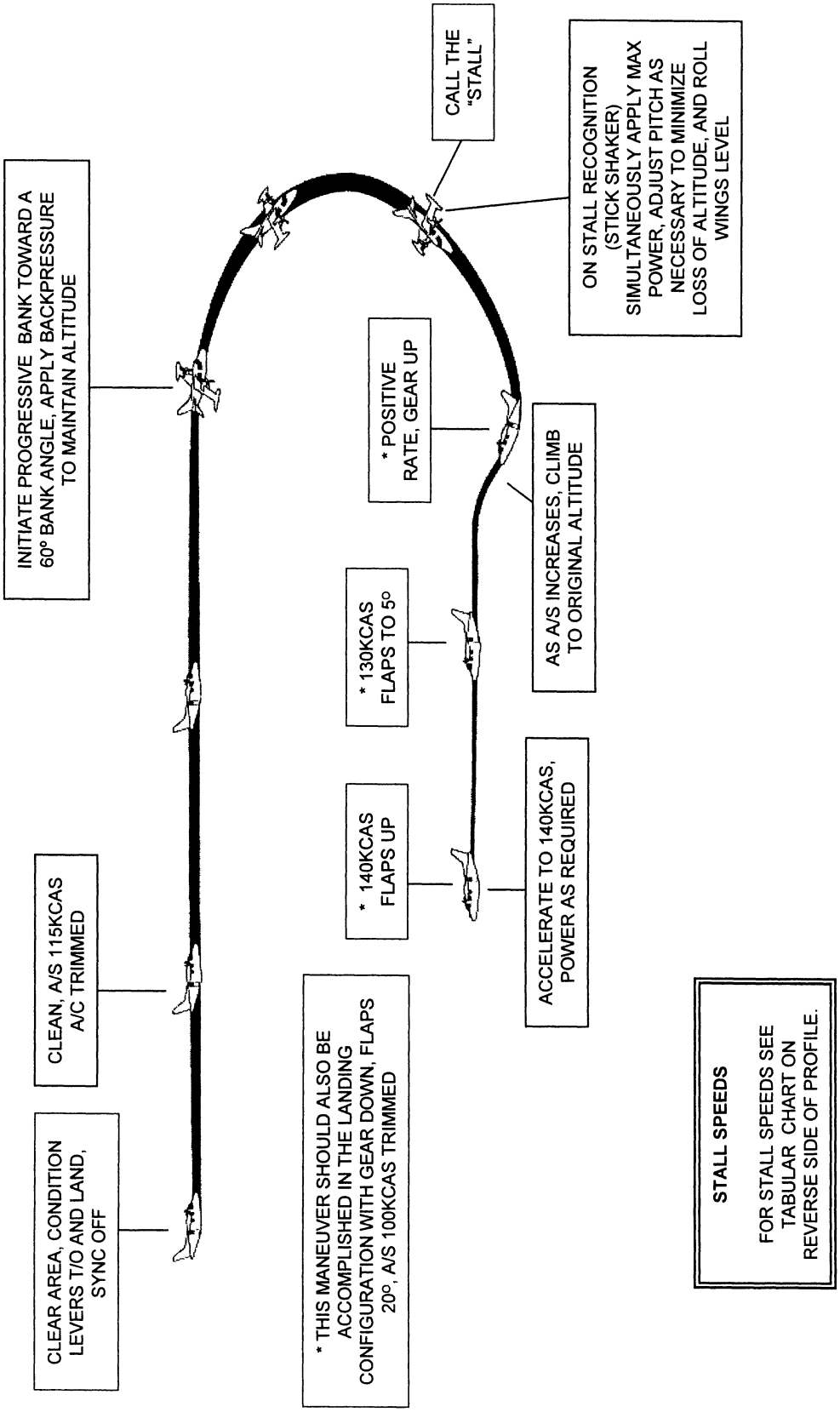
B-10

STALL SPEEDS

FLAPS SET	0	5	20	40
GR.WT.	K / M / J / L	K / M / J / L	K / M / J / L	K / M / J / L
7,000	85/ 85/	80/ 80/	72/ 72/	64/ 64/
7,500	88 / 88/	83/ 83/	74/ 75/	67/ 66/
8,000	91/ 91/ 90/	86/ 85/ 84/	77/ 77/ 74/	69/ 68/ 69
8,500	94/ 94/ 93/	89/ 88/ 87/	79/ 79/ 77/	71/ 70/ 71/
9,000	97/ 96/ 95/ 93	91/ 91/ 89/ 88	82/ 81/ 79/ 77	73/ 72/ 73/ 72
9,500	99 /99/ 98/ 96	93/ 93/ 92/ 90	84/ 83/ 81/ 79	75/ 74/ 75/ 74
9,920	101/	95/	85/	76/
10,000	/102/100/ 98	/ 96/ 94/ 92	/ 86/ 84/ 81	/ 76/ 77/ 76
10,470	/104/	/ 98/	/ 88/	/ 78/
10,500	/103/101	/ 96/ 94	/ 85/ 83	/ 79/ 77
10,800	/104/	/ 97/	/ 86/	/ 80/ 78
11,000	/103	/ 97	/ 85	/ 79
11,500	/106	/ 99	/ 87	/ 81

MU-2B J (-35), K (-25), L (-36), M (-26)

ACCELERATED STALLS



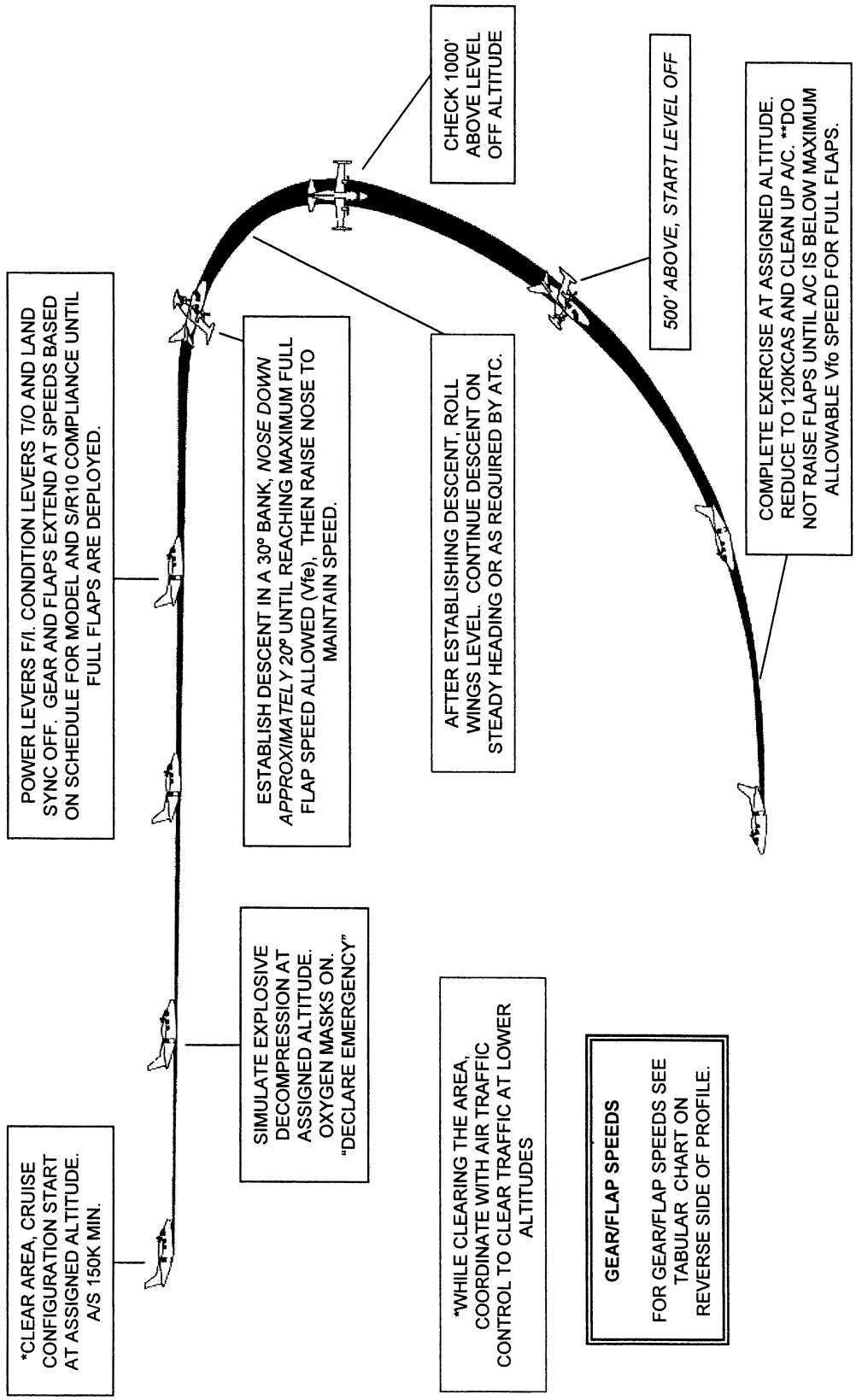
B-11

STALL SPEEDS (APPROXIMATE)
AT MAXIMUM GROSS TAKEOFF WEIGHT
J, K, L, M

BANK ANGLE	10	20	30	40	50	60
FLAPS	J / L / K / M	J / L / K / M	J / L / K / M	J / L / K / M	J / L / K / M	J / L / K / M
UP	106/107/102/105	108/109/105/108	112/114/109/112	120/121/116/120	130/132/126/130	148/150/143/147
5°	99/100/ 96/ 98	101/102/ 98/101	105/107/102/105	112/113/109/112	122/123/119/122	138/140/134/138
20°	87/ 88/ 86/ 88	89/ 90/ 88/ 90	92 /94/ 92/ 94	98/100/ 97/100	108/109/107/109	122/123/120/123
40°	81/ 82/ 77/ 79	83/ 84/ 79/ 81	86/ 87/ 82/ 84	92/ 93/ 87/ 90	100/102/ 96/ 98	112/115/108/110

MU-2B J (-35), K (-25), L (-36), M (-26)

EMERGENCY DESCENT (LOW SPEED)



B-12

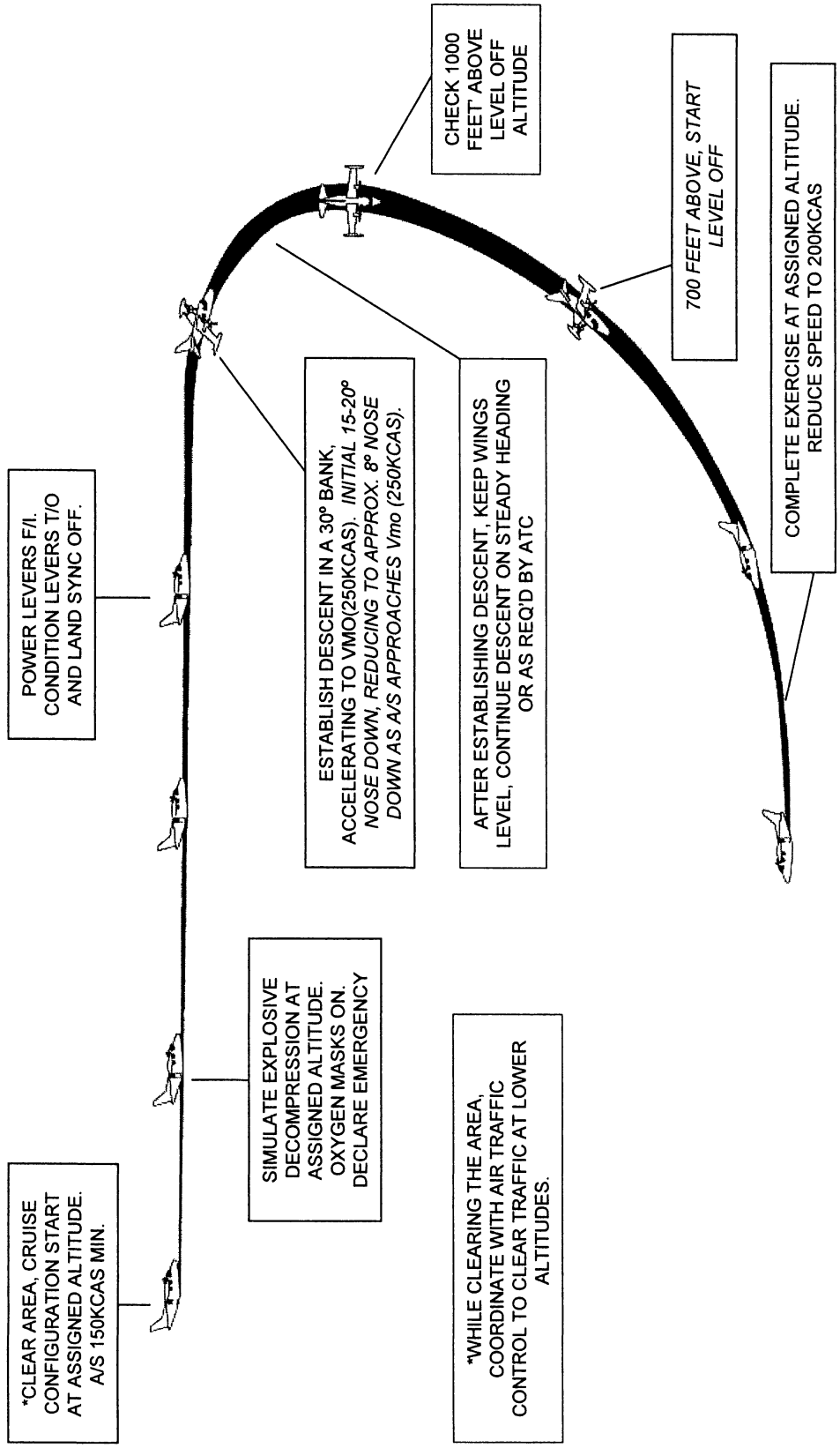
GEAR AND FLAP EXTEND SCHEDULE

(K+ AND J+ ARE MODIFIED BY S/R10)

GEAR			
K, K+:	**160KCAS**		
M, J, J+:	**170KCAS**		
L:	**175KCAS**		
FLAPS	**5º**	**20º**	**40º**
J: S/N 548 – 609 NOT MODIFIED BY S/R10	**146KCAS**	**146KCAS**	**120KCAS**
J+: S/N 548 – 609 MODIFIED BY S/R10 AND S/N 610 - 654	**175KCAS**	**146KCAS**	**120KCAS**
K: S/N 239 – 279 NOT MODIFIED BY S/R10	**140KCAS**	**140KCAS**	**120KCAS**
K+: S/N 239 – 279 MODIFIED BY S/R10 AND S/N 280 - 318	**175KCAS**	**140KCAS**	**120KCAS**
L / M	**175KCAS**	**155KCAS**	**120KCAS**

MU-2B J (-35), K (-25), L (-36), M (-26)

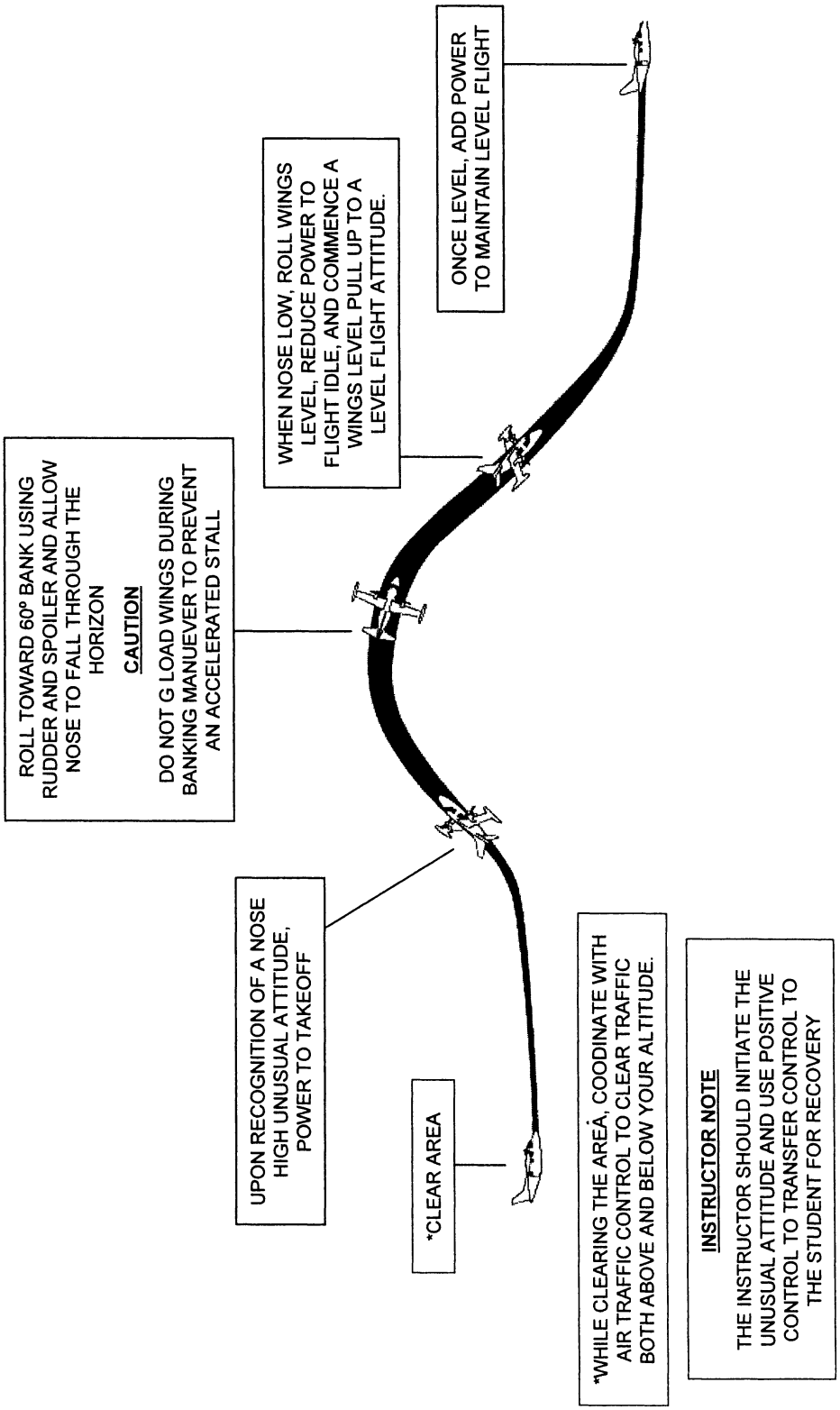
EMERGENCY DESCENT (HIGH SPEED)



B-13

MU-2B J (-35), K (-25), L (-36), M (-26)

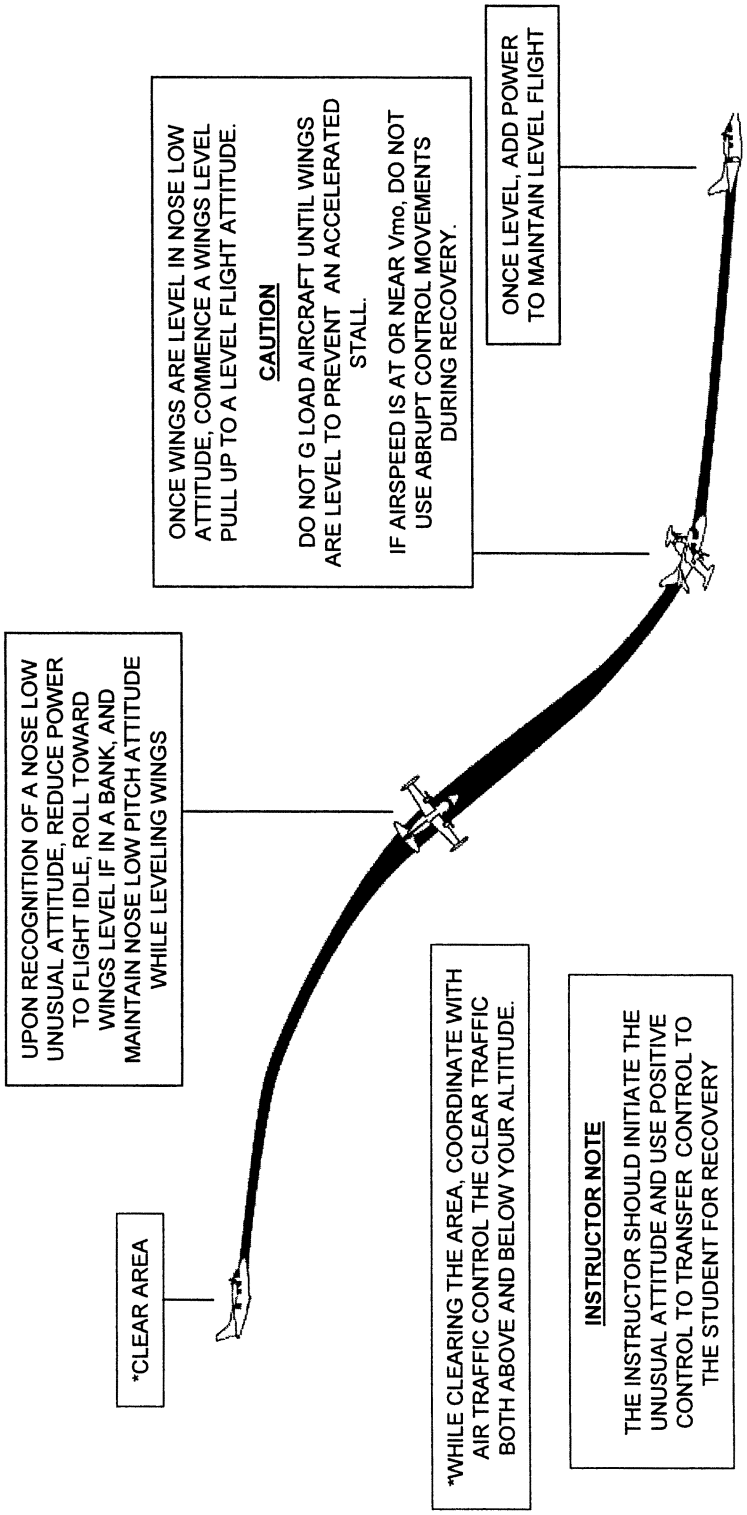
UNUSUAL ATTITUDE RECOVERY (NOSE HIGH)



B-14

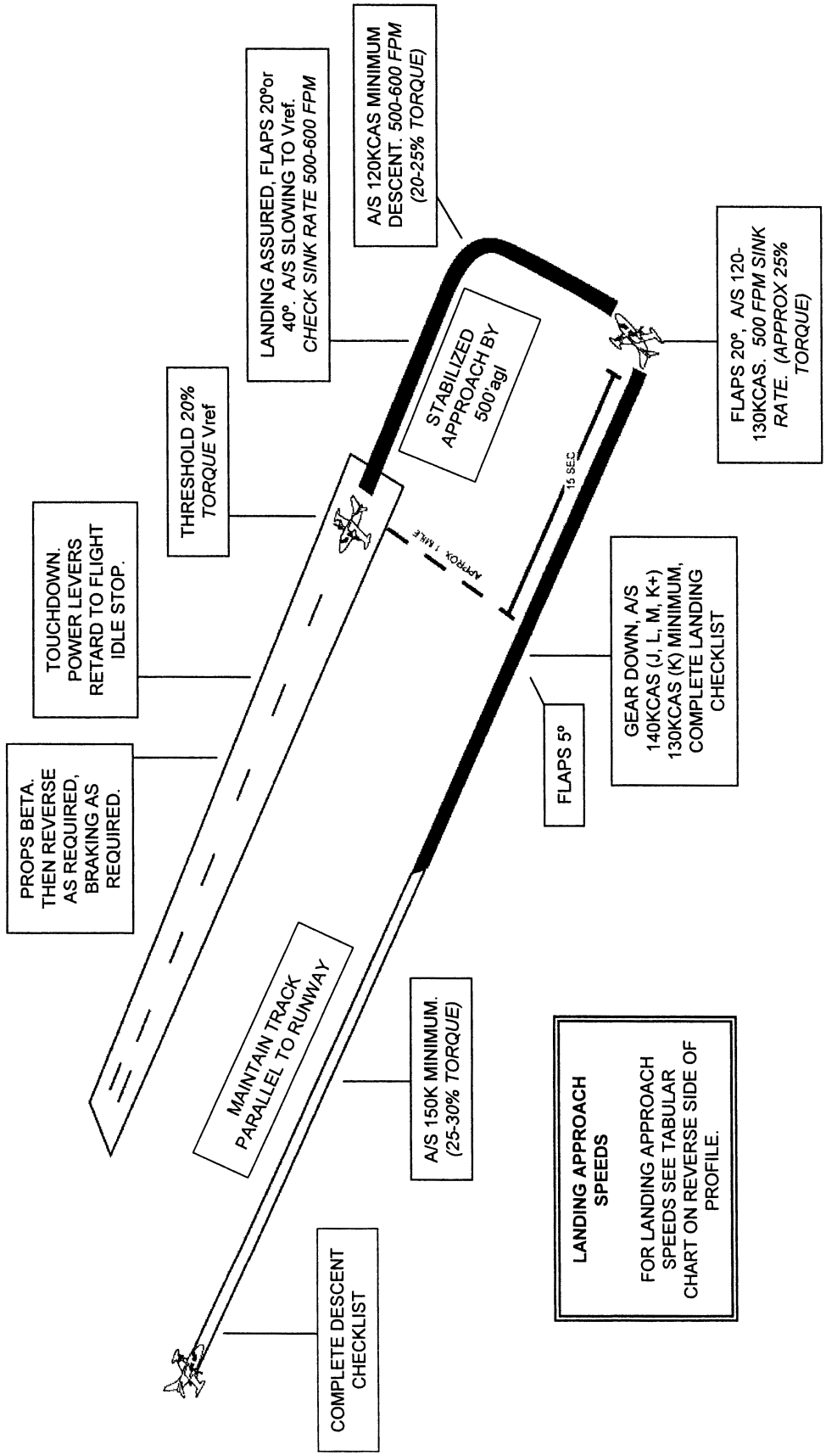
MU-2B J (-35), K (-25), L (-36), M (-26)

