（別紙２）Evidence-based Training

Evidence-based Training (EBT)

第１章　総則

１－１　目的

ICAO は、安全運航の確保のために重要なコンピテンシーの醸成に焦点を当てた訓練を行うことを目的として、Procedures for Air Navigation Services-Training (Doc9868) 及び Manual of Evidence-based Training (Doc9995) を発行し、より効果的・効率的・魅力的な訓練として Evidence-based Training を制定している。

EBT は、資格に必要な能力を確保した上で、コンピテンシーの更なる醸成を目的とした訓練を実施することに重点が置かれており、Baseline EBT 及び Enhanced EBT が設定されている。

Baseline EBT は、航空機を世代別に分類し、世界各国の運航データ等の分析を踏まえ、航空機の世代別に重視される航空機乗組員のコンピテンシーを醸成するための効果的・効率的・魅力的な訓練内容を提供しているものである。これにより、十分な分析及び訓練の開発を行うリソースを持たない航空運送事業者であっても、実施できるプログラムとなっている。

Enhanced EBT は、航空運送事業者の保有機材に係るデータ、運航データ及び訓練・審査データ等を分析し、その結果を Baseline EBT の訓練内容から応用することにより、航空運送事業者のニーズに即した訓練プログラムの構築を可能とするものである。

EBT は、CBTA の考え方を取り入れたプログラムの一つであることから、EBT を参考にした CBTA プログラムを導入することが可能である。このため、この別紙２は、EBT の具体的な導入方法を示すことを目的とする。

１－２　関連文書

IATA (International Air Transport Association) は、EBT を適切に実施できるよう、航空運送事業者の視点から「Evidence-based Training Implementation Guide」を発行しており、EBT を参考にした CBTA プログラムの導入においては有益であるため、必要に応じて参考にすること。

また、ICAO、IATA、IFALPA (International Federation of Air Line Pilots' Associations)は、EBT の開発に向けて、世界各国の LOSA(Line Operations Safety Audit)、FDM (Flight Data Monitoring) 及び航空事故・重大インシデント等の報告制度から得られ

た膨大なデータを分析しており、IATA はその内容について「Data Report For Evidence-based Training」を発行している。航空機の世代別及び運航フェーズ別の脅威（Threat）及びエラー（Error）の特定等、訓練内容を理解するために有効であるため、必要に応じて参考にすること。

さらに、(公財) 航空輸送技術研究センターは、「EBT（Evidence-based Trainng）に基づく操縦士訓練のあり方に関する調査・研究報告書」を発行しており、諸外国における運用実態等について調査を行っているため、実運用において有益である。

１－３　航空機の世代

EBT では、LOSA、FDM 及び航空事故・重大インシデント等の報告制度から得られたデータを詳しく分析することにより、航空機の世代別に異なる訓練課目が必要であることが示されている。EBT では、航空機に応じて、次に掲げる世代に分類される。

航空機の世代	代表的な機種
第４世代（ジェット）	A318/A319/A320/A321 (including neo)、A330、A340-200/300、A340-500/600、B777、A380、B787、A350、Bombardier C Series、Embraer E170/E175/E190/E195
第３世代（ジェット）	A310/A300-600, B737-300/400/500、B737-600/700/800 (NG)、B737 MAX、B757、B767、B747-400、B747-8、B717、BAE 146、MD11、MD80、MD90、F70、F100、Bombardier CRJ Series、Embraer ERJ 135/145
第３世代（ターボプロップ）	ATR 42-600、ATR 72-600、Bombardier Dash 8-400、BAE ATP、Embraer 120、Saab 2000
第２世代（ジェット）	A300 (except A300-600)、BAC111、B727、B737-100/200、B747-100/200/300、DC9、DC10、F28、L1011
第２世代（ターボプロップ）	ATR 42、ATR 72 (all series except -600)、BAE J-41、Fokker F27/50、Bombardier Dash 7 Bombardier Dash 8-100/200/300 Series、Convair 580-600 Series、Shorts 330 and 360、Saab 340
第１世代（ジェット）	DC8、 B707