UNUSUAL ATTITUDE RECOVERY (NOSE LOW)



MU-2B J (-35), K (-25), L (-36), M (-26)

NORMAL LANDING (20°or 40° FLAPS)



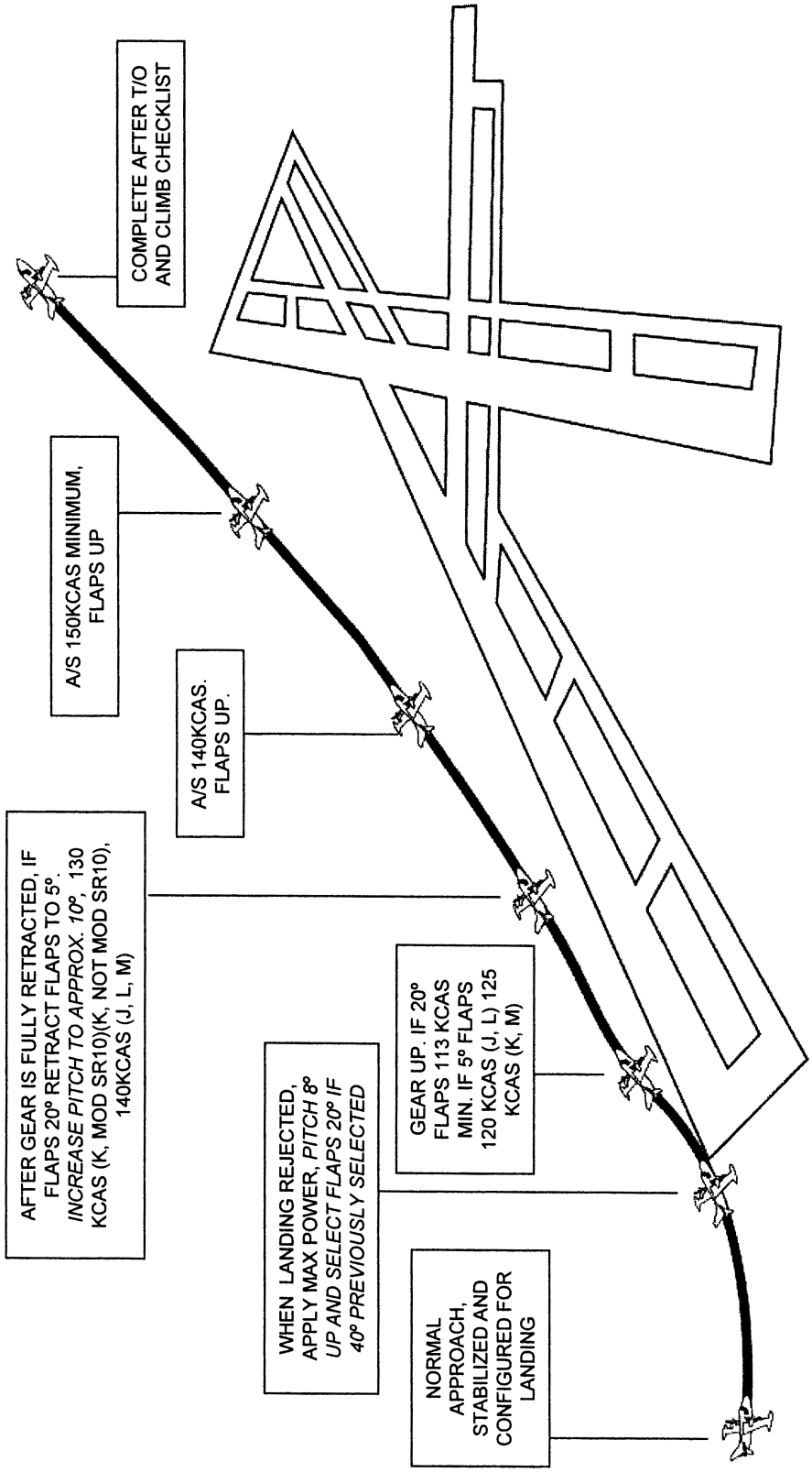
B-16

LANDING APPROACH SPEEDS Vref
J, K, L, M

	FLAPS 20° (1.3 VS1)				FLAPS 40° (1.5 VS1)			
WEIGHT	K	M	J	L	K	M	J	L
7,000	93	96				96		
7,500	96	100	93		99	100	100	
8,000	100	103	96		103	103	103	
8,500	103	106	100	99	106	106	106	105
9,000	106	109	103	99	109	109	109	108
9,435	108				112			
9,500		112	106	103		112	112	111
9,955		115				115		
10,000			109	105			115	114
10,260			110				117	
10,500				108				117
11,000				110				119
11,025				110				119

MU-2B J (-35), K (-25), L (-36), M (-26)

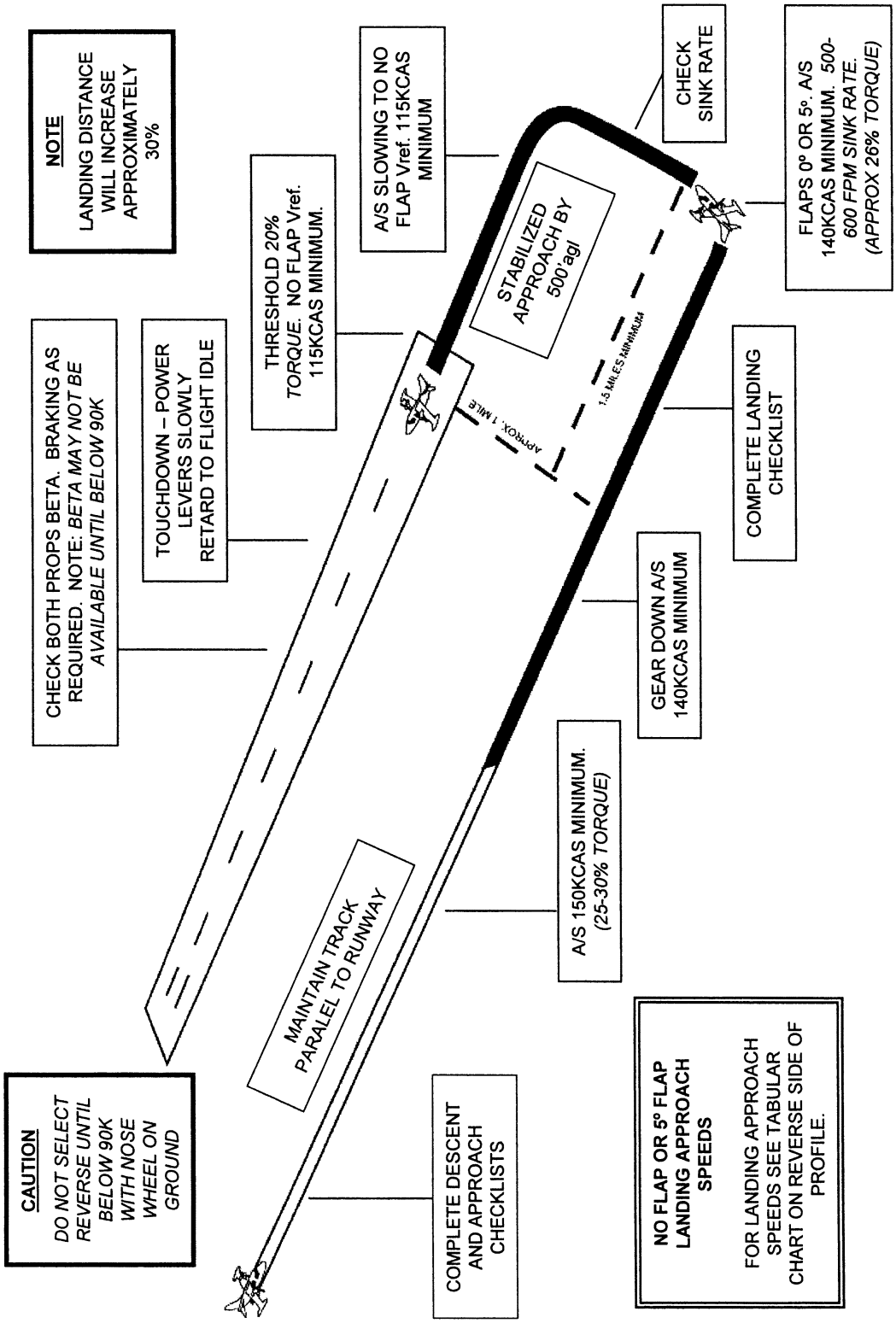
GO AROUND - REJECTED LANDING



B-17

MU-2B J (-35), K (-25), L (-36), M (-26)

NO FLAP OR 5° FLAP LANDING



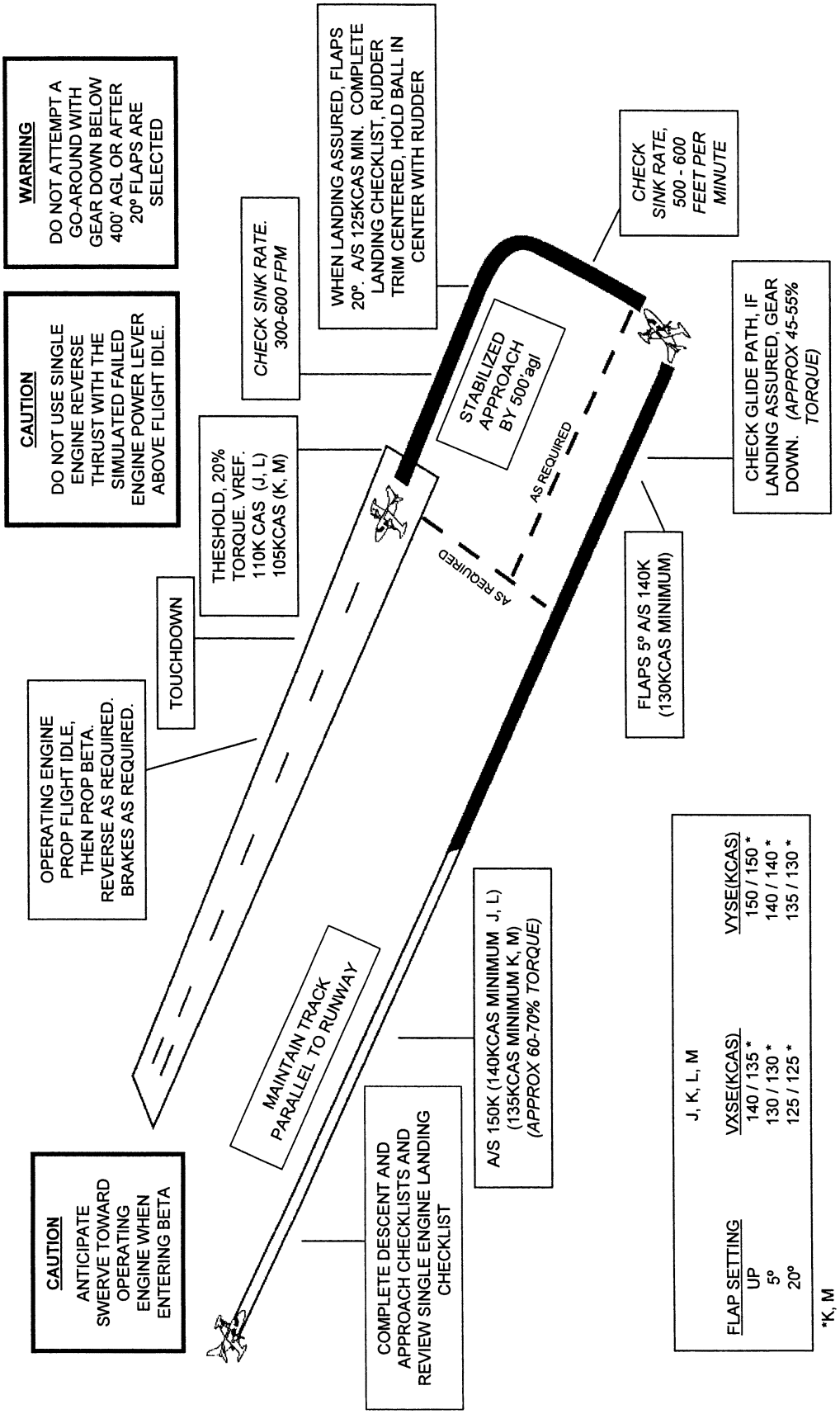
NO FLAP Vref 1.25 VS1
(BUT NOT BELOW 115KCAS)
USE FOR FLAP UP OR 5°

J, K, L, M

	FLAPS UP				FLAPS 5°			
WEIGHT	J	K	L	M	J	K	L	M
7,500		115				115		
8.000	115	115		115	115	115		115
8.500	117	118		118	115	115		115
9.000	119	122	117	120	115	115	115	115
9,435		124				117		
9.500	123		120	124	115		115	117
9.955				127				119
10.000	125		123		118		115	
10.260	128							
10.500			127				118	
11,000			129				124	
11.025			129				124	

MU-2B J (-35), K (-25), L (-36), M (-26)

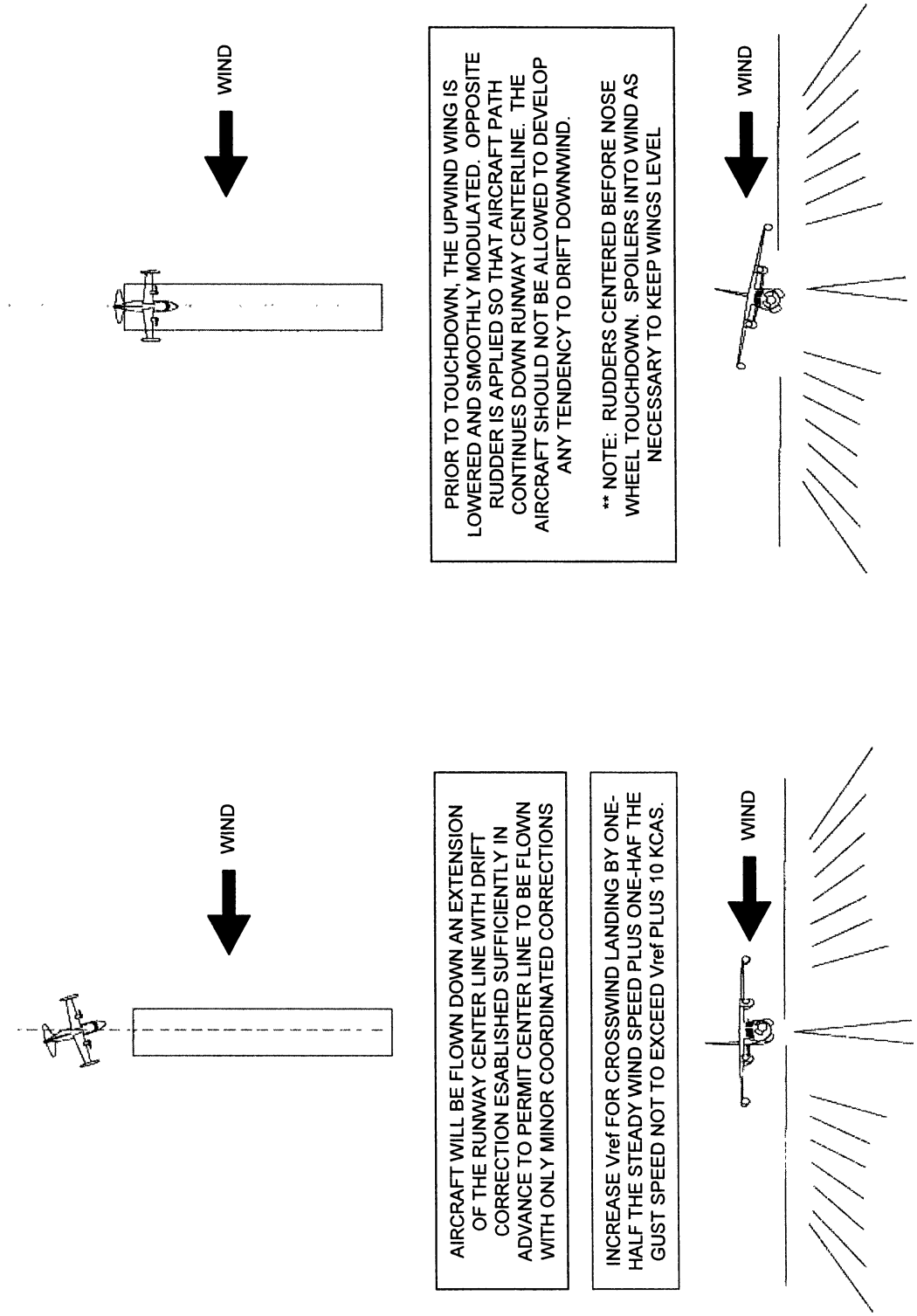
ONE ENGINE INOPERATIVE LANDING



B-19

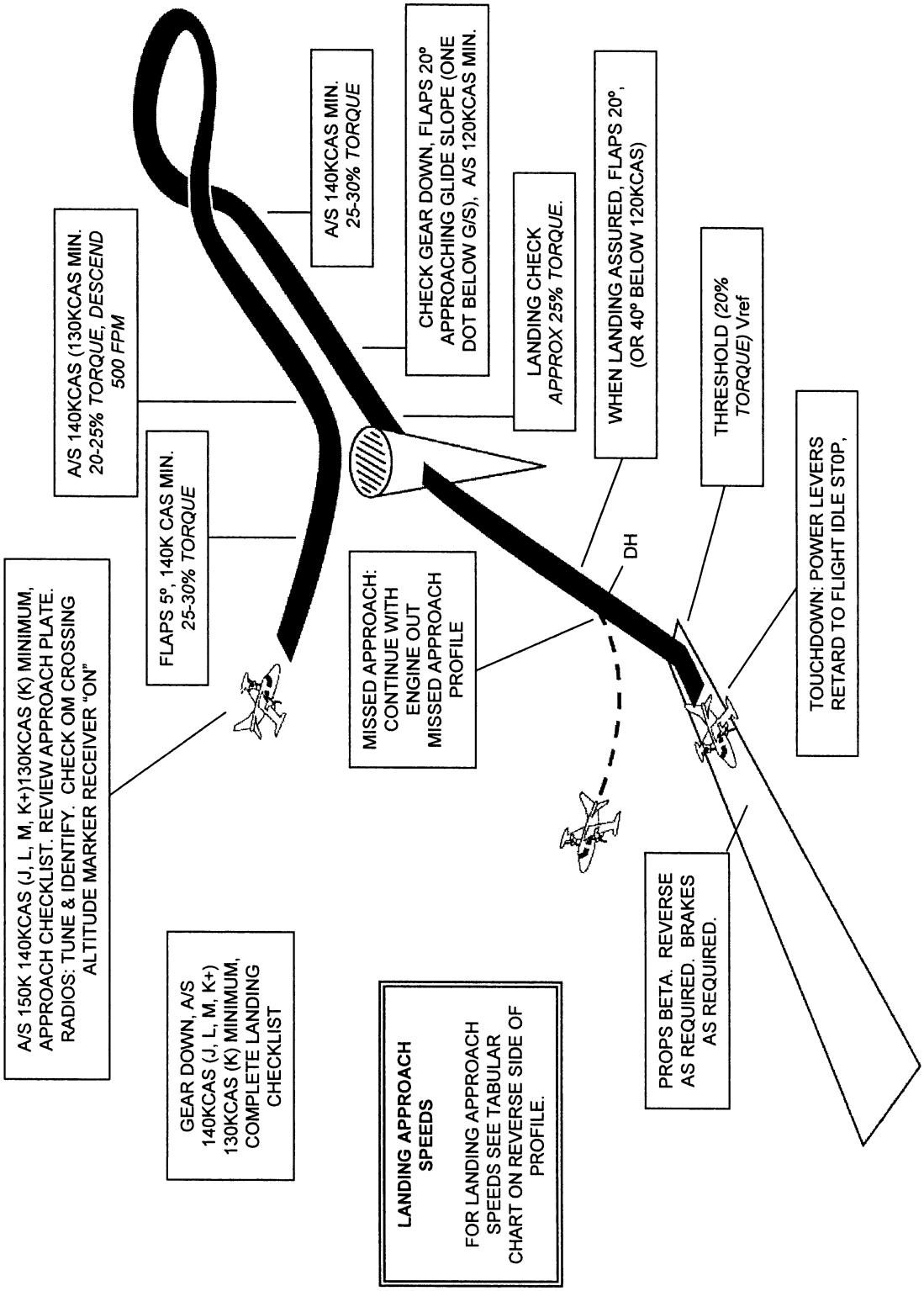
MU-2B J (-35), K (-25), L (-36), M (-26)

CROSSWIND LANDING



MU-2B J (-35), K (-25), L (-36), M (-26)

ILS AND MISSED APPROACH



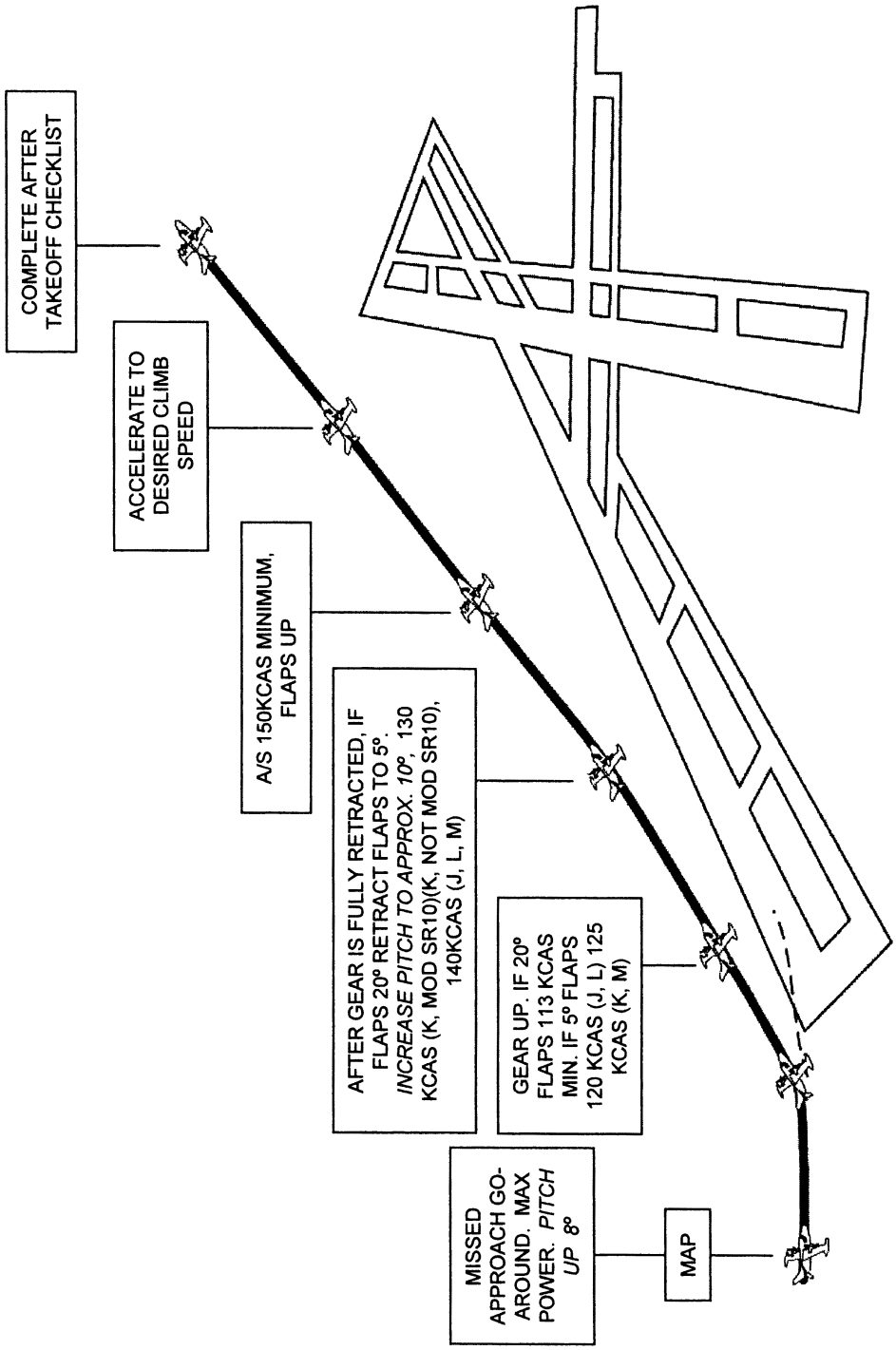
B-21

LANDING APPROACH SPEEDS Vref
J, K, L, M

	FLAPS 20° (1.3 VS1)				FLAPS 40° (1.5 VS1)			
WEIGHT	K	M	J	L	K	M	J	L
7,000	93	96				96		
7,500	96	100	93		99	100	100	
8,000	100	103	96		103	103	103	
8,500	103	106	100	99	106	106	106	105
9,000	106	109	103	99	109	109	109	108
9,435	108				112			
9,500		112	106	103		112	112	111
9,955		115				115		
10,000			109	105			115	114
10,260			110				117	
10,500				108				117
11,000				110				119
11,025				110				119

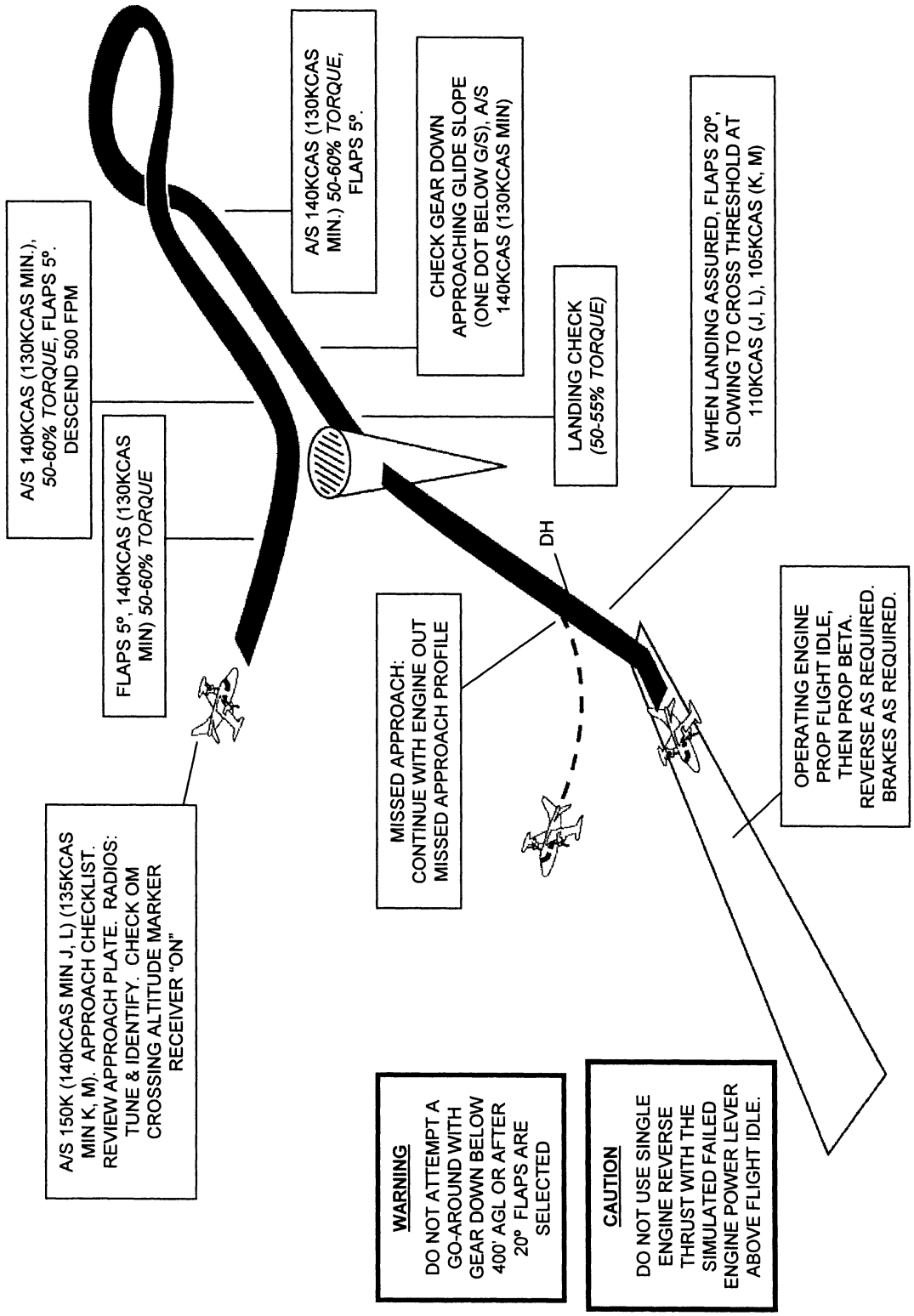
MU-2B J (-35), K (-25), L (-36), M (-26)

TWO ENGINE MISSED APPROACH



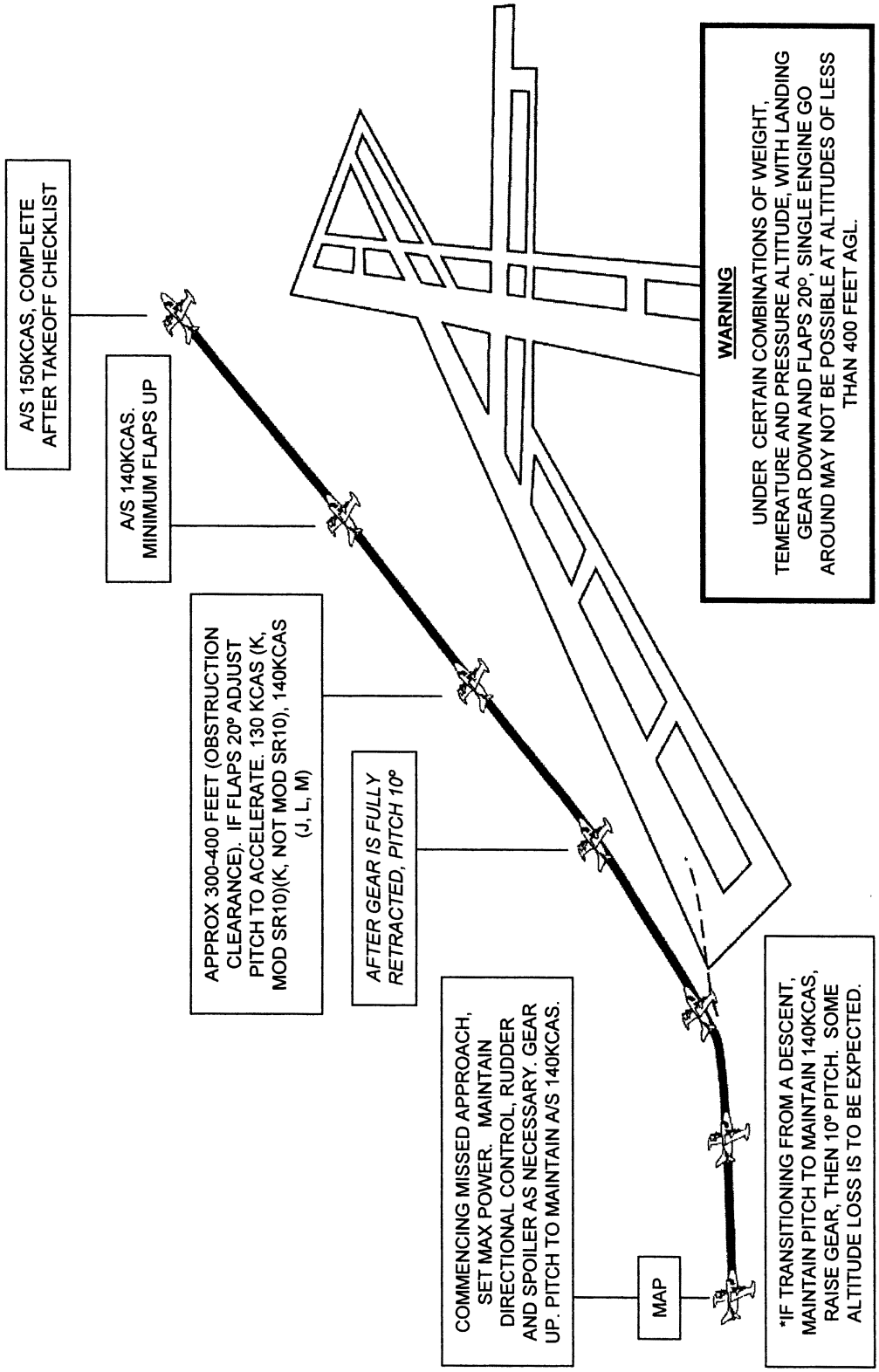
MU-2B J (-35), K (-25), L (-36), M (-26)

ONE ENGINE INOPERATIVE ILS AND MISSED APPROACH



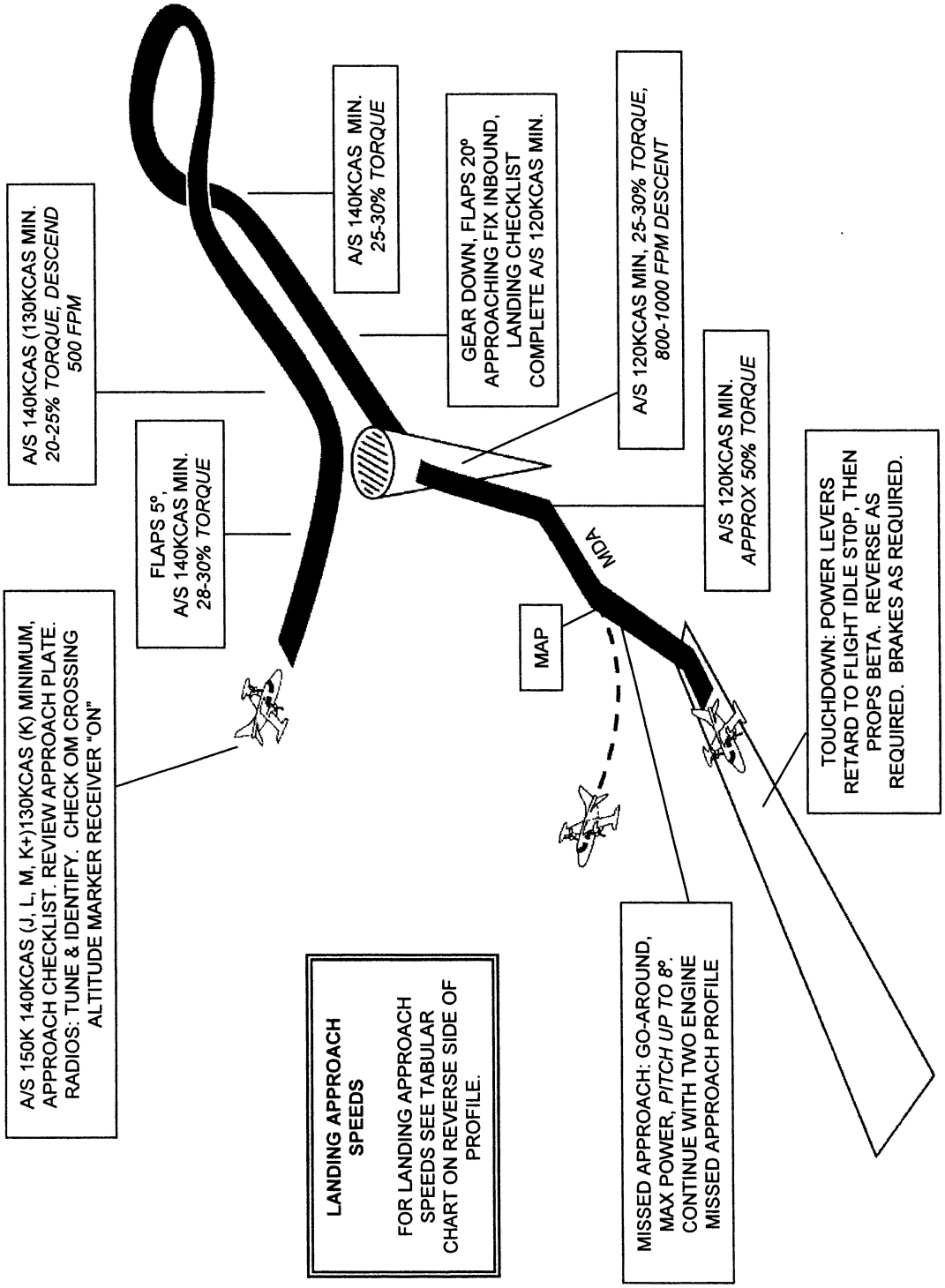
MU-2B J (-35), K (-25), L (-36), M (-26)

ONE ENGINE INOPERATIVE MISSED APPROACH



MU-2B J (-35), K (-25), L (-36), M (-26)

NON-PRECISION AND MISSED APPROACH



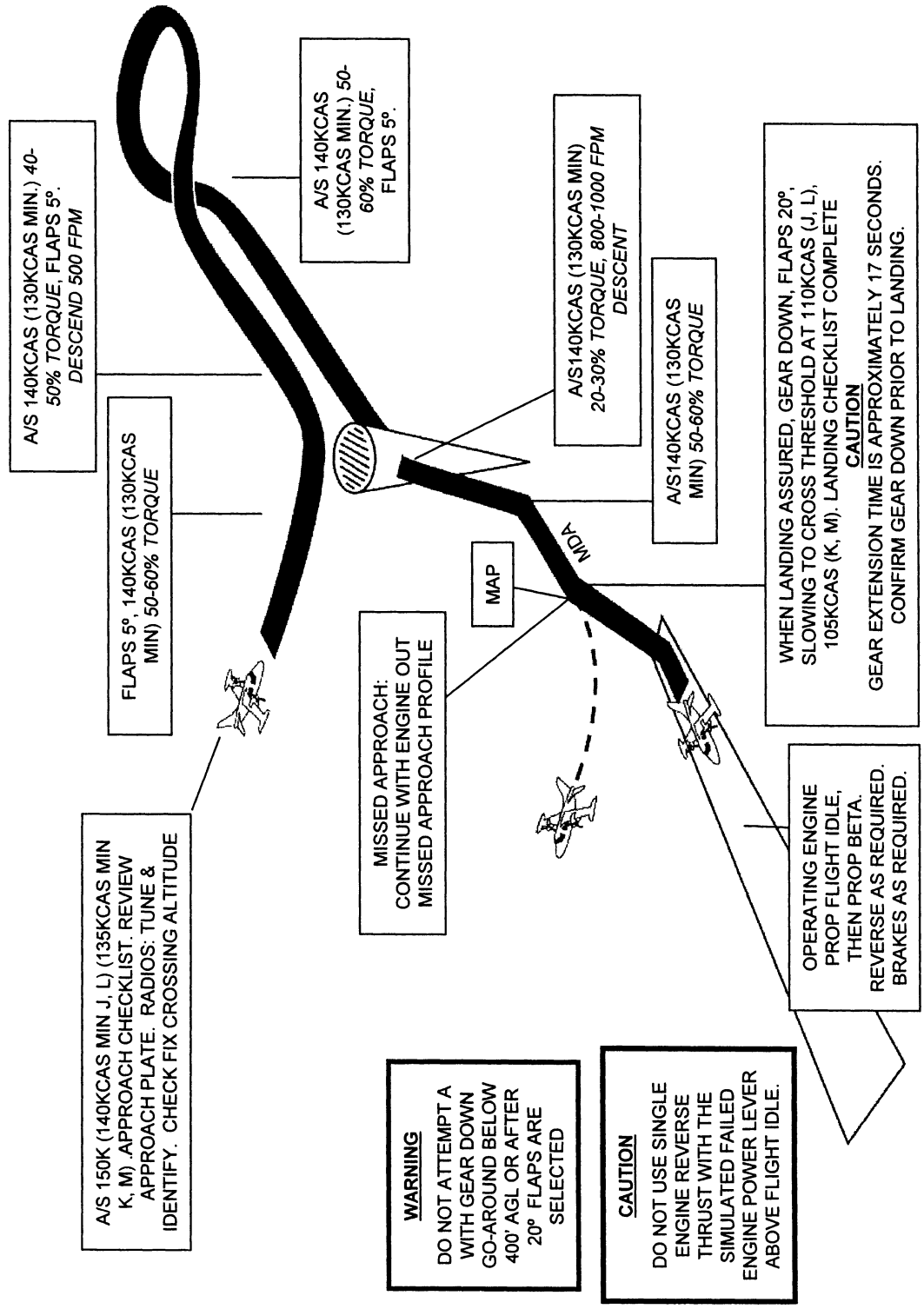
B-25

LANDING APPROACH SPEEDS Vref
J, K, L, M

	FLAPS 20° (1.3 VS1)				FLAPS 40° (1.5 VS1)			
WEIGHT	K	M	J	L	K	M	J	L
7,000	93	96				96		
7,500	96	100	93		99	100	100	
8,000	100	103	96		103	103	103	
8,500	103	106	100	99	106	106	106	105
9,000	106	109	103	99	109	109	109	108
9,435	108				112			
9,500		112	106	103		112	112	111
9,955		115				115		
10,000			109	105			115	114
10,260			110				117	
10,500				108				117
11,000				110				119
11,025				110				119

MU-2B J (-35), K (-25), L (-36), M (-26)

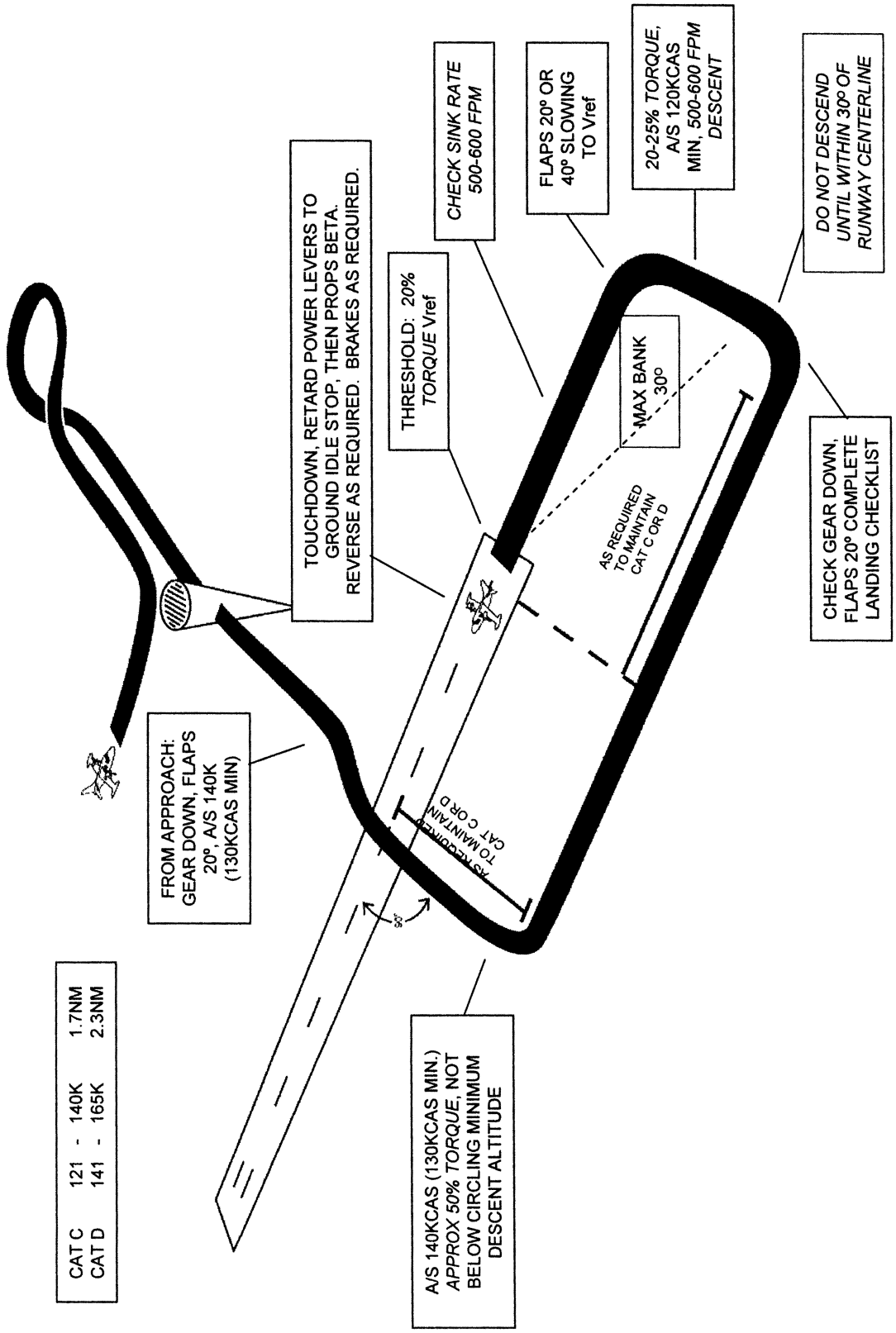
ONE ENGINE INOPERATIVE NON-PRECISION AND MISSED APPROACH



B-26

MU-2B J (-35), K (-25), L (-36), M (-26)

CIRCLING APPROACH AT WEATHER MINIMUMS



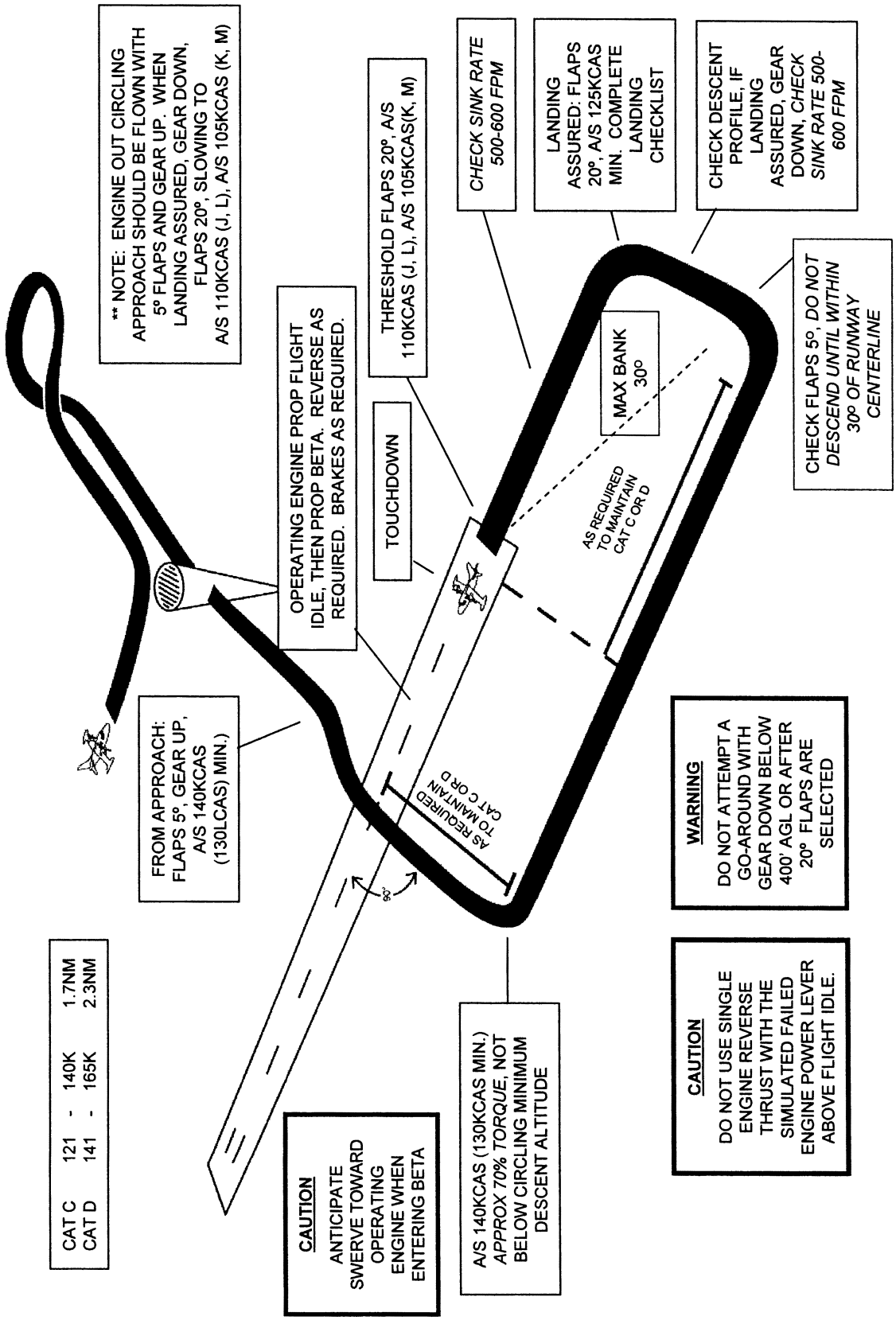
B-27

LANDING APPROACH SPEEDS Vref
J, K, L, M

	FLAPS 20° (1.3 VS1)				FLAPS 40° (1.5 VS1)			
WEIGHT	K	M	J	L	K	M	J	L
7,000	93	96				96		
7,500	96	100	93		99	100	100	
8,000	100	103	96		103	103	103	
8,500	103	106	100	99	106	106	106	105
9,000	106	109	103	99	109	109	109	108
9,435	108				112			
9,500		112	106	103		112	112	111
9,955		115				115		
10,000			109	105			115	114
10,260			110				117	
10,500				108				117
11,000				110				119
11,025				110				119

MU-2B J (-35), K (-25), L (-36), M (-26)