第２章　コンピテンシー（Competency）

航空機乗組員として求められるコンピテンシーの基本的な枠組みは次に掲げるとおりであり、航空機乗組員に必要なコンピテンシーを細分化した各要素及びそれを評価するための指標で構成されている。この枠組みは、安全運航の確保のために特に重要な要素としてテクニカルスキル及びノンテクニカルスキルを含む要素により構成されている。この中には、コンピテンシーの要素のうちの「知識」及び「姿勢」の２つの要素が含まれていないが、航空運送事業者が必要に応じ、知識及び姿勢についても設定することが推奨される。

コンピテンシーを評価するための指標として、各コンピテンシー要素に関連する観察可能なパフォーマンスとして行動指標（Behavioral Indicator）を掲げているが、航空運送事業者は独自の評価手法を採用することができる。パフォーマンスが発揮されるべき条件や基準については、航空機製造事業者が安全性を考慮し推奨する運航手順及び設計思想等を参考にしながら、実運航に即して設定すること。

なお、航空運送事業者は、時代とともに変化する運航の実態及び運航ニーズ等を踏まえて、独自のコンピテンシーの枠組みを開発することが推奨されるため、次に掲げるコンピテンシーの枠組みを参考にしながら、ISD によるプログラムの開発・実施・見直しの中で随時見直しを行うこと。

（１）Aircraft Flight Path Management Automation（自動操縦による飛行管理）

「自動操縦による飛行管理」は、飛行管理装置（FMS）及びガイダンスを適切に使用することを含め、自動操縦により航空機の飛行を適切に管理することを目的としている。

【行動指標】

□状況に応じて、正確かつ円滑に自動操縦装置を使用することにより航空機を適切にコントロールする。

□航空機が予定の飛行経路から逸脱しないよう適切に対応する。

□航空機の通常運用範囲（Normal flight envelop）で飛行する。

□最適な運航性能を得るための飛行管理を行う。

□FMS の操作など注意をそらす要因等に対応している間においても、自動操縦装置を使用することにより、所定の飛行経路を維持する。

□運航フェーズ及び航空機乗組員の作業負担を考慮しながら、適時適切に自動操縦のレベル及びモードを選択する。

□自動操縦のエンゲージ及びモード変更を含めて、自動操縦の状況を的確にモニタリングする。

（２）Aircraft Flight Path Management Manual Control（マニュアル操縦による飛行管理）

「マニュアル操縦による飛行管理」は、飛行管理装置（FMS）及びフライトガイダンス

システム（Flight Guidance System）を含め、マニュアル操縦により飛行を適切に管理することを目的としている。

【行動指標】

□状況に応じて、正確かつ円滑にマニュアル操縦操作を行うことにより航空機を適切にコントロールする。
□航空機が予定の飛行経路から逸脱しないよう適切に対応する。
□航空機の通常運用範囲（Normal flight envelop）で飛行する。
□安全運航のため、航空機の姿勢、速度及び推力等を適切にコントロールする。
□最適な運航性能を得るための飛行管理を行う。
□機器の不具合など注意をそらす要因等に対応している間においても、マニュアル操縦操作により、所定の飛行経路を維持する。
□運航フェーズ及び航空機乗組員の作業負担を考慮しながら、適時適切にフライトガイダンスシステム（Flight Guidance System）のレベル及びモードを選択する。
□ガイダンスのエンゲージ及び自動操縦のモード変更を含めて、フライトガイダンスシステムの状況を的確にモニタリングする。

（３）Application of Procedures（手順の実施）

「手順の実施」は、適切な知識を活用し、運航手順書及び関連規則等に従って、適切に運航手順を確認し実施することを目的としている。

【行動指標】

□運航指示書のソースを理解する。
□安全運航を確保するために逸脱が必要な場合でない限り、SOP に従う。
□適時適切に、全ての運航指示書を確認し実施する。
□航空機のシステム及び関連する装置を正確に操作する。
□該当する規則を遵守する。
□運航手順に関連する知識を活用する。

（４）Situation Awareness（状況認識）

「状況認識」は、運航中に利用可能な関連情報を正しく把握・理解し、運航に影響を及し得る事態（リスク）を予測することを目的としている。

【行動指標】

□航空機及びそのシステムの状況を正確に認識している。
□航空機の位置（垂直・水平方向）及び予測される飛行経路を正確に認識している。
□運航に影響を及ぼし得る外部環境を正確に認識している。