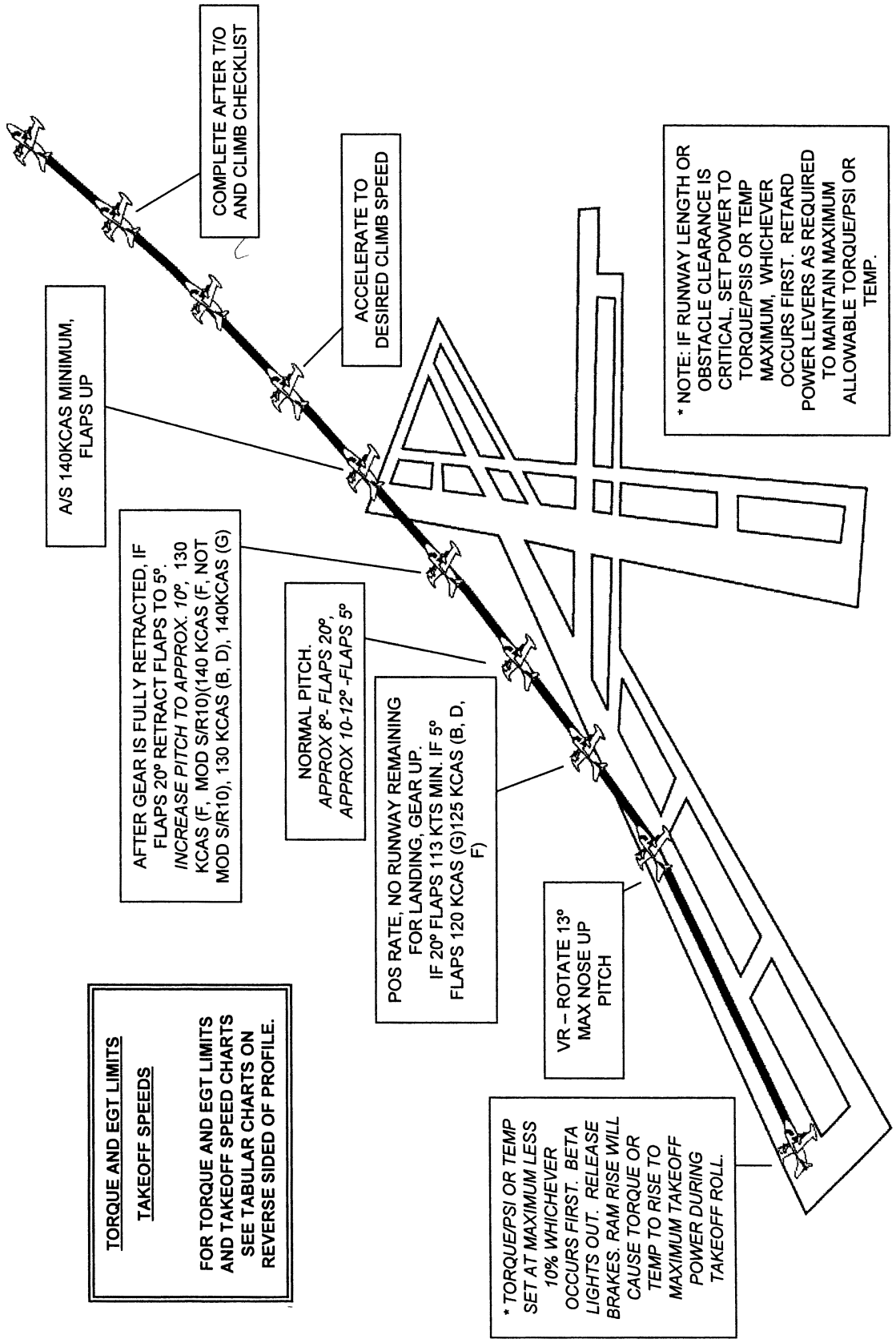
ONE ENGINE INOPERATIVE CIRCLING APPROACH AT WEATHER MINIMUMS



B-28

MU-2B B, D (-10), F (-20), G (-30)

NORMAL TAKE-OFF, 5º OR 20º FLAPS



C-1

TORQUE LIMITS

B, D	64 PSI
F, G	60 PSI (STATIC)
	64 PSI (RAM CONDITIONS 5 MINUTES

EGT LIMITS DEPEND ON OUTSIDE AIR TEMPERATURE, CHECK EGT LIMITS PRIOR TO DEPARTURE.

TAKE OFF SPEEDS
ROTATE

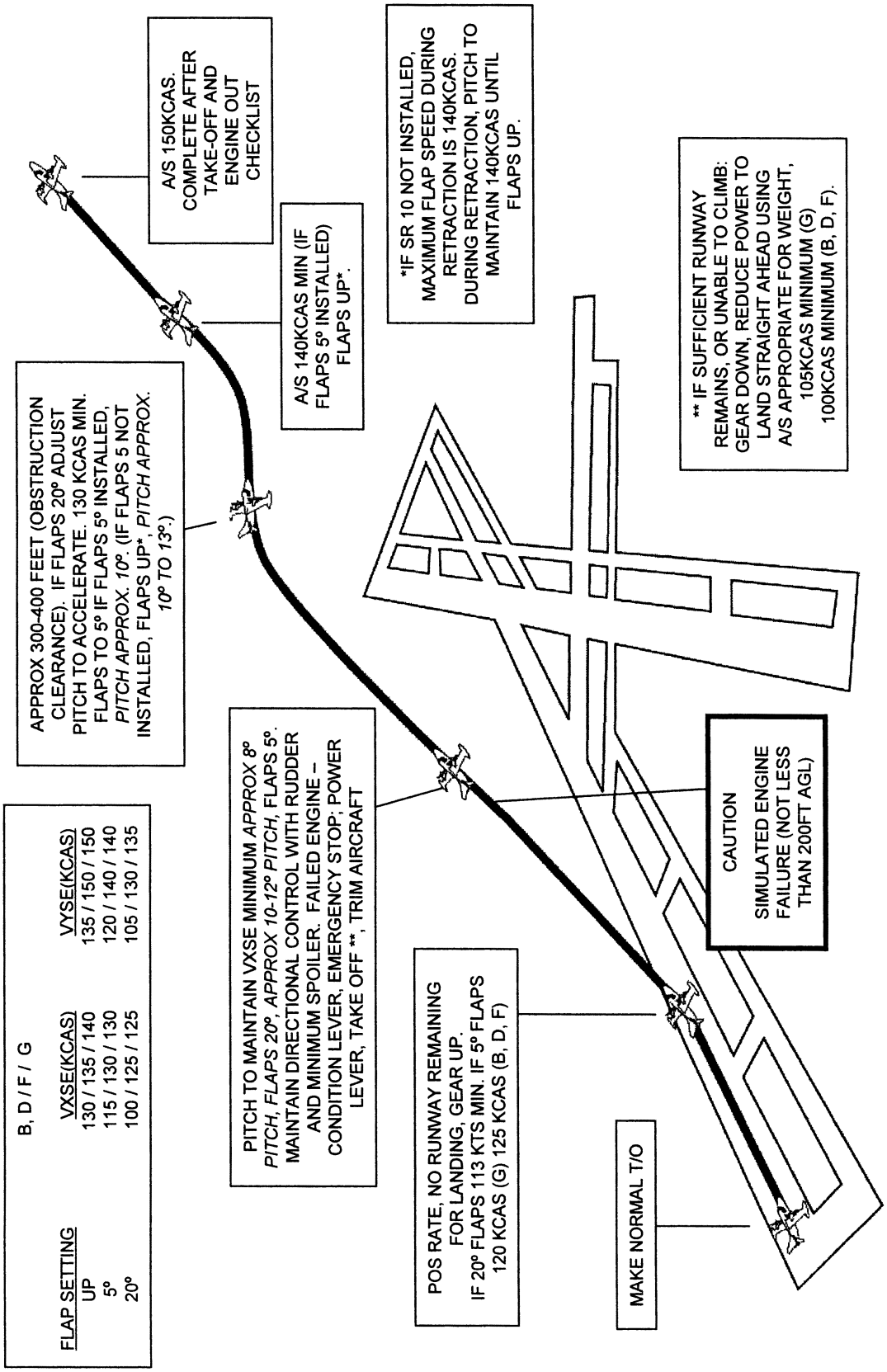
FLAPS 5°	B	B+	D	F	G
10,800 LBS					109
10,000 LBS					105
9,920 LBS				108	
9,500 LBS				107	103
9,350 LBS		111	111		
9,000 LBS		110	110	106	101
8,930 LBS	109				
8,000 LBS	107	107	107	104	100
7,500 LBS	106	106	106	102	
7,000 LBS	104	104	104		

FLAPS 20°	B	B+	D	F	G
10,800 LBS					105
10,000 LBS					102
9,920 LBS				102	
9,500 LBS				101	101
9,350 LBS		104	104		
9,000 LBS		103	103	100	100
8,930 LBS	103				
8,000 LBS	101	101	101	99	100
7,500 LBS	100	100	100	98	
7,000 LBS	99	99	99		

B: NOT MODIFIED BYH S/B 036 AND S/B 092
B+: MODIFIED BY S/B 036 AND S/B 092

MU-2B B, D (-10), F (-20), G (-30)

TAKE-OFF ENGINE FAILURE – FLAPS 5º OR 20º



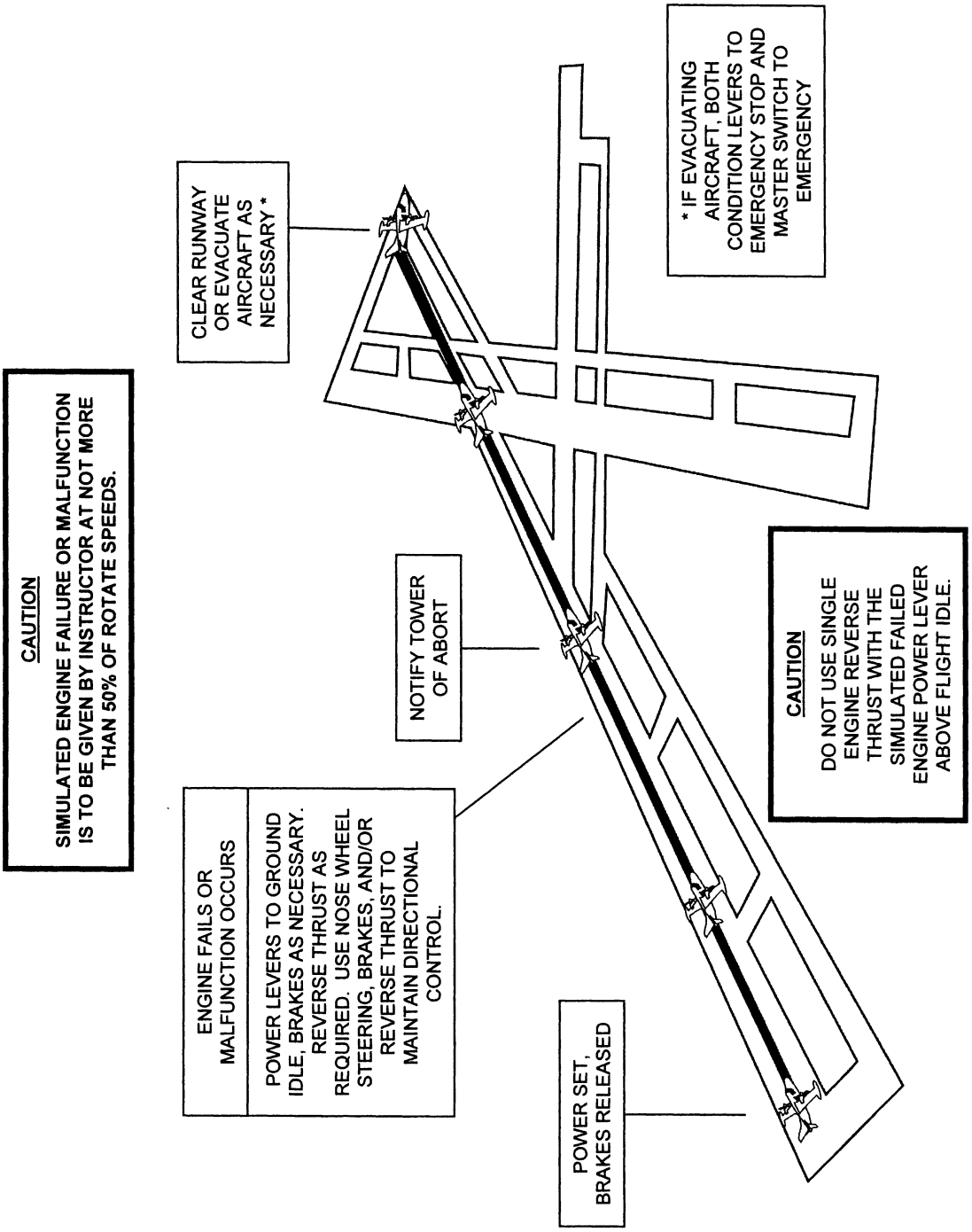
B, D / F / G

FLAP SETTING	VXSE(KCAS)	VYSE(KCAS)
UP	130 / 135 / 140	135 / 150 / 150
5º	115 / 130 / 130	120 / 140 / 140
20º	100 / 125 / 125	105 / 130 / 135

C-2

MU-2B B, D (-10), F (-20), G (-30)

TAKE-OFF ENGINE FAILURE ON RUNWAY

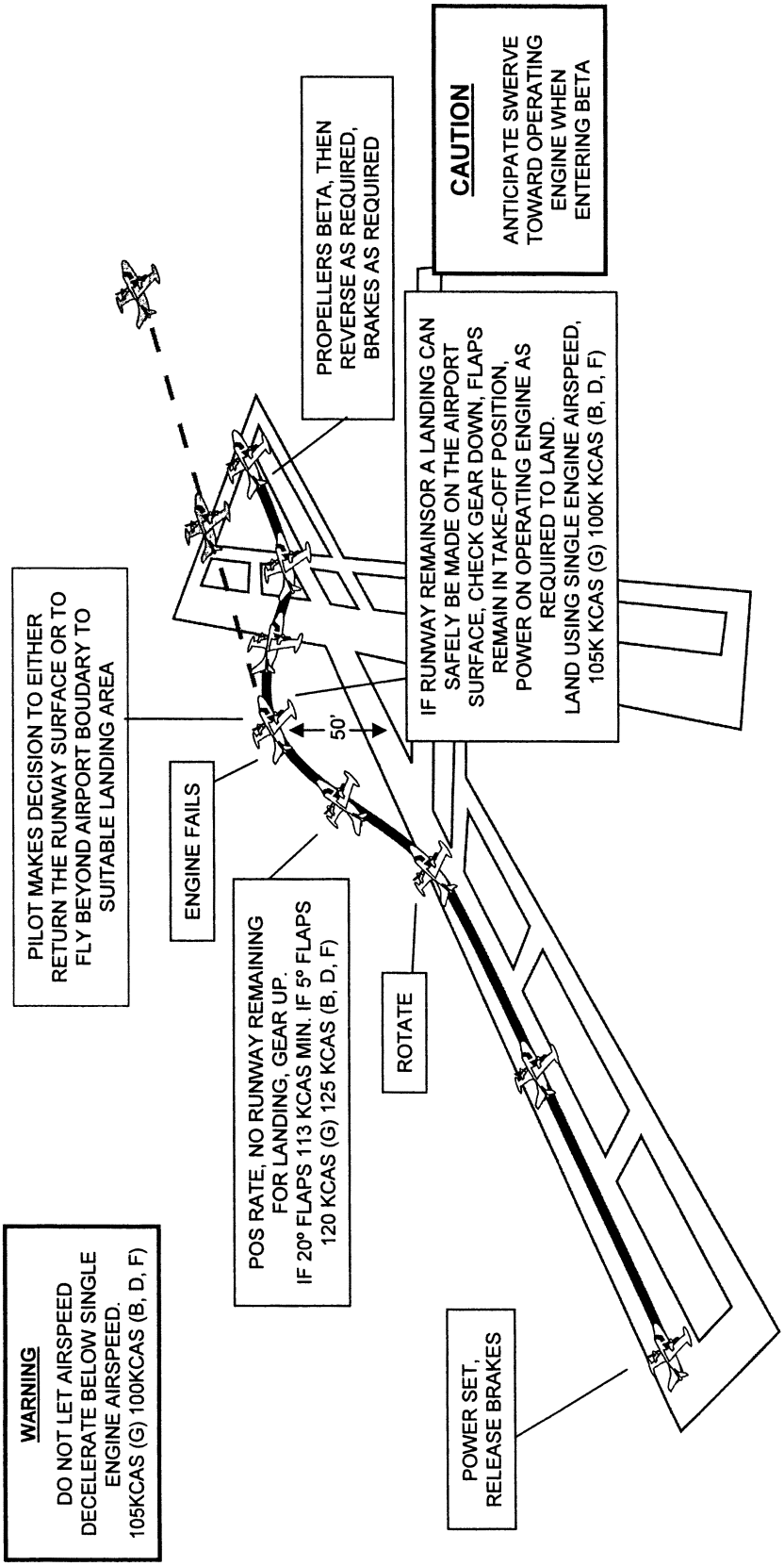


C-3

MU-2B B, D (-10), F (-20), G (-30)

TAKE-OFF ENGINE FAILURE - UNABLE TO CLIMB

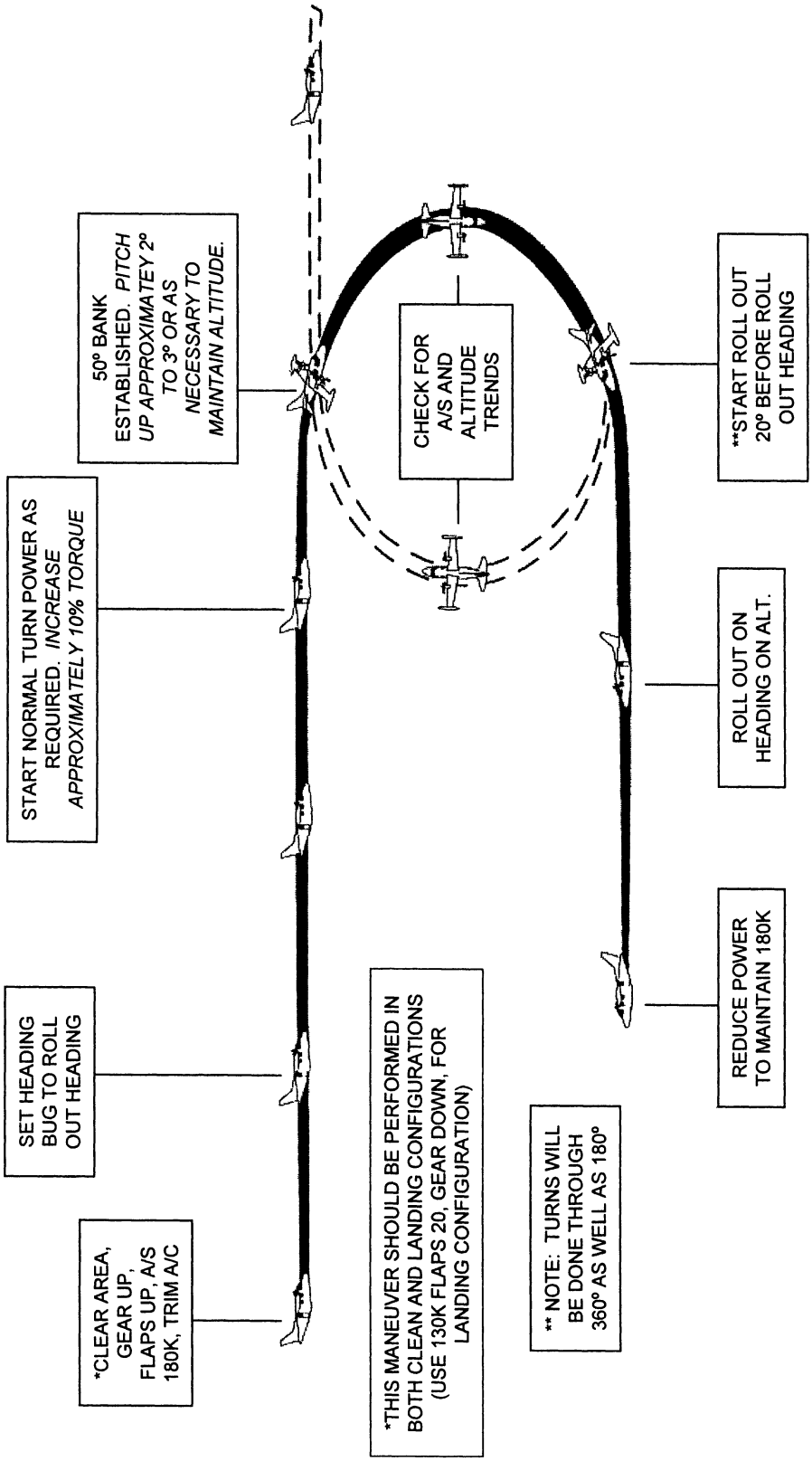
CLASSROOM DISCUSSION OR FTD USE ONLY



C-4

MU-2B B, D (-10), F (-20), G (-30)

STEEP TURNS



MU-2B B, D (-10), F (-20), G (-30)

SLOW FLIGHT MANEUVERING

MINIMUM CONTROLLABLE AIRSPEED

SLOW FLIGHT MANEUVERING IS CONDUCTED AS FOLLOWS:

CLEAR THE AREA PRIOR TO BEGINNING THE MANEUVER.

START WITH CLEAN CONFIGURATION AND CHANGE AIRCRAFT CONFIGURATION FROM CLEAN TO FULL FLAP AND GEAR IN STAGES. USE A MAXIMUM OF 15° BANK AND PERFORM HEADING CHANGES OF 90° LEFT AND RIGHT. CONSTANT ALTITUDE IS REQUIRED THROUGHOUT.
MAINTAIN 115K IN ALL CONFIGURATIONS.

**APPROXIMATE POWER SETTINGS ARE:

CLEAN	*TORQUE (35%) OR PSI (23) PER ENGINE*	*APPROX PITCH +12*
5° FLAP	*TORQUE (32%) OR PSI (21) PER ENGINE*	*APPROX PITCH +8*
5° FLAP & GEAR	*TORQUE (44%) OR PSI (29) PER ENGINE*	*APPROX PITCH +9*
20° FLAP & GEAR	*TORQUE (42%) OR PSI (27) PER ENGINE*	*APPROX PITCH +4*
40° FLAP & GEAR	*TORQUE (54%) OR PSI (35) PER ENGINE*	*APPROX PITCH 0*

** NOTE: POWER SETTINGS WILL VARY WITH AIRCRAFT WEIGHT AND ALTITUDE.

STALL SPEEDS (APPROXIMATE)
AT MAXIMUM GROSS TAKEOFF WEIGHT
B, B+, D, F, G

	B/ B+ / D / F / G	B / B+ / D / F / G
ANGLE OF BANK	0°	15°
FLAPS		
UP	95/ 98 / 98/102/104	98/ 99/ 99/104/106
5°	85/ 88/ 88/ 95/ 98	88/ 89/ 89/ 97/100
20°	80/ 81/ 81/ 85/ 86	81/ 83/ 83/ 87/ 88
40°	72/ 73/ 73/ 77/ 80	73/ 74/ 74/ 78/ 81

Vmc: 20° FLAPS (90KCAS G, 93KCAS F, 89KCAS D, 89/91KCAS B)
5° FLAPS (99KCAS G, 100KCAS F, 97KCAS D, 97/99KCAS B)
(FOR B MODEL Vmc SPEED CONSULT SERIAL NUMBER APPLICABILITY IN AFM)

CAUTION

STALL WARNING MAY ACTIVATE
4 TO 9 KTS ABOVE STALL

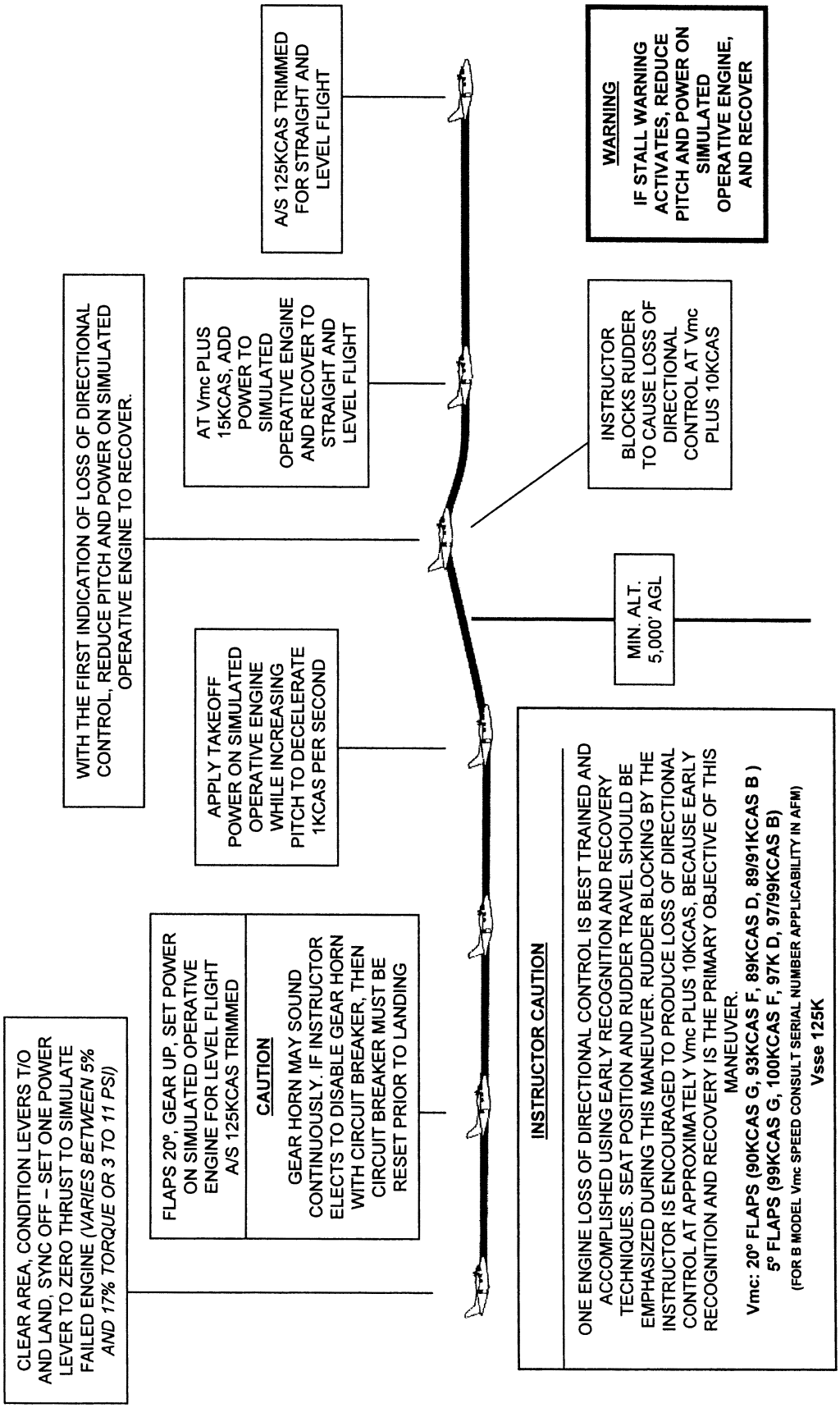
MINIMUM CONTROLLABLE AIRSPEED IS CONDUCTED AS FOLLOWS:

CLEAR THE AREA PRIOR TO BEGINNING THE MANEUVER.