□残燃料と飛行時間の関係を把握している。
□運航関係者の状況を配慮し、必要な対応ができるよう彼らのキャパシティを考慮している。
□何が発生するかを正確に予測し計画を立てている。
□手がかりとなる脅威（Threat）に基づき、緊急時の効果的な対応策を準備している。
□航空機及び乗員・乗客の安全のため、脅威を認識し、柔軟に対応している。
□状況認識の喪失を示す兆候を認識し、適切に対応している。

（５）Problem Solving and Decision Making（問題解決及び意思決定）

「問題解決及び意思決定」は、リスクを正しく認識し、適切なプロセスにより、問題の解決策を決定し、決定に基づく行動のレビューを行うことを目的としている。

【行動指標】
□適切なソースから正確かつ妥当な情報を入手している。
□状況が悪化した際の事実関係と原因を認識し、検証している。
□問題に対する適切な解決方策を採用している。
□安全性を損なうことなく、問題に取り組んでいる。
□適切かつタイムリーな意思決定のプロセスを採用している。
□適切に優先順位を設定している。
□効果的に代替案を確認し、検討している。
□決定事項をモニタリングし、レビューを行い、必要に応じて修正を行っている。
□効果的にリスクを認識し、対応している。
□安全運航を確保するため、不測の事態に直面した際にも臨機応変に対応している。

（６）Communication（コミュニケーション）

「コミュニケーション」は、通常運航及び異常運航下において、口頭伝達や非言語伝達等のあらゆる手段を通じて、必要な情報や考えを正しく伝えることにより、２人の航空機乗組員の状況認識を共有することを目的としている。

【行動指標】
□聞き手が情報を受け取ることができる状態であることを確認している。
□何を、いつ、どのように、誰とコミュニケーションするかを適切に選択している。
□情報を明確に、正確に、簡潔に伝えている。
□重要な情報を伝える際には、聞き手が正しく理解していることを確認している。
□情報を受けた際は、相手の内容を積極的に聞き、理解したことを明確に示している。
□理解が不十分な場合には、自分の理解が明確になる質問をしている。
□標準的な言葉遣いで無線電話の手順に従ってコミュニケーションを行っている。

□会社が発行する運航に関する文書を正確に理解している。
□英語によるデータリンクメッセージを読み、理解し、対応している。
□必要に応じて、運航手順により会社に運航に係る報告を行っている。
□非言語のコミュニケーションを正確に理解している。
□口頭によるメッセージにあわせて、アイコンタクト、ボディーランゲージ、ジェスチャーを活用している。

（7）Leadership and Teamwork（リーダーシップ及びチームワーク）

「リーダーシップ及びチームワーク」は、リーダーシップを発揮し、効果的なチームワークを構築することにより、安全運航のための相乗効果を生むことを目的としている。

【行動指標】

□他の航空機乗組員の役割や目的を理解し賛同している。
□コミュニケーションしやすい雰囲気をつくり、チームへの参画を促している。
□リーダーシップを発揮し、必要なタイミングで指示を出している。
□間違いを認め、責任をとっている。
□他の航空機乗組員のニーズを把握し、適切に対応している。
□関連する懸念事項や自分の考えを伝えている。
□お互いに、建設的なフィードバックを行っている。
□安全運航のために重要な場合には、毅然として介入している。
□他の運航乗務員の気持ちを理解し、敬意を持ち、寛容に対応している。
□他の航空機乗組員とともに計画し、双方の能力に応じて、適切かつ公平にタスクを配分する
□意見の対立や相違点について、建設的に対処し、解決している。
□あらゆる状況において、自制心を保っている。

（8）Workload Management（業務管理）

「業務管理」は、あらゆる状況下において各航空機乗組員のパフォーマンスが発揮されるよう、適時適切に優先順位をつけてタスクを行うため、全てのリソースを効率的に管理することにより、オーバーロードを防止することを目的としている。

【行動指標】

□あらゆる状況において、自制心を保っている。
□適切にタスクの計画を設定し、優先順位をつけ、予定を立てている。
□タスクを実施する際には、効率的に時間管理を行っている。
□支援の申し出・受け入れを行い、必要な場合には業務を任せ、初期の段階で助けを求めている。

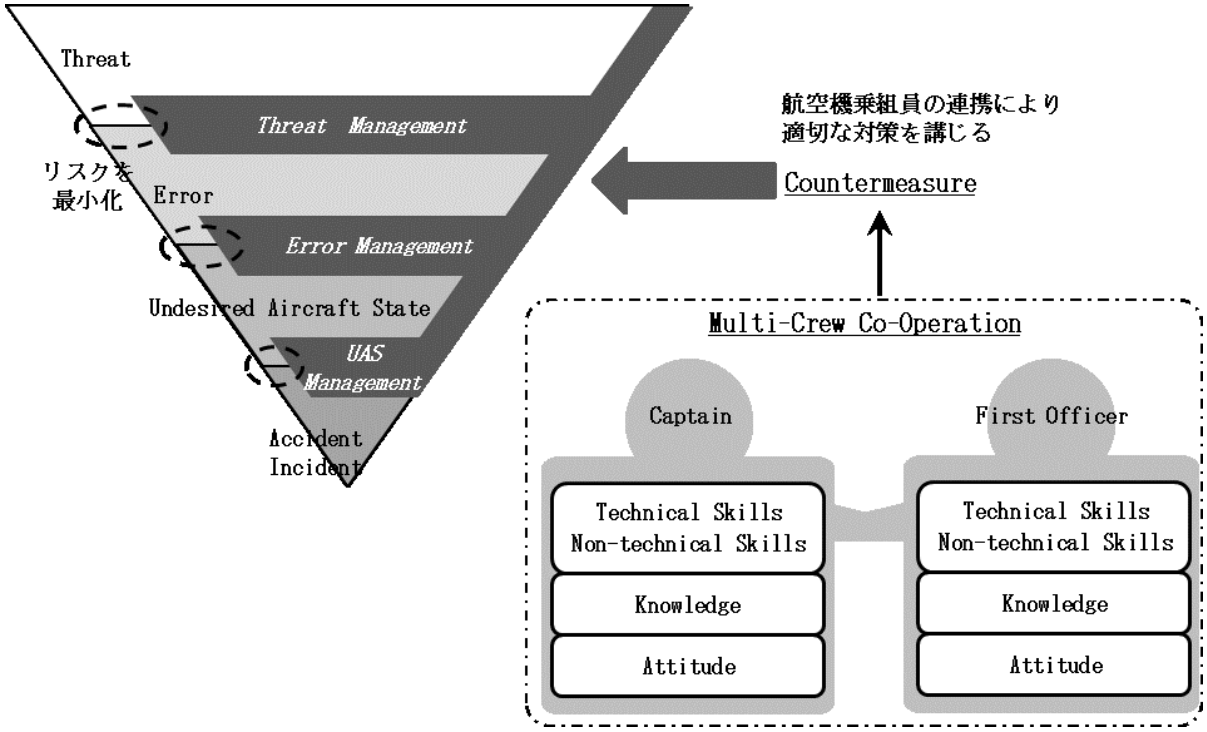
□入念に、行動のレビュー・モニタリング・クロスチェックを行っている。
□タスクが期待したとおりに実施されていることを確認している。
□中断、注意散漫、状況変化、不成功について、効果的に対応し、正常な状態への回復を行っている。

第３章　カリキュラム

３－１　EBT の考え方

３－１－１　Threat and Error Management（TEM）

EBT は、世界各国の LOSA、FDM 及び航空事故・重大インシデント等の報告制度から得られたデータの分析に基づき導き出されたプログラムである。データ分析においては、「発生可能性」、「重大性」及び「訓練効果」の３つの観点から、航空機の世代及び運航フェーズ別に重要な脅威（Threat）及びエラー（Error）が特定され、これらに対処（Management）するために必要なコンピテンシーと強く関連付けられている。このため、十分な分析及び訓練の開発を行うリソースを持たない航空運送事業者でも実施することができるプログラムである。



Threat and Error Management の考え方

３－１－２　訓練

EBT は、３年を１サイクルとし、３－２－１に示す３つのフェーズで構成された訓練モジュールを定期的に行うことを典型的なプログラムとして設計されており、TEM のためのコンピテンシーの醸成に主眼を置いた訓練プログラムである。