THE MANEUVER MAY BE DONE IN ANY COMBINATION OF GEAR OR FLAP CONFIGURATIONS. IF BANK IS TO BE USED, IT SHOULD BE DONE AT BANK OF NOT MORE THAN 10°. BEGIN THE MANEUVER BY CONFIGURING THE AIRCRAFT IN THE DESIRED GEAR AND FLAP CONFIGURATION. SLOW THE AIRCRAFT UNTIL THE STALL WARNING (STICK SHAKER) IS ACTIVATED AND ADD POWER TO MAINTAIN ALTITUDE AND A SPEED JUST ABOVE AERODYNAMIC STALL. DO NOT ALLOW THE AIRCRAFT TO REACH AERODYNAMIC STALL BUFFET.

MU-2B B, D (-10), F (-20), G (-30)

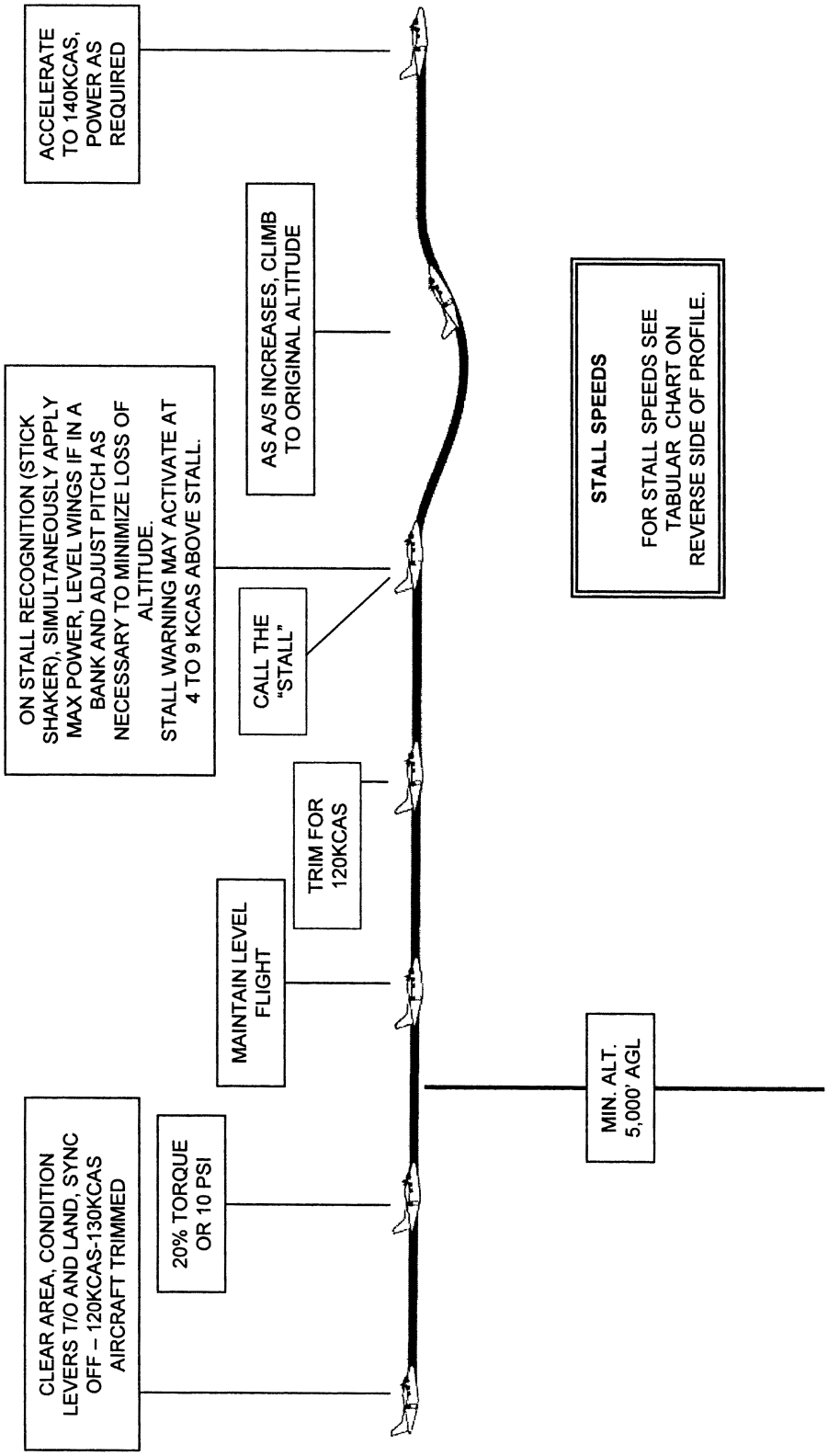
ONE ENGINE INOPERATIVE MANEUVERING LOSS OF DIRECTIONAL CONTROL



C-7

MU-2B B, D (-10), F (-20), G (-30)

APPROACH TO STALL CLEAN CONFIGURATION / WINGS LEVEL

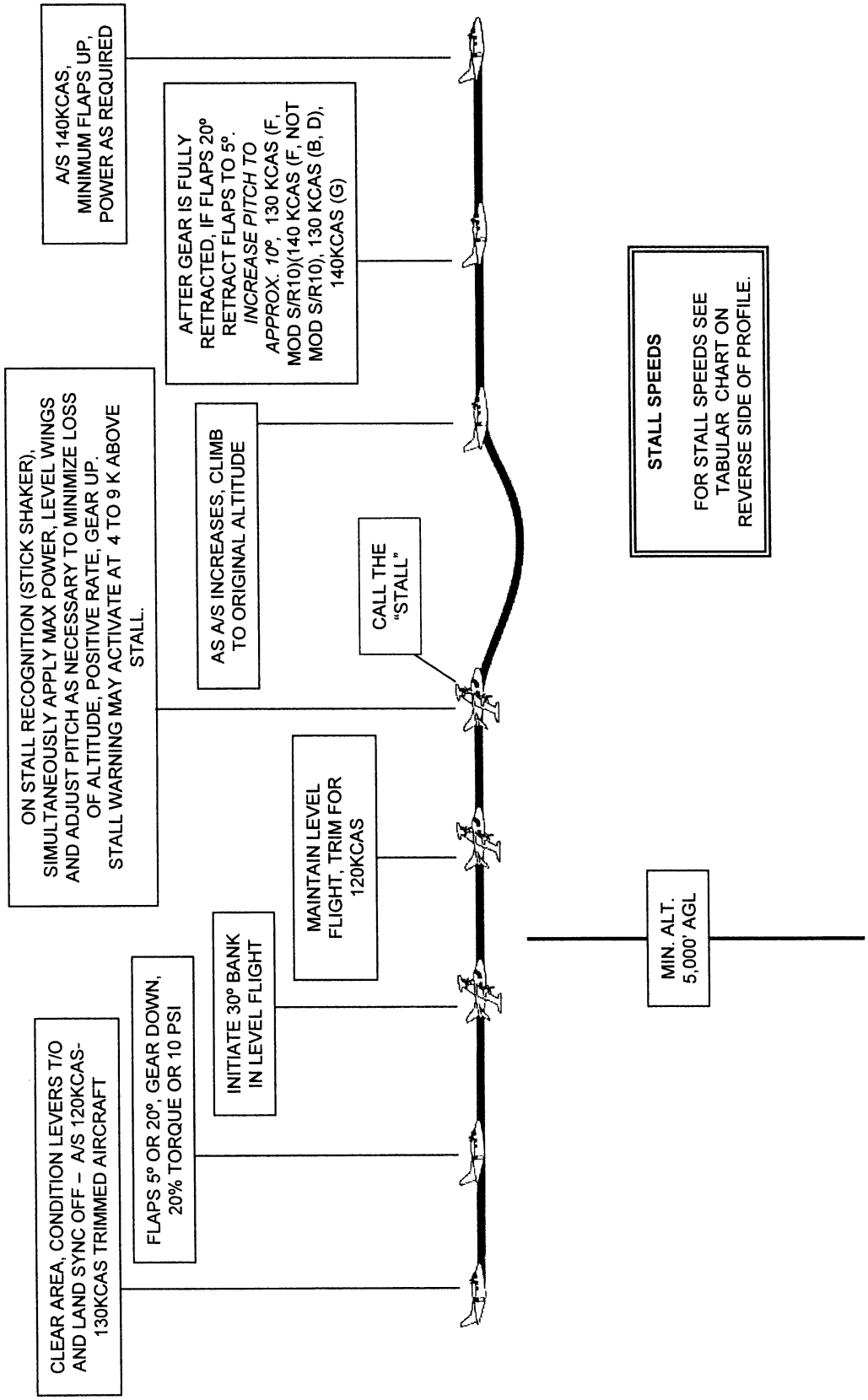


STALL SPEEDS				
FLAPS SET	0	5	20	40
GR.WT.	B/ B+, D/ F/ G	B/ B+, D/ F/ G	B/ B+, D/ F/ G	B/ B+, D/ F/ G
7,000	85/ 85/ 85	76/ 76/ 80	70/ 70/ 72	63/ 63/ 64
7,500	88/ 88/ 85/	78/ 78/ 83/	73/ 73/ 74/	66/ 63/ 67/
8,000	90/ 90/ 91/ 90	81/ 81/ 86/ 84	75/ 75/ 77/ 74	68/ 68/ 69/ 69
8,500	93/ 93/ 94/ 93	83/ 83/ 88/ 87	78/ 78/ 79/ 77	70/ 70/ 71/ 71
8,930	95/	85/	79/	72/
9,000	/ 95/ 97/ 95	/ 86/ 91/ 90	/ 80/ 81/ 79	/ 72/ 73/ 73
9,350	/ 97/	/ 87/	/ 81/	/ 73/
9,500	/ 99/ 98	93/ 92	/ 83/ 81	/ 75/ 75
9,920	/101/	95/	/ 85/	/ 76/
10,000	/101	/ 94	/ 83	/ 77
10,500	/103	/ 97	/ 85	/ 79
10,800	/105	/ 98	/ 87	/ 81

MU-2B B, D (-10), F (-20), G (-30)

APPROACH TO STALL

TAKEOFF CONFIGURATION 15-30° BANK



C-9

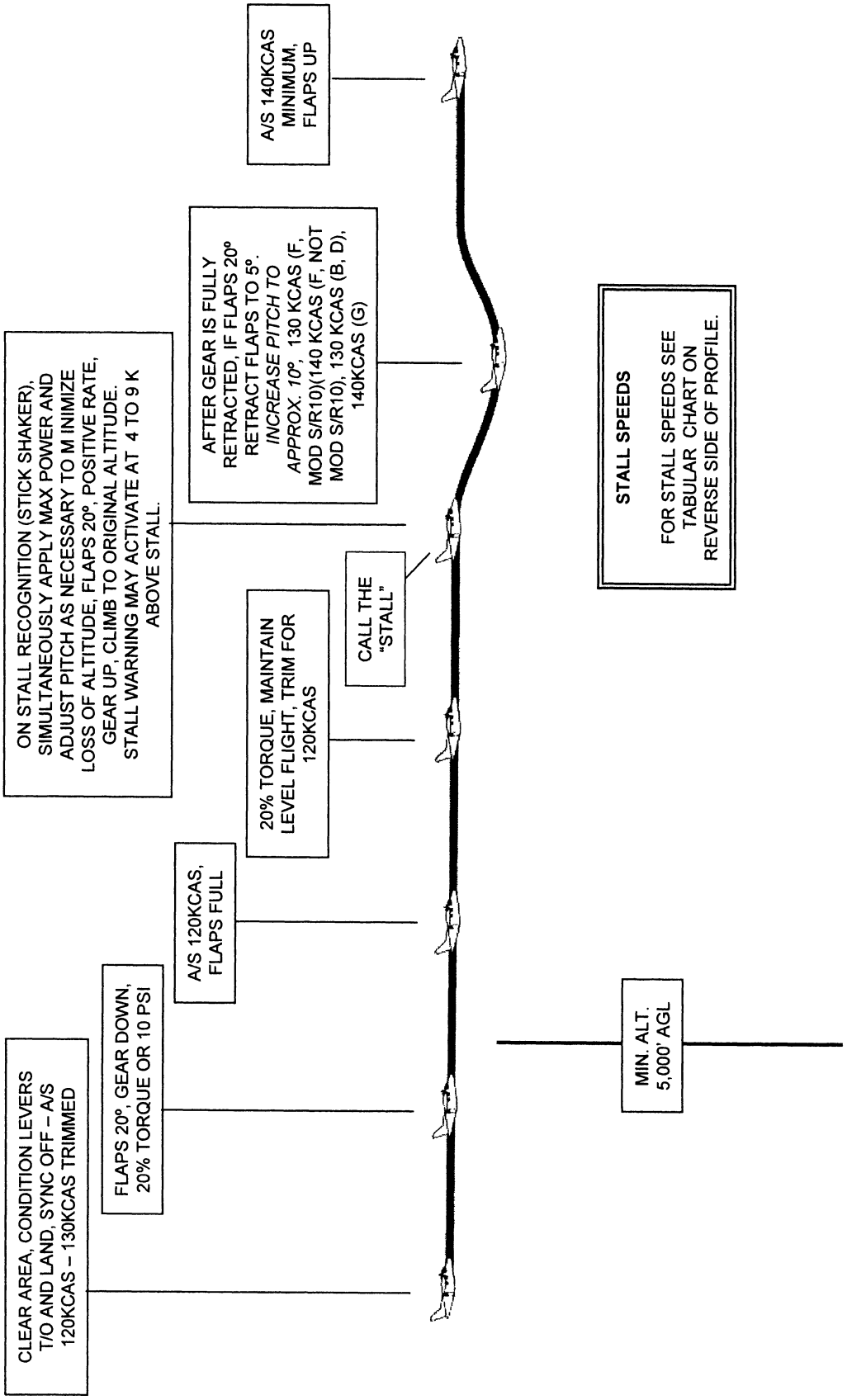
STALL SPEEDS (APPROXIMATE)
AT MAXIMUM GROSS TAKEOFF WEIGHT
B, B+, D, F, G

BANK ANGLE	10	20	30	40	50	60
FLAPS	B/ B+, D/ F/ G	B/ B+, D/ F/ G	B/ B+, D/ F/ G	B/ B+, D/ F/ G	B/ B+, D/ F/ G	B/ B+, D/ F/ G
UP	96/ 99/102/106	99/ 101/105/108	103/105/109/112	109/111/116/120	120/122/126/130	136/138/143/148
5°	87/ 88/ 96/ 99	89/ 90/ 98/101	92/ 94/102/105	98/100/109/112	107/109/119/122	120/124/135/138
20°	80/ 82/ 86/ 87	82/ 84/ 88/ 89	86/ 87/ 92/ 93	91/ 93/ 97/ 98	99/101/107/108	113/114/120/122
40°	72/ 74/ 77/ 81	74/ 75/ 79/ 82	77/ 79/ 82/ 86	82/ 83/ 87/ 91	90/ 91/ 95/100	102/103/108/113

MU-2B B, D (-10), F (-20), G (-30)

APPROACH TO STALL

GEAR DOWN – FULL FLAPS

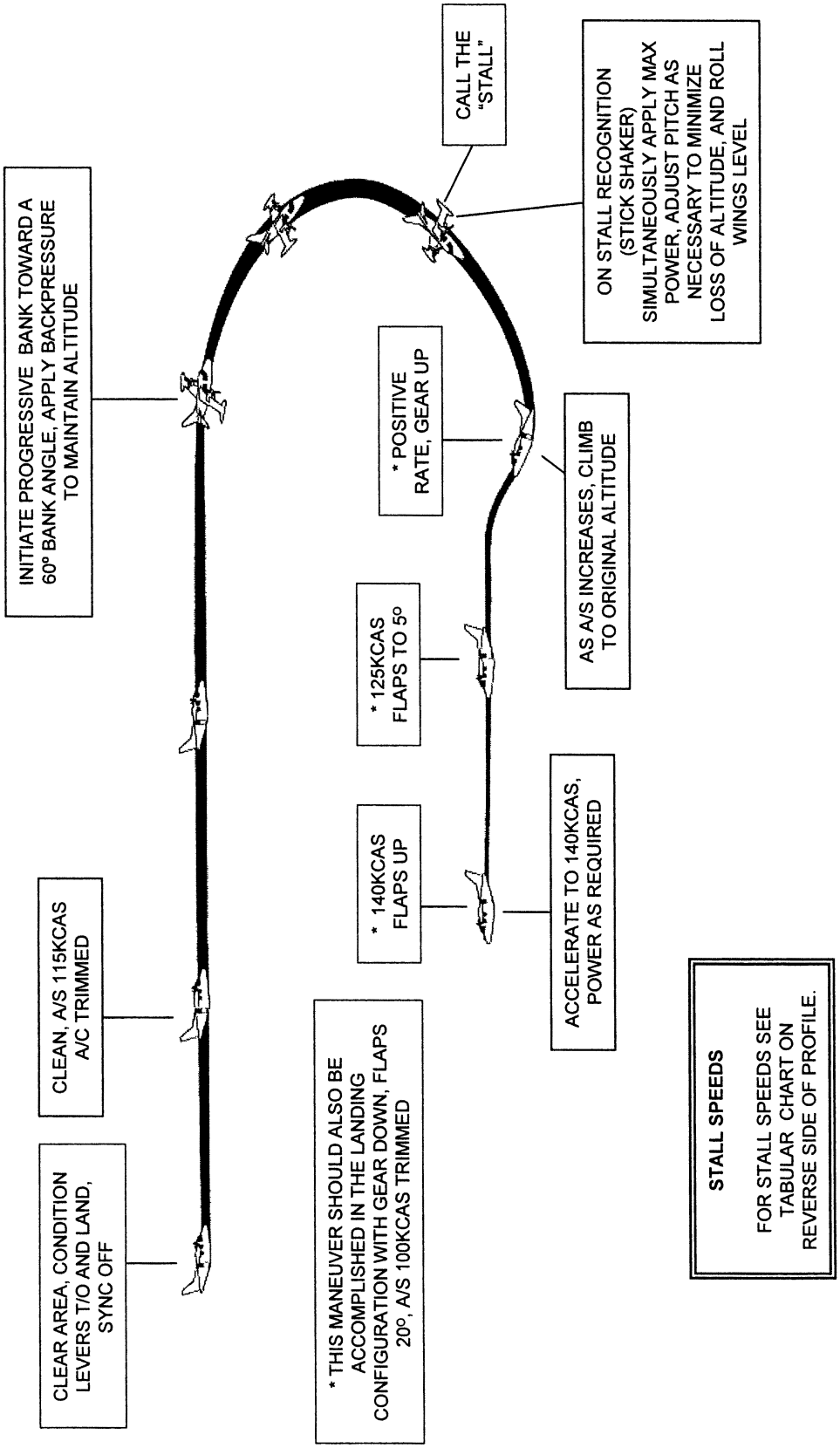


C-10

	STALL SPEEDS			
FLAPS SET	0	5	20	40
GR.WT.	B/ B+, D/ F/ G	B/ B+, D/ F/ G	B/ B+, D/ F/ G	B/ B+, D/ F/ G
7,000	85/ 85/ 85	76/ 76/ 80	70/ 70/ 72	63/ 63/ 64
7,500	88/ 88/ 85/	78/ 78/ 83/	73/ 73/ 74/	66/ 63/ 67/
8,000	90/ 90/ 91/ 90	81/ 81/ 86/ 84	75/ 75/ 77/ 74	68/ 68/ 69/ 69
8,500	93/ 93/ 94/ 93	83/ 83/ 88/ 87	78/ 78/ 79/ 77	70/ 70/ 71/ 71
8,930	95/	85/	79/	72/
9,000	/ 95/ 97/ 95	/ 86/ 91/ 90	/ 80/ 81/ 79	/ 72/ 73/ 73
9,350	/ 97/	/ 87/	/ 81/	/ 73/
9,500	/ 99/ 98	93/ 92	/ 83/ 81	/ 75/ 75
9,920	/101/	95/	/ 85/	/ 76/
10,000	/101	/ 94	/ 83	/ 77
10,500	/103	/ 97	/ 85	/ 79
10,800	/105	/ 98	/ 87	/ 81

MU-2B B, D (-10), F (-20), G (-30)

ACCELERATED STALLS



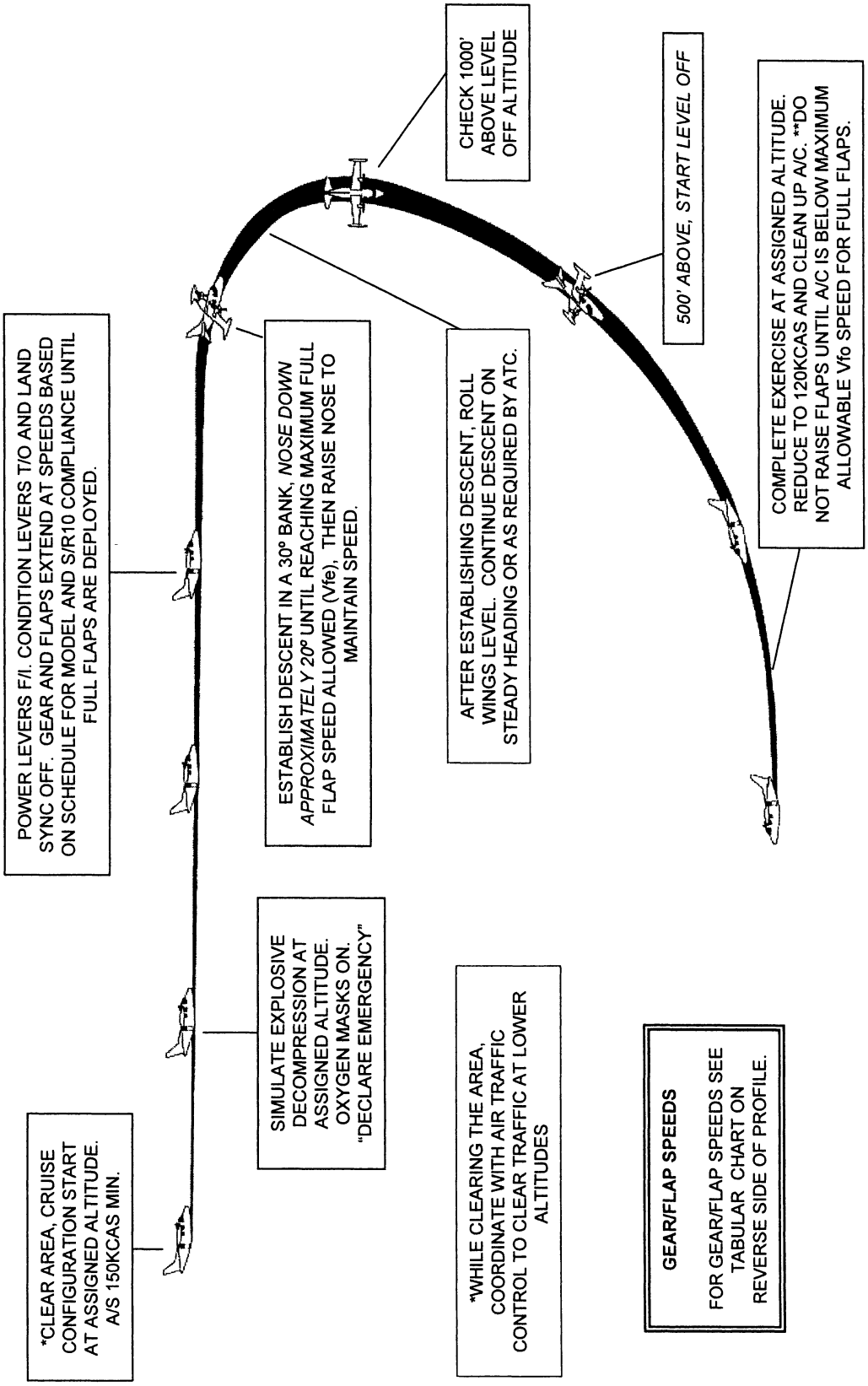
C-11

STALL SPEEDS (APPROXIMATE)
AT MAXIMUM GROSS TAKEOFF WEIGHT
B, B+, D, F, G

BANK ANGLE	10	20	30	40	50	60
FLAPS	B/ B+, D/ F/ G	B/ B+, D/ F/ G	B/ B+, D/ F/ G	B/ B+, D/ F/ G	B/ B+, D/ F/ G	B/ B+, D/ F/ G
UP	96/ 99/102/106	99/ 101/105/108	103/105/109/112	109/111/116/120	120/122/126/130	136/138/143/148
5°	87/ 88/ 96/ 99	89/ 90/ 98/101	92/ 94/102/105	98/100/109/112	107/109/119/122	120/124/135/138
20°	80/ 82/ 86/ 87	82/ 84/ 88/ 89	86/ 87/ 92/ 93	91/ 93/ 97/ 98	99/101/107/108	113/114/120/122
40°	72/ 74/ 77/ 81	74/ 75/ 79/ 82	77/ 79/ 82/ 86	82/ 83/ 87/ 91	90/ 91/ 95/100	102/103/108/113