３－１－３　航空機システムの不具合（Aircraft System Malfunctions）

評価フェーズ（Evaluation Phase）及び運航シナリオ訓練フェーズ（Scenario-Based Training Phase）に盛り込むべき航空機システムの不具合は、コンピテンシーを大いに活用しなければ対応できないようなものであること。この考え方により網羅されない不具合については、高度な機材を活用した EBT による訓練・審査とは異なる方法により、別途必要な訓練（集合座学訓練等）を実施する必要がある。

不具合の分類は、下表に掲げる不具合の特性及びそれらに対応するために求められるパフォーマンスの要素により決定される。ある不具合への対応のために発揮されたコンピテンシーは、同一特性のグループに分類される不具合への対応のためのコンピテンシーと同等であると考えられる。

特性	求められるパフォーマンス	例
緊急性 (Immediacy)	航空機乗組員が即時にかつ速やかに介入や決断を行うことを要するシステム不具合	火災、発煙、高高度での減圧、離陸時の不具合、着陸時のブレーキ故障等
複雑性 (Complexity)	複雑な対応手順を要するシステム不具合	複数の油圧系統故障、煙の制御
飛行制御の低下 (Degradation of aircraft control)	異常な操縦特性を伴った飛行制御の重大な機能低下を招くシステム不具合	飛行制御の固着（ジャム)、フライバイワイヤ制御の機能低下
計器表示の消失 (Loss of Instrumentation)	機能が低下した計器や代替計器を活用したモニタリング及び飛行経路の管理を要するシステム故障	プライマリーディスプレイの信頼性低下、飛行速度の表示異常
結果事象への対応 (Management of consequence)	広範な対応を要するシステム故障（運航や環境と直接の関係がないもの)	燃料漏れ

３－１－４　進入方式（Approach Types）

運航シナリオ訓練フェーズ（Scenario-Based Training Phase）で実施する進入方式の分類は、それらに対応するために求められるパフォーマンスの要素により決定される。ある進入方式への対応のために発揮されたコンピテンシーは、同一グルー

プに分類される進入方式への対応のためのコンピテンシーと同等であると考えられる。進入方式の分類を行う際には、次に掲げる要素が考慮されるべきである。

（１）直線進入／視認によるアライメント進入／周回進入
（２）自動操縦装置のレベル
（３）精密進入／非精密進入
（４）内外のガイダンス
（５）ビジュアル・セグメント
（６）特定の進入方式（PRM、RNP-AR 等）
（７）標準と異なる進入角
（８）低視程下での運航（カテゴリー運航）

また、進入中の様々な状況でのゴーアラウンド訓練は不可欠であり、高頻度で実施するべき訓練項目である。一方で、普段の運航において定期的に実施する進入方式については、訓練頻度を少なくしても差し支えないものとする。

３－２　カリキュラム

次に掲げる基準を参考にカリキュラムを定め、その課目、標準時間及び実施方法を定めること。

３－２－１　ステップ１（定期訓練・定期審査等に CBTA プログラムを導入）

本紙２－１に定めるステップ１に従って、定期訓練・定期審査等に CBTA プログラムを導入する場合には、次に掲げる基準を参考にカリキュラムを定めること。

（１）定期訓練サイクル

36 ヶ月を定期訓練サイクルとして設定するとともに、さらに当該サイクルを３分割した期間（12 ヶ月）を評価期間として設定し、次に掲げる３つのフェーズから構成される訓練モジュールを年２回（合計６回）均等に実施することを基本とする。これは、EBT を実施する際の標準的な訓練体系として推奨されるものである。

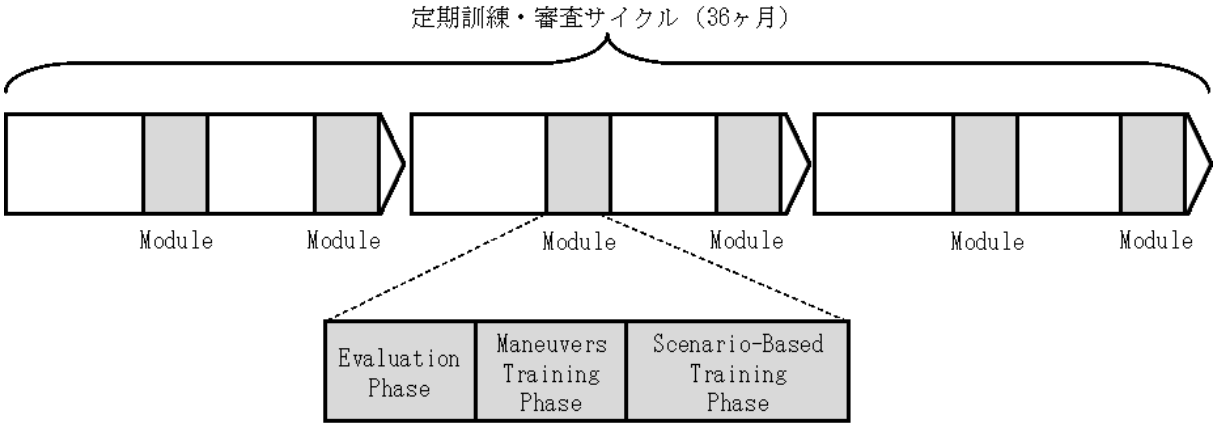
上記に関わらず、Enhanced EBT を指向する場合等において、航空運送事業者がより効果的・効率的・魅力的な訓練体系が確保されると考える場合には、これに依らずに次に掲げる３つのフェーズを組み合わせた訓練体系を構築することでも差し支えないものとする。

ａ）評価フェーズ（Evaluation Phase）

ｂ）操縦操作訓練フェーズ（Maneuvers Training Phase）

ｃ）運航シナリオ訓練フェーズ（Scenario-Based Training Phase）

なお、EBT は、コンピテンシーの醸成に重点を置いた訓練体系の構築を目指したものであるが、我が国においては、航空法において定期的な審査の実施が求められているため、上記に加えて、本紙に定める技能審査及び路線審査も別途盛り込んだ訓練・審査体系を構築すること。



EBT における典型的なカリキュラム構成

（２）訓練モジュール

ａ）評価フェーズ（Evaluation Phase）

ア）評価フェーズは、訓練の一部であり次に掲げる内容を目的としている。

・航空機乗組員としてのコンピテンシーの評価

・更に訓練内容を向上させるとともに、訓練効果を測定するためのデータ収集

・それぞれの航空機乗組員に必要な訓練ニーズの特定

イ）航空機乗組員としてのコンピテンシーを確認するため、実運航に即した運航シナリオの中でコンピテンシーの評価を行うこと。詳細は、この別紙２の付録１～３を参照すること。

ウ）評価において、課題が確認された場合には、そのパフォーマンスに至った根本原因（Root Cause）の特性に努めること。

エ）教官は、運航シナリオの途中で指導及び中断を行わないこと。また、教官は、運航シナリオに沿って外部リソース（ATC、Cabin crew 等）の役割を担いながら、航空機乗組員のパフォーマンスの観察に集中する

こと。

オ）教官が、運航シナリオの途中で介入せざるを得なくなった場合には、航空機乗組員のパフォーマンスに及ぼす影響を考慮して対応すること。

カ）36ヶ月の定期訓練サイクルの中で、コンピテンシーの要素を均等に評価できるように、評価内容や運航シナリオを適切に設定すること。

b）操縦操作訓練フェーズ（Maneuvers Training Phase）

ア）操縦操作訓練フェーズは、航空運送事業者が定めた要件を維持させるため、重要な操縦操作を行うためのテクニカルスキルの訓練及び向上を目的としている。

イ）重要な操縦操作に必要なスキル及びそれに関連する手順を対象に訓練を行うこと。詳細は、この別紙２の付録１～３を参照すること。

ウ）教官は、航空機乗組員のコンピテンシーを確認しつつ、訓練の機会を有効活用しスキルの向上を積極的に手助けするよう努めること。

エ）スキルに焦点を当てた訓練であることから、繰り返し訓練することによりパフォーマンス向上の機会を与えるものであり、運航シナリオ形式の訓練で実施しないこと。

c）運航シナリオ訓練フェーズ（Scenario-Based Training Phase）

ア）運航シナリオ訓練フェーズは、予測可能な事態だけでなく予測不可能な事態への対応能力の向上に向けて、発生し得る脅威（Threat）及びエラー（Error）に適切に対応するためのコンピテンシーを醸成し、更なる向上を図ることを目的としている。