MU-2B B, D (-10), F (-20), G (-30)

EMERGENCY DESCENT (LOW SPEED)



C-12

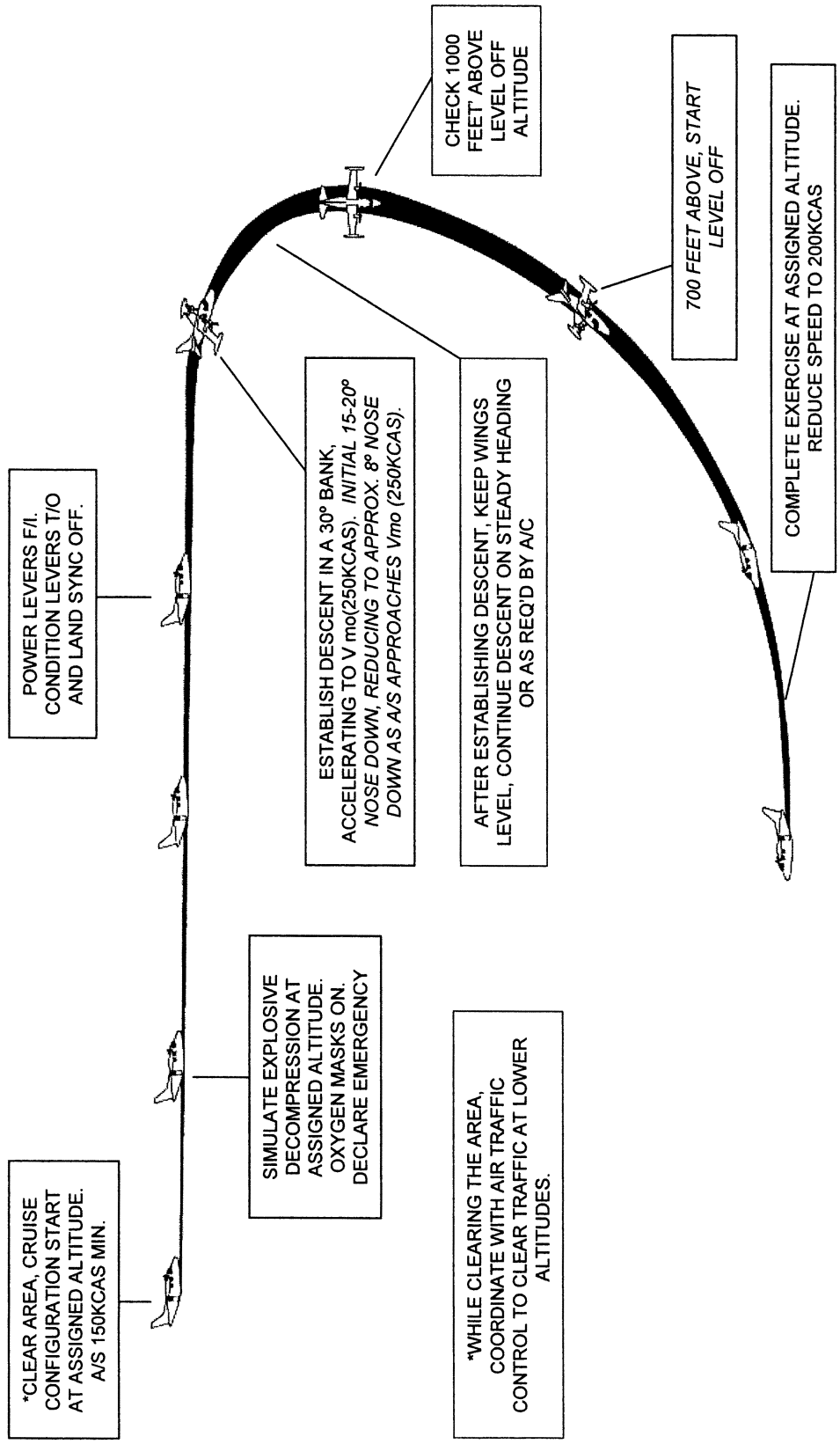
GEAR AND FLAP EXTEND SCHEDULE

(F+ AND G+ ARE MODIFIED BY S/R10)

GEAR			
B, D, F, F+:	160KCAS		
G, G+:	170KCAS		
FLAPS	5°	20°	40°
G: NOT MODIFIED BY S/R10	146KCAS	146KCAS	120KCAS
G+: MODIFIED BY S/R10 AND	175KCAS	146KCAS	120KCAS
F: NOT MODIFIED BY S/R10	140KCAS	140KCAS	120KCAS
F+: MODIFIED BY S/R10 AND	175KCAS	140KCAS	120KCAS
B, D, F	140KCAS	140KCAS	120KCAS

MU-2B B, D (-10), F (-20), G (-30)

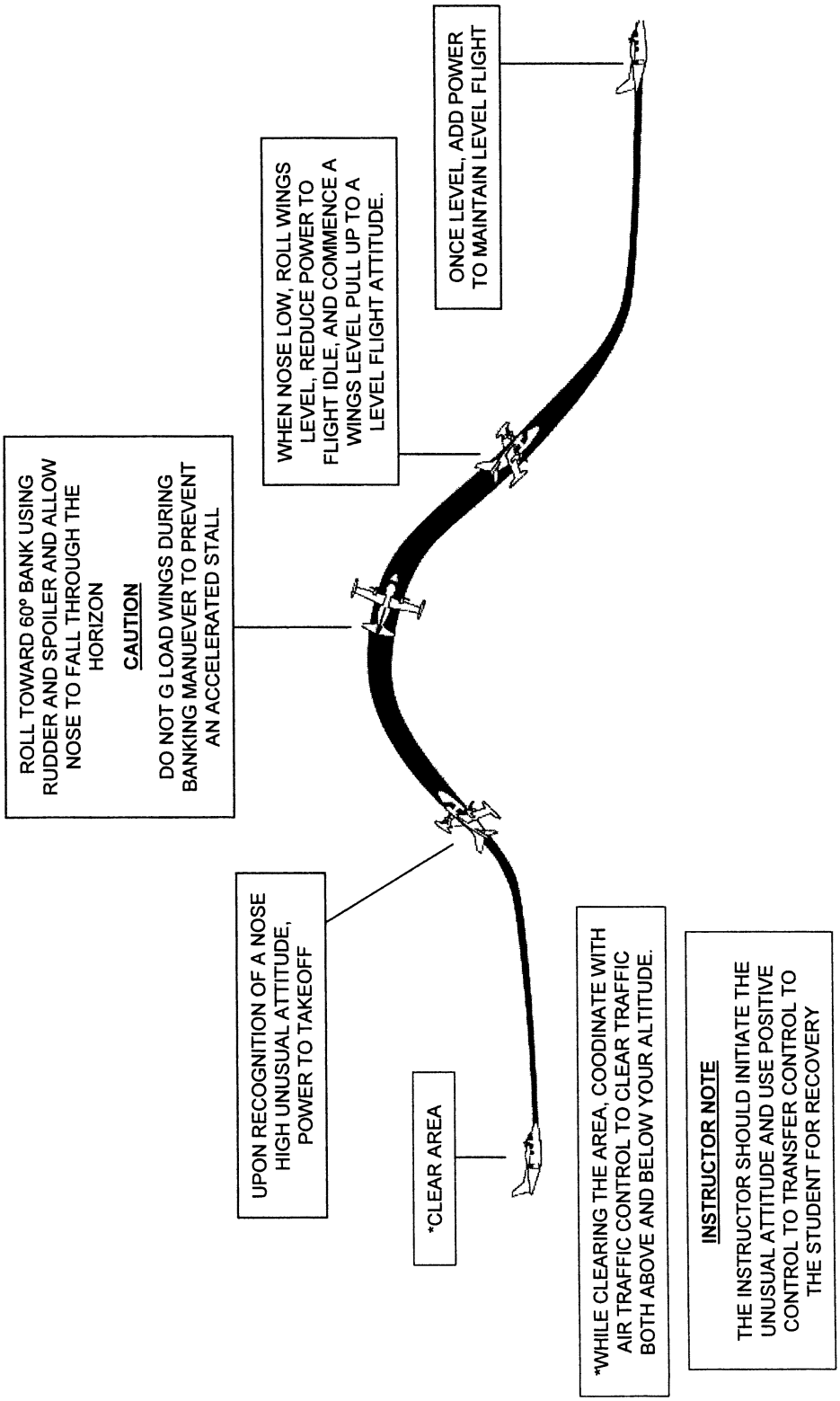
EMERGENCY DESCENT (HIGH SPEED)



C-13

MU-2B B, D (-10), F (-20), G (-30)

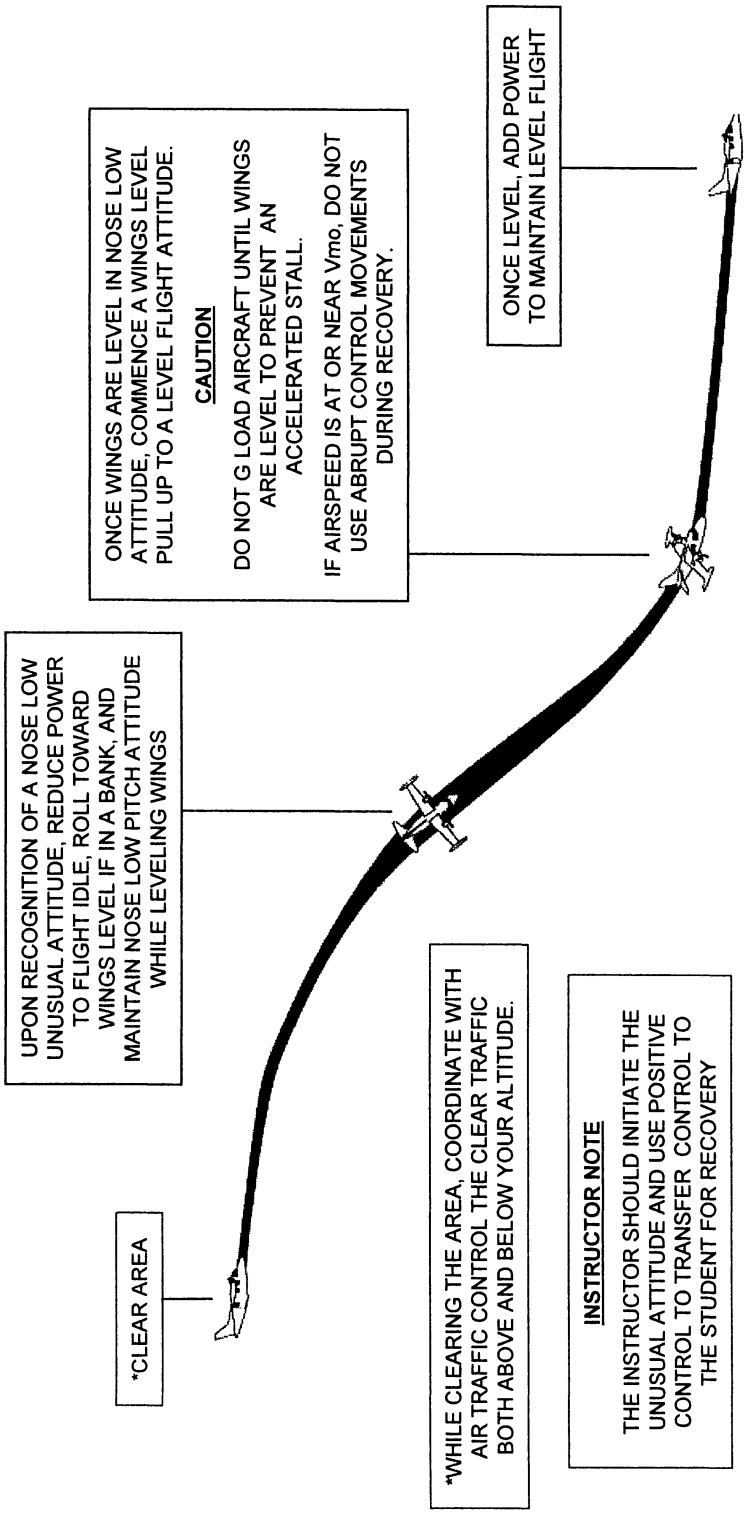
UNUSUAL ATTITUDE RECOVERY (NOSE HIGH)



C-14

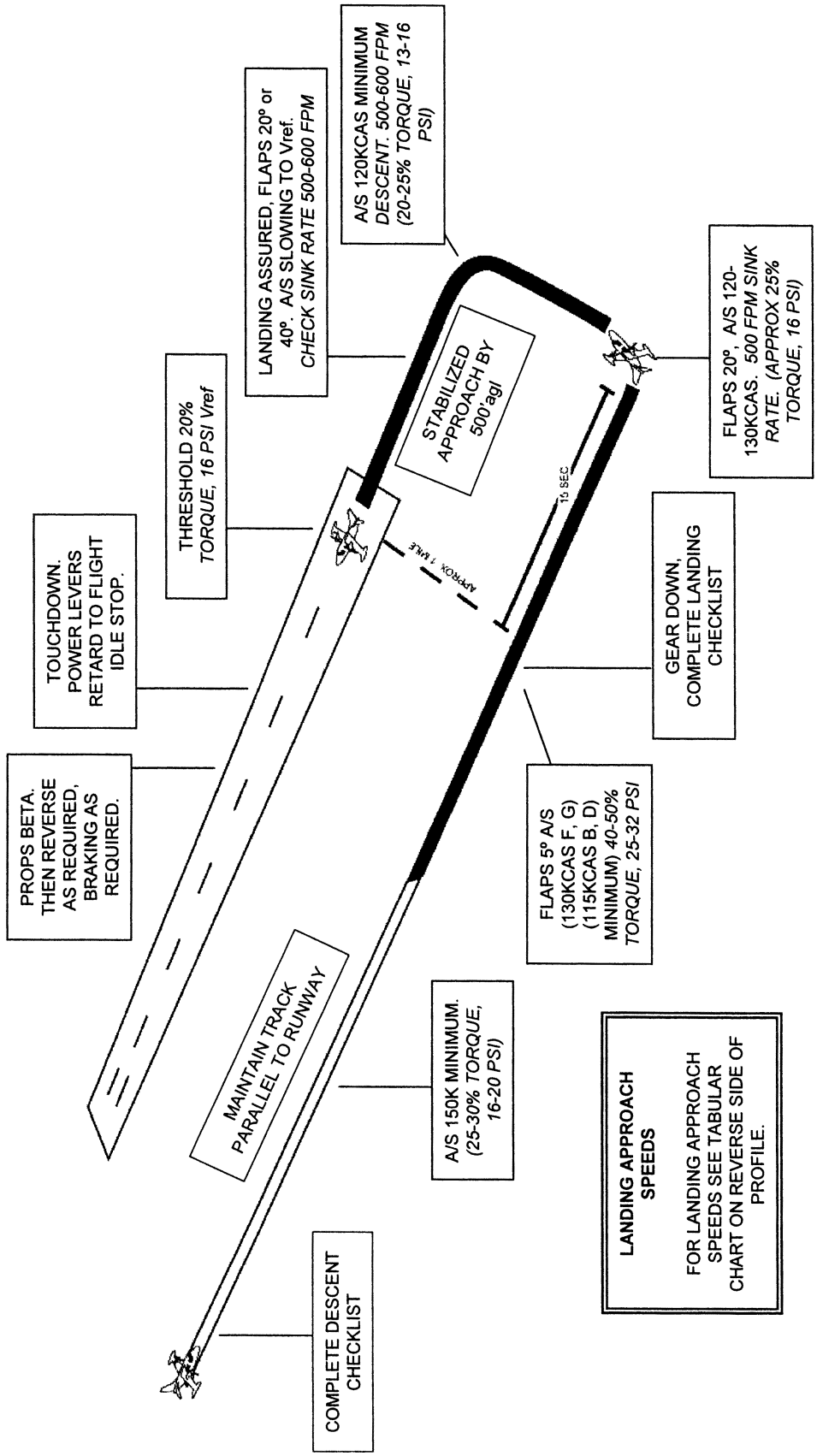
MU-2B B, D (-10), F (-20), G (-30)

UNUSUAL ATTITUDE RECOVERY (NOSE LOW)



MU-2B B, D (-10), F (-20), G (-30)

NORMAL LANDING (20°or 40° FLAPS)



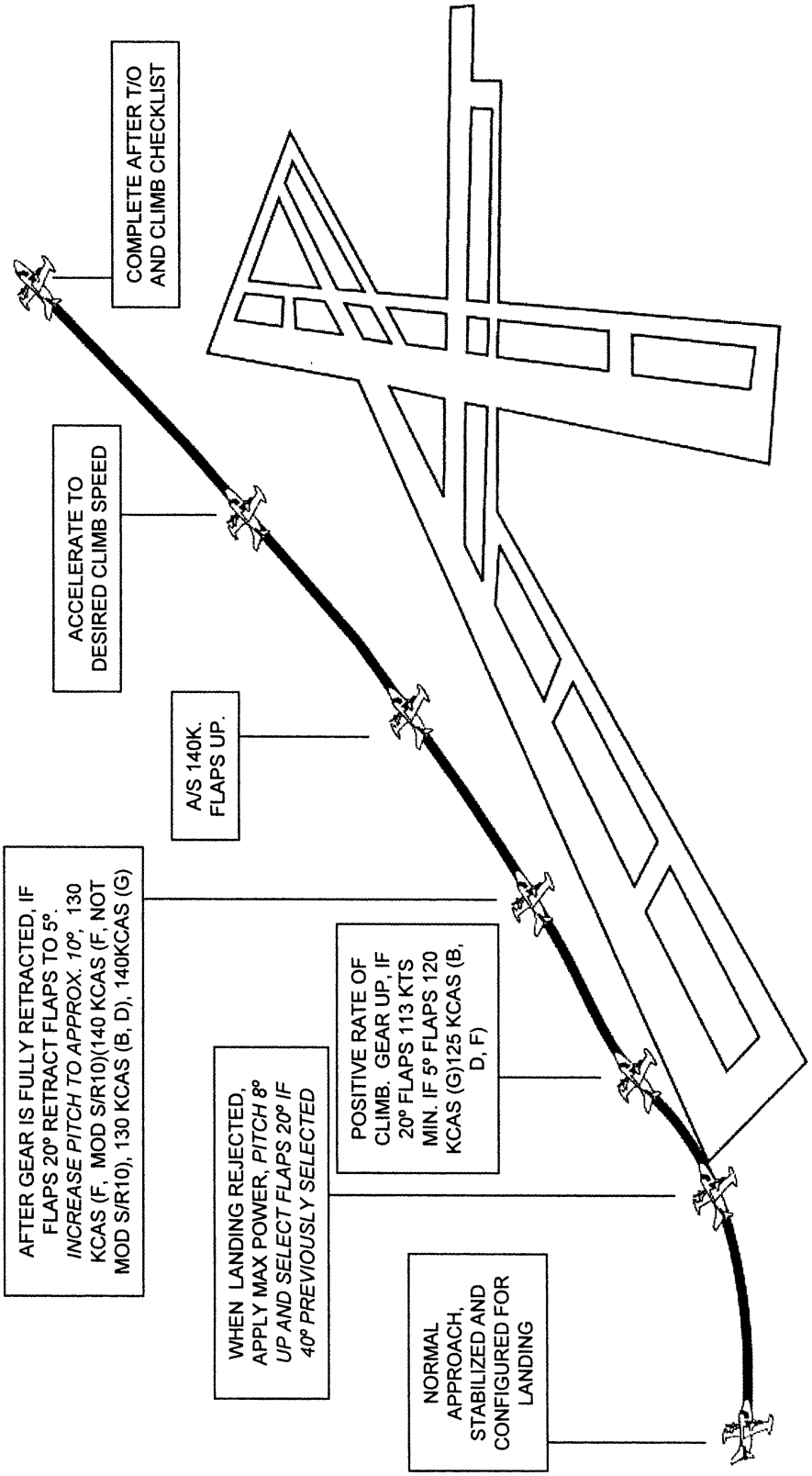
C-16

LANDING APPROACH SPEEDS Vref
B, B+, D, F, G

	FLAPS 20° (1.3 VSI)				FLAPS 40° (1.5 VSI)			
WEIGHT	B	B+, D	F	G	B	B+, D	F	G
7,000	92	92	93		94	94		
7,500	95	95	96	94	98	98	99	100
8,000	98	98	100	97	101	101	103	103
8,500		101	103	100		104	106	106
8,490	101				104			
8,930		103				107		
9,000			106	103			109	109
9,435			108				112	
9,500				105				112
10,000				108				115
10,260				109				117

MU-2B B, D (-10), F (-20), G (-30)

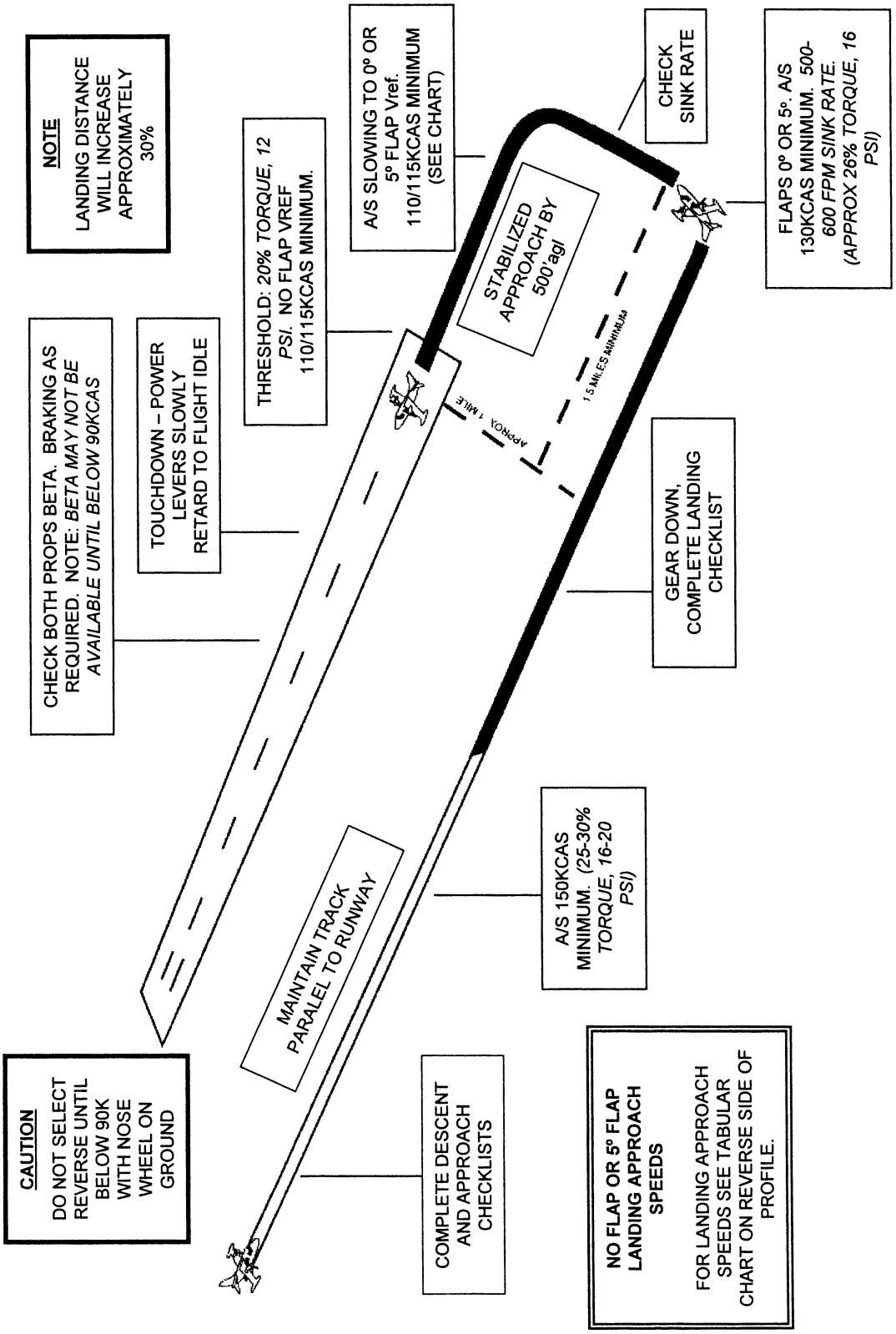
GO AROUND - REJECTED LANDING



C-17

MU-2B B, D (-10), F (-20), G (-30)