イ）運航シナリオは、実運航に即した複数の脅威（Threat）が含まれた運航シナリオで構成されていること。詳細は、この別紙２の付録１～３を参照すること。

ウ）運航シナリオ訓練フェーズの内容は、評価フェーズで低評価となったコンピテンシーを向上させることを目的とした構成にすること。

エ）教官は、航空機乗組員のコンピテンシーの向上及びより良い訓練を実施するために、必要な場合には、運航シナリオを中断すること及び介入することが可能であるものとする。

オ）Pilot-Monitoring（PM）は、安全運航のために重要であり、次に掲げる役割を果たしている。EBTはPMの養成にも重点が置かれており、教官はPF・PM両方の役割のバランスをとりながら、訓練効果を最大化すること。

・積極的にPMとしての役割を果たす

・状況認識（Situation Awareness）を維持する（特に、他の航空機

乗組員のタスクの実施状況の観察）

・飛行計画の変更において、必要な情報を提供することにより PF（Pilot Flying）をサポートする

・PF が見えづらい計器（パラメータ）を監視する

・PF の行動を監視する

・PF のバックアップを確保する（PF が異常事態に適切に対応できなかった場合等に、役割を引き継ぐといった冗長性の確保）

・SOP 又は制限範囲からの逸脱をコールアウトする

・SOP に設定されたタスクを実施する

カ）In-Seat Instruction（ISI）は、運航シナリオ訓練フェーズ（Scenario-based Training Phase）においてのみ実施される着座状態での教育である。この ISI に関わる運航シナリオにおける航空機乗組員の対応については、否定的な評価とならないよう配慮すること。ISI は、次に掲げるような事前に設定された運航シナリオに従って実施すること。

・教官がインキャパシテーションになった状況を模擬し、その状況に対するその他の航空機乗組員の対応を見る場合

・教官が操縦席に座り、事前に設定された PF 又は PM としての役割を実演して見せる場合や途中で他の航空機乗組員により介入させる場合

キ）EBT の開発におけるデータ分析において、航空機乗組員が驚くような又は予期しないような脅威（Threat）やエラー（Error）に直面した場合には、適切に対応することが非常に困難になることが示されている。付録１～３に示す「サプライズ（Surprise)」は、同様のシナリオを繰り返し実施することにより、慣熟してしまわないよう、可能な範囲で、シナリオの形態、発生時期、発生形態を変化させることを考慮すること。

ク）EBT の開発におけるデータ分析において、航空機乗組員の意図的な規程逸脱と航空事故・重大インシデントにつながる重大な Error の発生には、強い関連があることが示されている。付録１～３に示す「コンプライアンス（Compliance)」は、EBT の訓練全般にわたる評価項目であり、教官は意図的な規程逸脱を確認した場合には、最適な学習機会として捉えて対応すること。

（３）技能審査

訓練モジュールに加えて、資格の維持に必要な航空機乗組員としてのコンピテンシーを有しているかどうかを評価するため、評価期間において、運航シナリオによる技能審査を１回実施すること。なお、（２）ａ）に定める評価フェー

ズを技能審査に代えて実施することでも差し支えないものとする。

（４）路線審査

訓練モジュールに加えて、実運航において航空機乗組員としてのコンピテンシーを評価するため、評価期間において路線審査を１回実施すること。

３－２－２　ステップ２（技能証明・機長認定等にCBTAプログラムを導入）

ICAO Doc9995では、資格の維持・向上に重点を置いた定期訓練に関するカリキュラムが設計・開発されているのみであり、資格付与に係る訓練・審査の具体的な内容が定められていない。このため、本紙２－１に定めるステップ２に従って、技能証明の取得・機長認定等にCBTAの考え方を取り入れる場合には、今後のEBTの開発動向等を踏まえつつ、本紙４－７－３に従って、ISDの考え方を取り入れた訓練・審査を実施すること。

３－３　Baseline EBTの導入

別紙２の１－２に定める航空機の世代のうち、我が国の航空運送事業者において主に運航されている第４世代（ジェット）、第３世代（ジェット）及び第３世代（ターボプロップ）の航空機に係るBaseline EBTのプログラムは、付録１～３のとおりである。