NO FLAP OR 5º FLAP LANDING



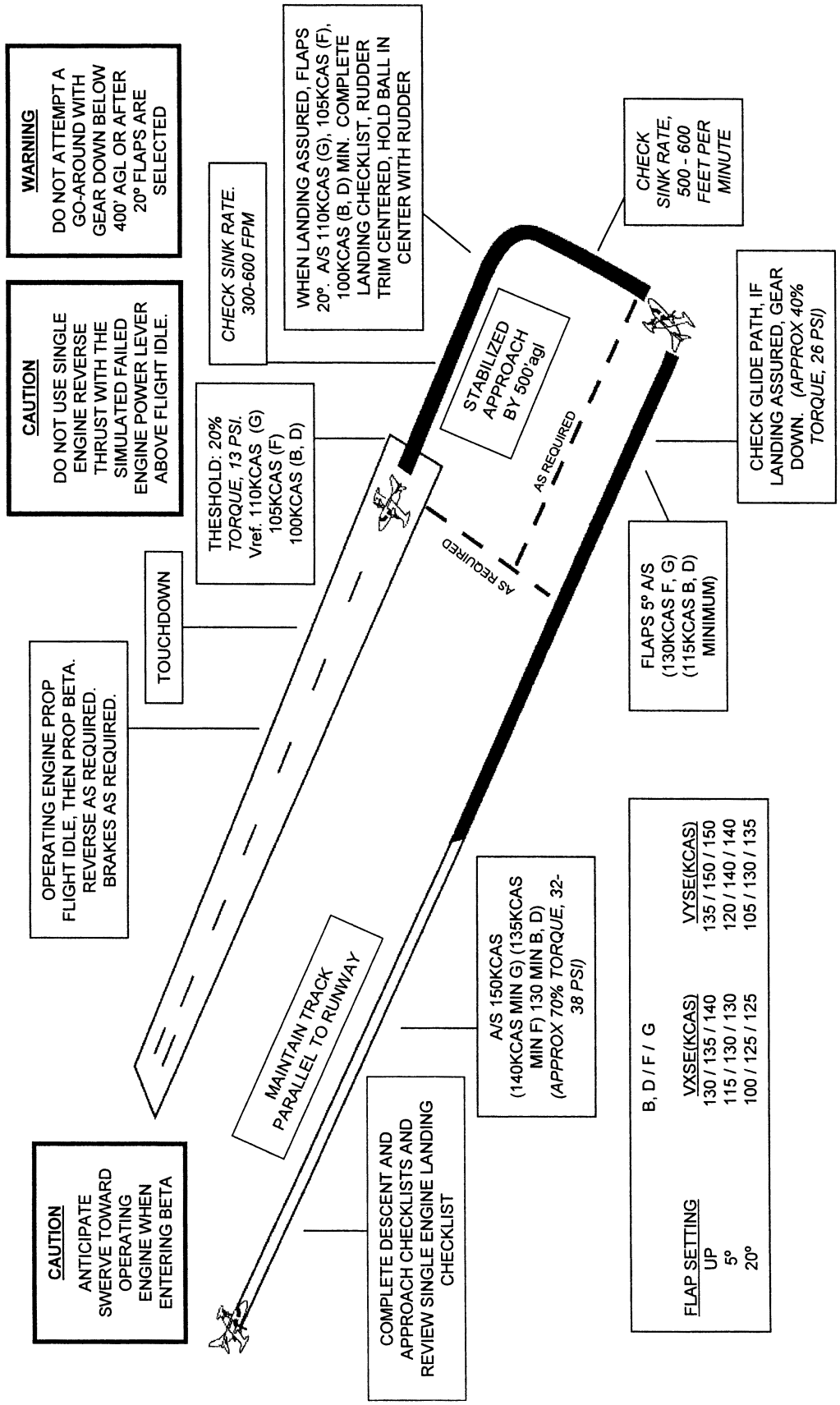
A-18

NO FLAP Vref 1.25 VS1
(BUT NOT BELOW 110KCAS (B, B+, D, F) 115KCAS (G))
USE FOR FLAP UP OR 5°
B, B+, D, F, G

	FLAPS UP					FLAPS 5°				
WEIGHT	B	B+	D	F	G	B	B+	D	F	G
7,500	110	110	110	110		110	110	110	110	
8.000	113	113	113	114	115	110	110	110	110	115
8,490	117					110				
8.500		117	117	118	117		110	110	110	115
8,930		119	119				110	110		
9.000				122	119				114	115
9,435				124					117	
9.500					123					115
10.000					127					118
10.260					128					120

MU-2B B, D (-10), F (-20), G (-30)

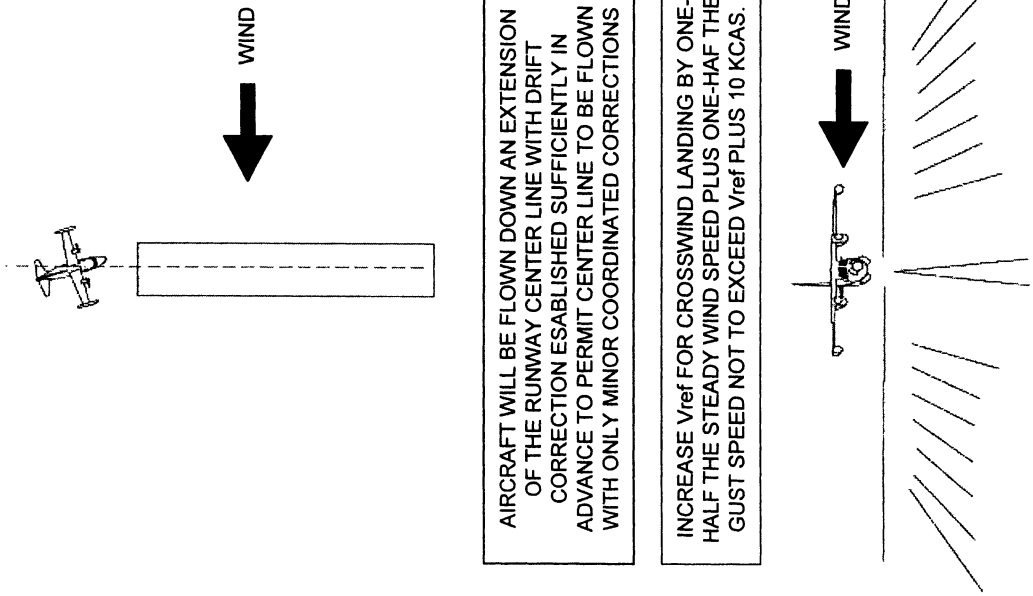
ONE ENGINE INOPERATIVE LANDING

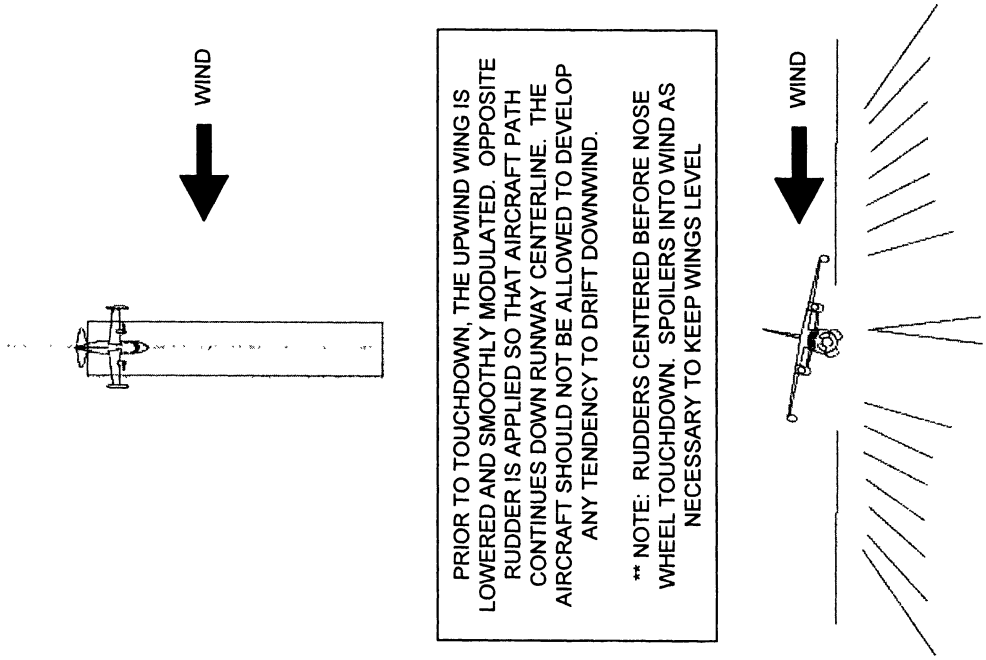


C-19

MU-2B B, D (-10), F (-20), G (-30)

CROSSWIND LANDING

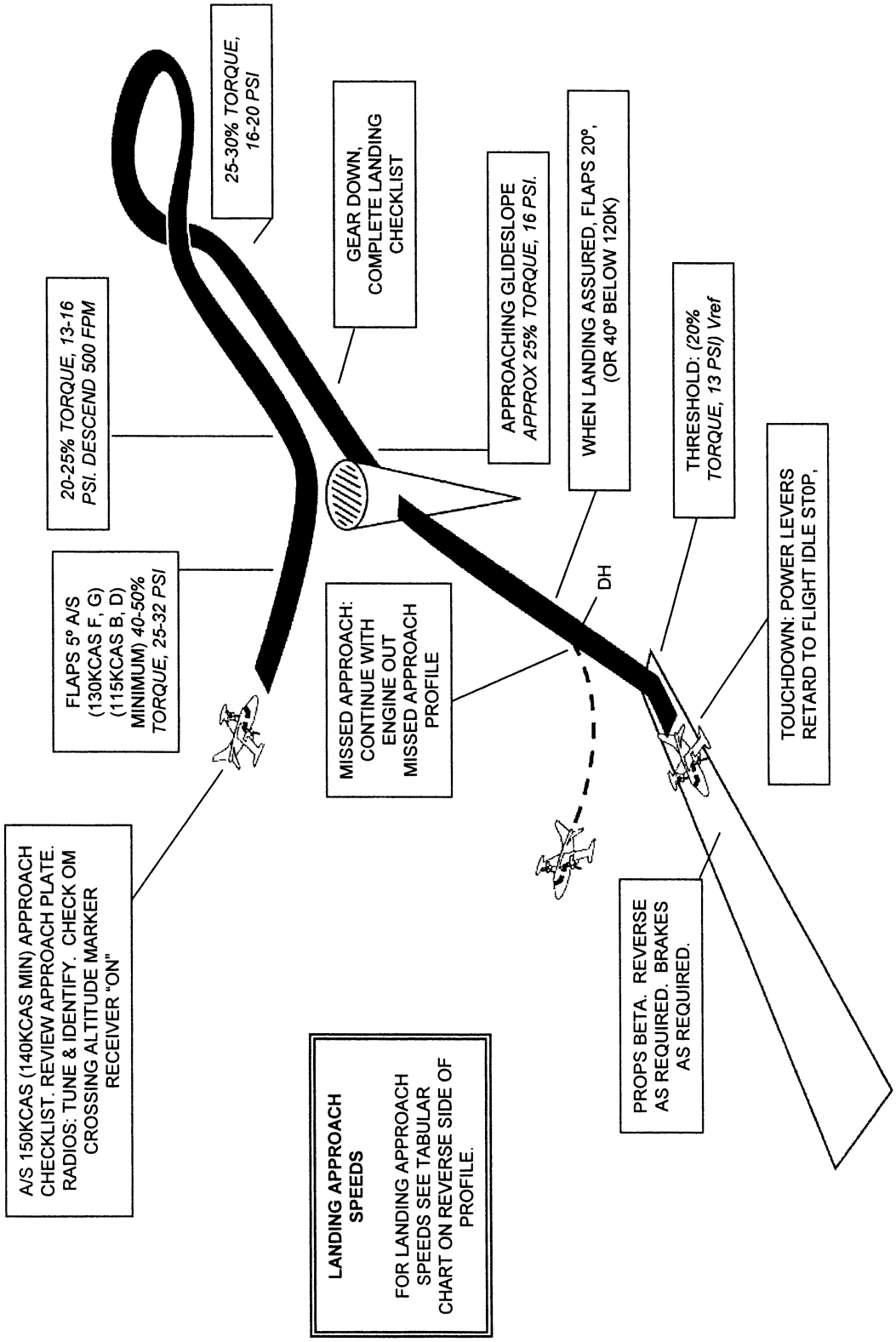




C-20

MU-2B B, D (-10), F (-20), G (-30)

ILS AND MISSED APPROACH

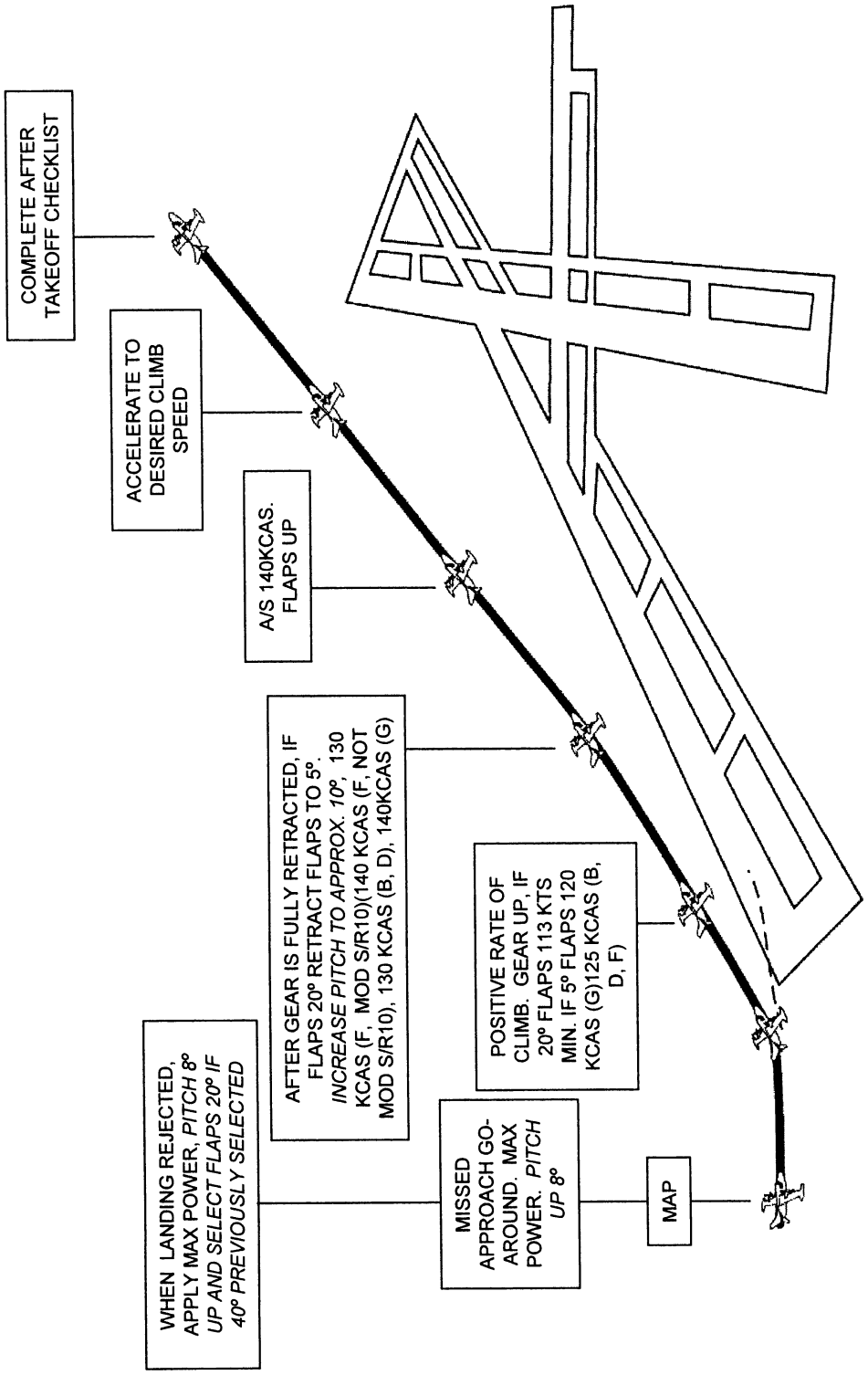


C-21

LANDING APPROACH SPEEDS Vref
B, B+, D, F, G

	FLAPS 20° (1.3 VSI)				FLAPS 40° (1.5 VSI)			
WEIGHT	B	B+, D	F	G	B	B+, D	F	G
7,000	92	92	93		94	94		
7,500	95	95	96	94	98	98	99	100
8,000	98	98	100	97	101	101	103	103
8,500		101	103	100		104	106	106
8,490	101				104			
8,930		103				107		
9,000			106	103			109	109
9,435			108				112	
9,500				105				112
10,000				108				115
10,260				109				117

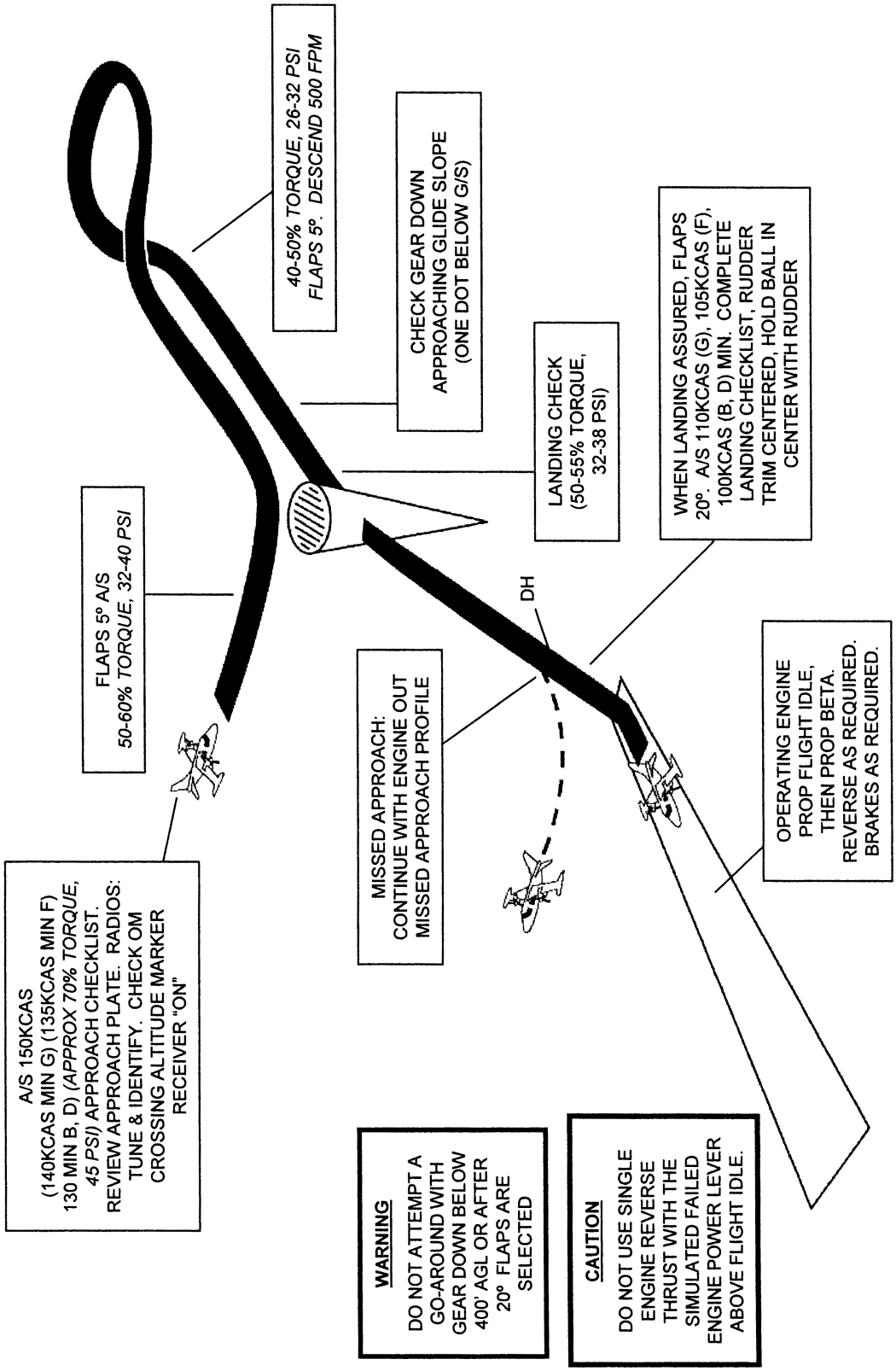
MU-2B B, D (-10), F (-20), G (-30)
TWO ENGINE MISSED APPROACH



C-22

MU-2B B, D (-10), F (-20), G (-30)

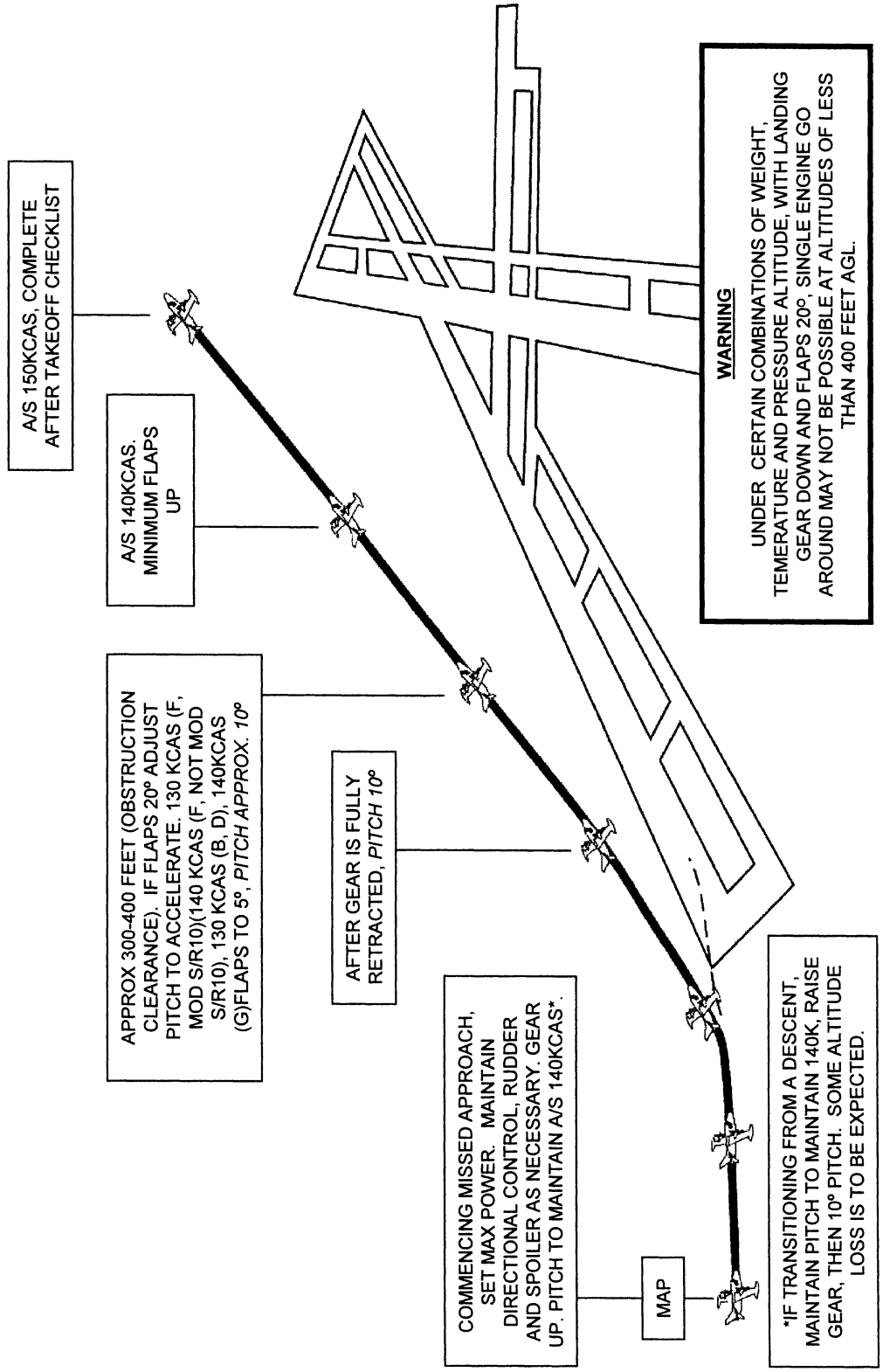
ONE ENGINE INOPERATIVE ILS AND MISSED APPROACH



C-23

MU-2B B, D (-10), F (-20), G (-30)

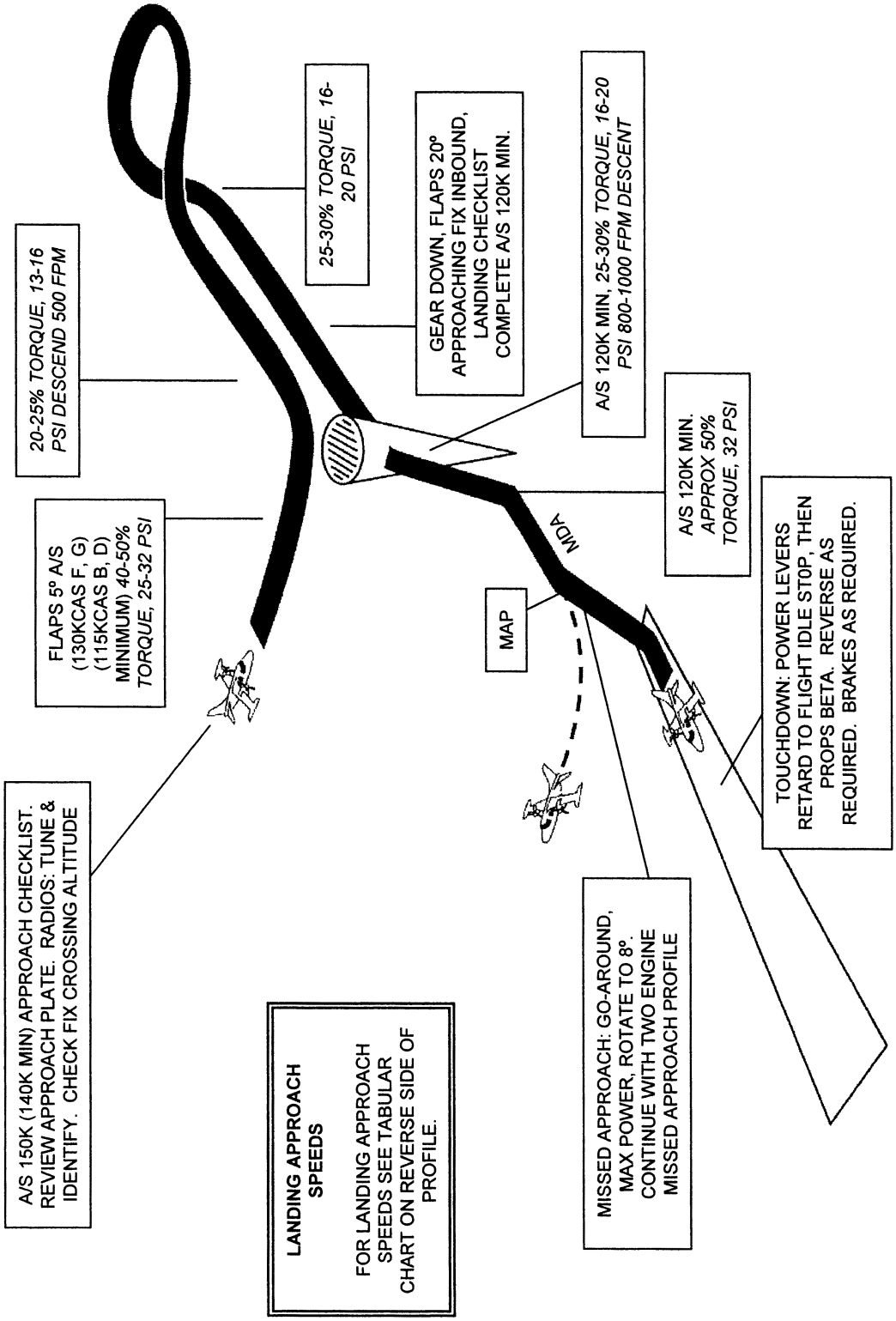
ONE ENGINE INOPERATIVE MISSED APPROACH



C-24

MU-2B B, D (-10), F (-20), G (-30)

NON-PRECISION AND MISSED APPROACH



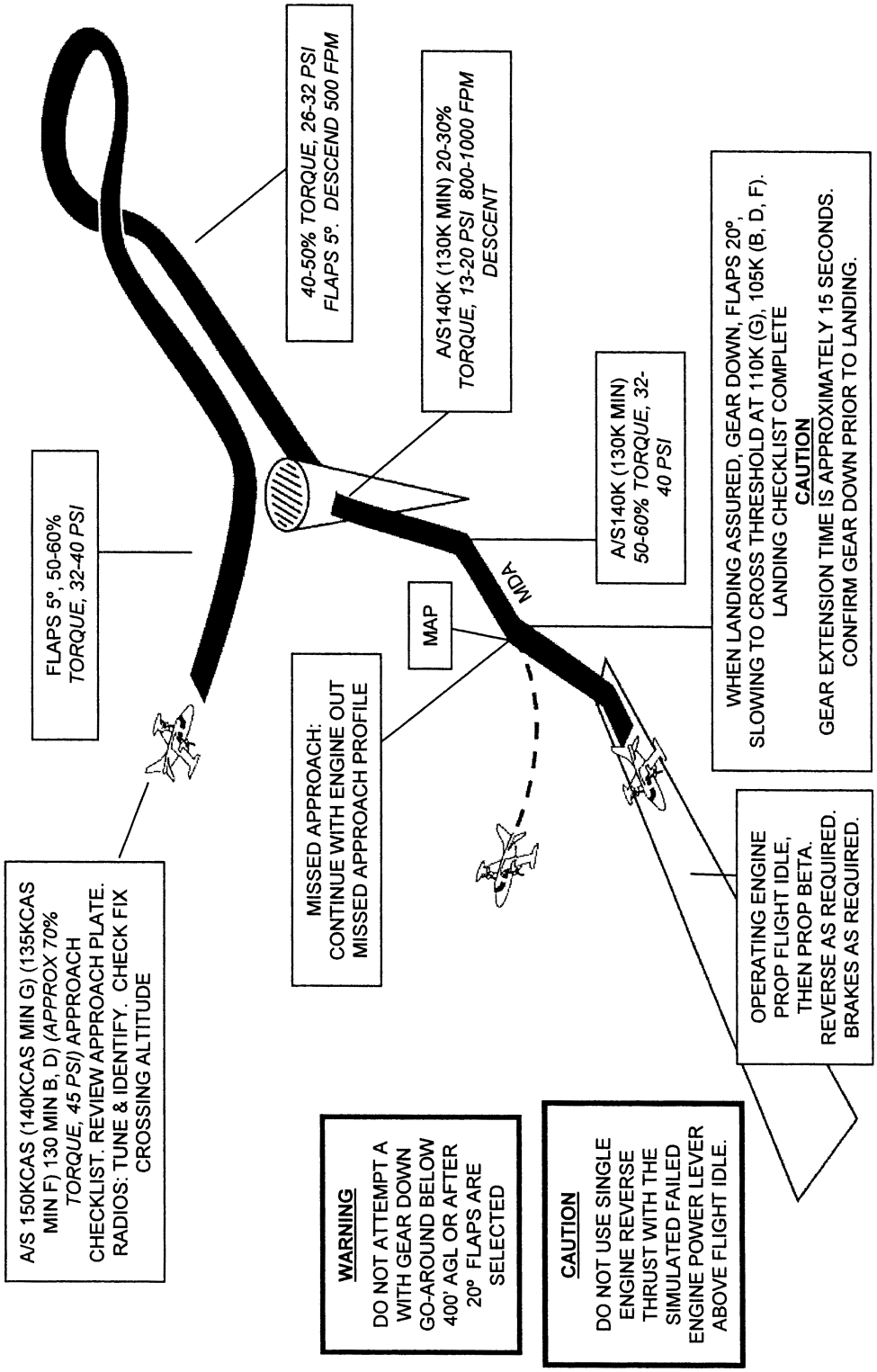
C-25

LANDING APPROACH SPEEDS Vref
B, B+, D, F, G

	FLAPS 20° (1.3 VSI)				FLAPS 40° (1.5 VSI)			
WEIGHT	B	B+, D	F	G	B	B+, D	F	G
7,000	92	92	93		94	94		
7,500	95	95	96	94	98	98	99	100
8,000	98	98	100	97	101	101	103	103
8,500		101	103	100		104	106	106
8,490	101				104			
8,930		103				107		
9,000			106	103			109	109
9,435			108				112	
9,500				105				112
10,000				108				115
10,260				109				117

MU-2B B, D (-10), F (-20), G (-30)

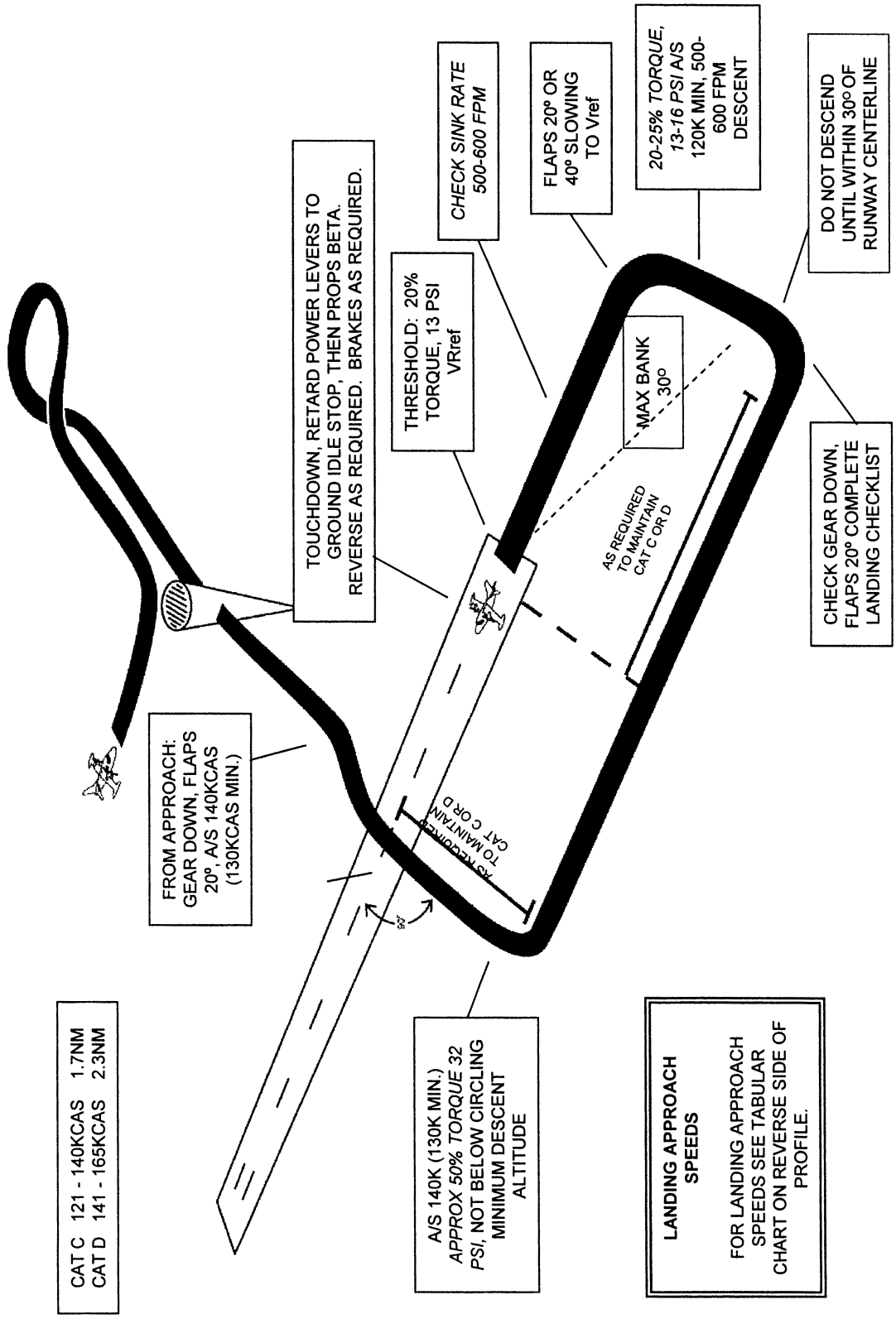
ONE ENGINE INOPERATIVE NON-PRECISION AND MISSED APPROACH



C-26

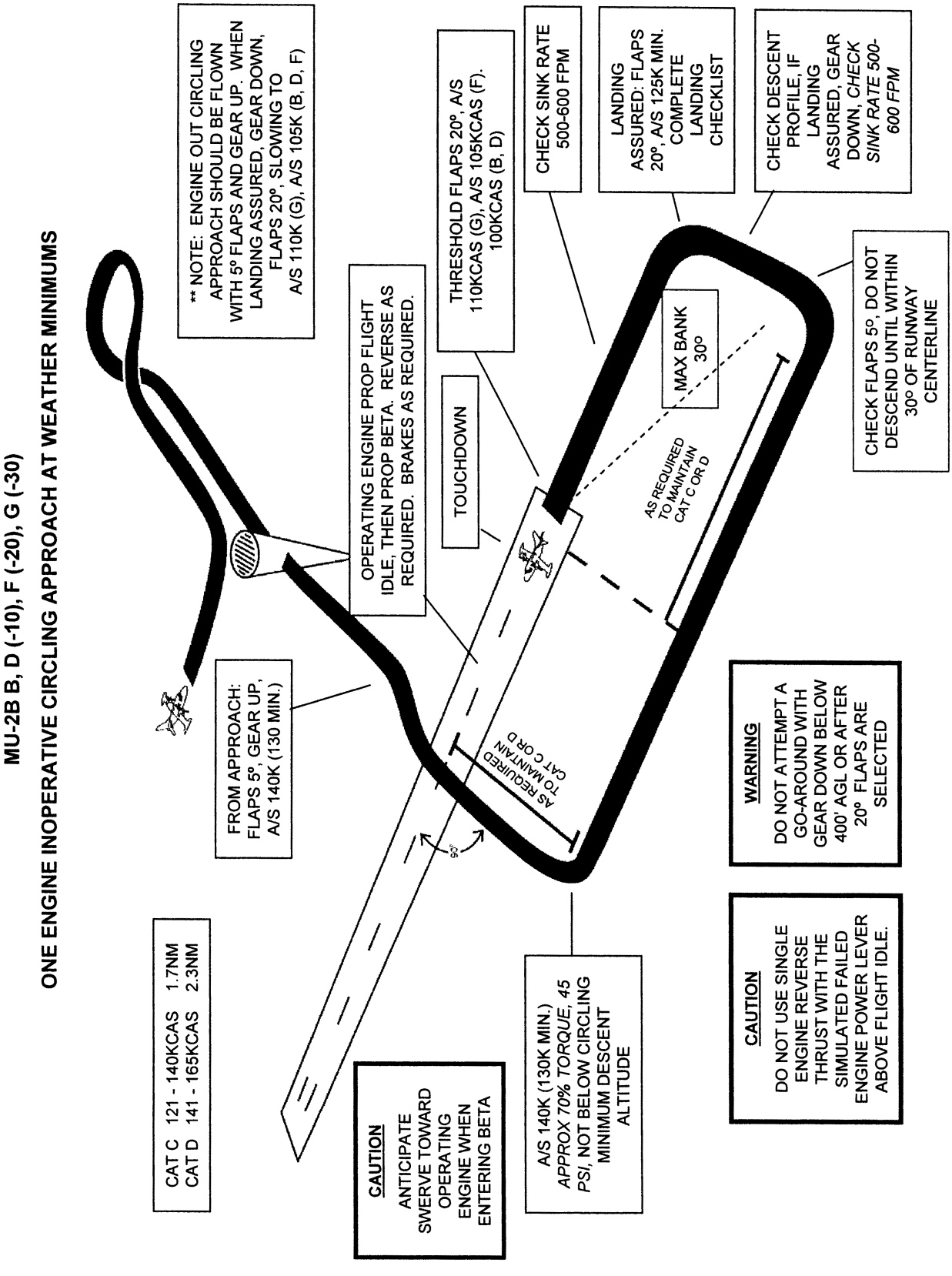
MU-2B B, D (-10), F (-20), G (-30)

CIRCLING APPROACH AT WEATHER MINIMUMS



LANDING APPROACH SPEEDS Vref
B, B+, D, F, G

	FLAPS 20° (1.3 VSI)				FLAPS 40° (1.5 VSI)			
WEIGHT	B	B+, D	F	G	B	B+, D	F	G
7,000	92	92	93		94	94		
7,500	95	95	96	94	98	98	99	100
8,000	98	98	100	97	101	101	103	103
8,500		101	103	100		104	106	106
8,490	101				104			
8,930		103				107		
9,000			106	103			109	109
9,435			108				112	
9,500				105				112
10,000				108				115
10,260				109				117



BILLING CODE 4910–13–C

(D) Each MU–2B profile in its respective section follows the outline below.

(1) Normal Takeoff (5- and 20-degrees flaps).

(2) Takeoff Engine Failure (5- and 20-degrees flaps).

(3) Takeoff Engine Failure on Runway or Rejected Takeoff.

(4) Takeoff Engine Failure after Liftoff—Unable to Climb (Classroom or FTD only).

(5) Steep Turns.
(6) Slow Flight Maneuvers.
(7) One Engine Inoperative Maneuvering/ Loss of Directional Control.
(8) Approach to Stall (clean configuration/ wings level).
(9) Approach to Stall (takeoff configuration/15- to 30-degrees bank).
(10) Approach to Stall (landing configuration/gear down/40-degrees flaps).
(11) Accelerated Stall (no flaps).
(12) Emergency Descent (low speed).
(13) Emergency Descent (high speed).
(14) Unusual Altitude Recovery (nose high).
(15) Unusual Altitude Recovery (nose low).
(16) Normal Landing (20- and 40-degrees flaps).
(17) Go Around/Rejected Landing.
(18) No Flap or 5-degrees flaps Landing.
(19) One Engine Inoperative Landing (5- and 20-degrees flaps).
(20) Crosswind Landing.
(21) ILS and Missed Approach.
(22) Two Engine Missed Approach.
(23) One Engine Inoperative ILS and Missed Approach.
(24) One Engine Inoperative Missed Approach.
(25) Non-Precision and Missed Approach.
(26) One Engine Inoperative Non-Precision and Missed Approach.
(27) Circling Approach at Weather Minimums.
(28) One Engine Inoperative Circling Approach at Weather Minimums.

Engine Performance

(A) The following should be considered in reference to power settings and airspeeds:

(1) Power settings shown in *italics* are provided as guidance only during training and are not referenced in the AFM. Power setting guidance is provided to show the approximate power setting that will produce the desired airspeed or flight condition. Actual power settings may be different from those stated and should be noted by the instructor and student for reference during other maneuvers. Power settings in the profiles are stated in torque or PSI and will vary with aircraft model, engine model, weight, and density altitude. Power settings are based on standard atmospheric conditions.

(2) Some pilots prefer to set power initially using fuel flow, because the fuel flow system is not field adjustable. Fuel flow settings refer to engine operations only. If fuel flow is used to set power for takeoff, check torque and temperature after setting fuel flow and adjust torque or temperature, whichever is limiting, for maximum takeoff power prior to liftoff.

(3) Improperly adjusted torque or improperly calibrated temperatures are a safety of flight issue and must be checked and corrected prior to conducting flight training.

(4) The pilot should refer to the performance section of the airplane flight manual to determine actual speeds required for his/her particular model and specific weight for any given operation.

In Flight Maneuvering

(A) Maneuvers conducted at altitude such as stalls and steep turns must always be preceded by clearing turns and at least one crew member must continually clear the flying area during the maneuver. The instructor must emphasize the importance of clearing the area, even if the maneuvers are being done in an FTD or simulator. This will create the habit pattern in the pilot to clear the area before practicing maneuvers.

(B) During stalling maneuvers and upon recognition of the indication of a stall, the pilot must call the ''stall'' to the instructor and then proceed with the recovery. In addition, during training, the pilot must announce the completion of the stall recovery maneuver. Instructors must exercise caution when conducting stall maneuvers and be prepared to take the controls if the safe outcome of the maneuver is in doubt.

(C) During accelerated stall maneuvers, it is important that the instructor pay close attention to the position of the ball throughout the maneuver and recovery so as to maintain coordinated flight. Stall recognition and recovery is the completion criteria, and it is not necessary to continue the stall beyond the stick shaker to aerodynamic buffet.

(D) When demonstrating a loss of directional control with one engine inoperative, the engine failure must only be simulated. During the slowing of the aircraft to demonstrate loss of directional control, the instructor should use the rudder block method to allow the student to experience the loss of directional control associated with VMC, at a speed of approximately 10 knots above actual VMC.

Note: To accurately simulate single engine operations, zero thrust must be established. The zero thrust torque setting will vary greatly from model to model. It is important to establish to zero thrust torque setting for your aircraft. This requires that the aircraft be flown on one engine to establish the zero thrust setting. This is accomplished by establishing single engine flight with one propeller feathered and noting the performance with the operating engine at maximum torque or temperature. It is suggested that two airspeeds be established for zero thrust power settings. They are 120 kts, flaps 20, gear up for takeoff and 140 knots, flaps 5, gear up for in-flight and approach maneuvering. Once performance has been established and recorded for each airspeed, restart the other engine and find the torque setting that duplicates the performance (climb or descent rate, airspeed) as was recorded with that propeller feathered. This torque setting will be zero thrust for the simulated inoperative engine. The student/pilot should note that the performance experienced with one engine operating at flight idle, may produce greater performance than if the engine were stopped and the propeller feathered.

Pre-maneuver briefings for any maneuver that requires either an actual engine shutdown or a simulated engine failure must be undertaken when using an aircraft. In the case of an actual engine shutdown, a minimum altitude of 3,000 ft above ground level (agl) must be used and done in a position where a safe landing can be made at an airport in the event of difficulty.

Takeoff and Landing

(A) When using the profiles to establish the procedure for configuring the aircraft for takeoff or landing, it is important to understand that each task for the procedure, as noted on the procedure diagram, establishes the point at which each task should have been completed and not the exact point at which the task should be accomplished unless otherwise stated in the task box. Numbers which represent performance such as descent rates or other maneuvering information that is not contained in the aircraft flight manual are shown in *italics.*

(B) In all takeoff profiles the prompt for the gear to be retracted is ''No Runway Remaining, Gear Up''. This should set the decision point for making a landback after an engine failure and should normally be reached at altitudes of less than 100 ft AGL. It is impractical to attempt a landback from above 100 ft AGL, because it can require distances up to 10,000 ft from the beginning of the takeoff run to bring the aircraft to a stop. But, even on very long runways, landback will not be necessary above 100 ft AGL and above Vyse for the flap configurations, if the single engine climb capability found in the POM charts, with the gear up, is positive (250 fpm or better) and obstacles clearance is not an issue.

(C) The manufacturers FAA-accepted checklists and checklist in Appendix C to this SFAR No. 108 describe a procedure for the discontinuance of flight following an engine failure after takeoff and the realization that the aircraft cannot climb. The corresponding flight profile in this training program is ''Takeoff Engine Failure, Unable to Climb''. This maneuver must not be attempted in the aircraft, but must be the subject of a classroom discussion or be demonstrated in the FTD.

(D) The focus of all landing procedures, whether two engine or engine out, is on a stabilized approach from an altitude of 500 feet. This will not be possible for all approach procedure maneuvering, especially during non-precision or circle to land approaches. Approach procedures for these two approaches should be stabilized from the point at which the pilot leaves the Minimum Descent Altitude for the landing.

(E) When performing one engine inoperative approaches, landings or missed approaches, the instructor must be prepared to add power to the simulated failed engine at the first sign of deteriorating airspeed or other situation that indicates the student's inability to correctly perform the maneuver.

(F) While maneuvering in the pattern or during instrument approach procedures with one engine inoperative, a 30° bank angle must not be exceeded. This will become especially important when executing non-precision and circle to land approaches.

Emergency and Abnormal Procedures

(A) During training, either in the FTD or in the aircraft, the performance of emergency and abnormal procedures is critical to the completion of the training program. All emergency and abnormal procedures should be simulated when training in the MU–2B airplane.

(B) When presenting emergency scenarios to the student, the instructor must not introduce multiple emergencies concurrently.

Scenario Based Training (SBT)

SBT flight training creates an environment of realism. The SBT programs utilize a highly structured flight operation scenario to simulate the overall flight environment. The pilot is required to plan a routine, point-to-point flight and initiate the flight. During the conduct of the flight, ''reality-based'' abnormal or emergency events are introduced without warning. Because the pilot is constantly operating in the world of unknowns, this type of training also builds in the ''startle factor'', and just as in the real-world, the consequences of the pilot's actions (decisions, judgment, airmanship, tactile skills, etc.) will continue to escalate and affect the outcome of the planned flight. Although flying skills are an integral part of this type of training, SBT enables the pilot to gain experience in dealing with unexpected events and more importantly further enhances the development of good judgment and decisionmaking.

PART 135—OPERATING REQUIREMENTS: COMMUTERS AND ON DEMAND OPERATIONS AND RULES GOVERNING PERSONS ON BOARD SUCH AIRCRAFT

■ 5. The authority citation for part 135 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 41706, 44701–44702, 44705, 44709, 44711–44713, 44715–44717, 44722, 45101–45105.

■ 6. Add SFAR No. 108 to part 135 to read as follows: SPECIAL FEDERAL AVIATION REGULATION NO. 108.

Note: For the text of SFAR No. 108, see part 91 of this chapter.

Issued in Washington, DC, on January 23, 2008.

Robert A. Sturgell,

Acting Administrator.

[FR Doc. 08–398 Filed 1–28–08; 8:45 am]

BILLING CODE 4910–13–P