Baseline EBTは、世界各国の航空事故・重大インシデント等の安全情報、世界中の航空会社の運航データや訓練・審査データ等を共有し、膨大なデータを分析した結果に基づき開発されている。このため、訓練・審査データや運航データの傾向を把握することにより、付録１～３を活用することにより、効果的・効率的・魅力的なカリキュラムを容易に構築することが可能なプログラムである。

付録１～３の構成要素は次に掲げるとおりであり、カリキュラムは付録１～３を参照しながら作成すること。

（１）訓練項目（Assessment and Training Topic）

訓練項目は、脅威（Threat）、エラー（Error）及びその他データ分析に基づき得られたものであり、訓練による見直しの対象となる。

「ISI（In Seat Instruction）」が付された項目は、着座状態での教育や体験課目の一部として位置づけられている。

（２）実施頻度（Frequency）

EBTにおける優先度であり、推奨実施頻度を示したものである。

A：全ての訓練モジュールに含まれるべき項目

B：２回に１回（１年に１回）の訓練モジュールに含まれるべき項目

C：６回に１回（３年に１回）の訓練モジュールに含まれるべき項目

（3）運航フェーズ（Flight phase for activation）

運航シナリオにおいて、安全運航に影響を及ぼす脅威（Threat）及びエラー（Error）が現れる運航フェーズの区分を示したものである。

略語	運航フェーズ	説明
ALL	ALL	全ての飛行フェーズ
GND	Pre-flight and Taxi	飛行準備から Line-up 完了まで
TO	Take-off	離陸推力の上昇からフラップ／スラットの収納完了まで
CLB	Climb	フラップ／スラットの収納完了から上昇の完了まで
CRZ	Cruise	上昇の完了から降下の開始まで
DES	Descent	降下の開始からスラット／フラップ展張開始又は初期進入のいずれか早いほうまで
APP	Approach	スラット／フラップ展張開始又は初期進入のいずれか早いほうから 50ft AAL まで（着陸復行を含む）
LDG	Landing	50ft AAL から Taxi スピードまで
GND	Taxi and Post-flight	Taxi スピードからエンジン停止まで

（4）説明（Description）

脅威（Threat）、エラー（Error）及び重要ポイントを含め、訓練項目を説明したものである。

（5）求められる結果（Desired Outcome）

到達基準や訓練効果を含め訓練により求められる結果を説明したものである。

（6）シナリオ要素の例（Example scenario element）

訓練項目に関するシナリオの要点をリスト化したものであり、実際の訓練を実施する際には航空運送事業者に実態に合わせた独自のシナリオを設定することが推奨される。

（7）コンピテンシーマップ（Competency map）

「X」の付されたコンピテンシーは運航シナリオに対処する上で重要なものであり、次のとおり決定される。

a）設定された脅威（Threat）及びエラー（Error）に適切に対応するために最も重要と考えられるコンピテンシーであること。

b）設定された脅威（Threat）及びエラー（Error）に適切に対応できない場合に、その原因として最も関連が深いと考えられるコンピテンシーであること。

３－４　Enhanced EBT の導入

Enhanced EBT は、運航に係るデータ、コンピテンシーの評価に係るデータ及び航空運送事業者の有する機材に係るデータ等を分析し、Baseline EBT のプログラムにその分析結果を応用することにより、航空運送事業者のニーズに合わせて構築することができるプログラムである。このため、Enhanced EBT は、訓練の「効果」、「効率」、「魅力」を高めるものであり、Baseline EBT と異なり、継続的なデータの収集・分析を詳細に行うことが必要である。

３－４－１　データ収集

データ収集・分析は、実運航で発生する脅威（Threat）の分析及び安全運航に影響を及ぼしうる要因の特定を目的に実施するものであり、次に掲げるデータの収集を行うことが有効であるため、可能な限り収集を行うこと。

（１）安全報告制度によるデータ

航空法第 111 条の４に基づく安全上の支障を及ぼす事態の報告及び航空安全プログラム（State Safety Program：SSP）における航空安全情報自発報告に係るデータは、CBTA プログラムを安全管理システムの取り組みの一貫として機能させるために有効な情報源である。このため、こうした安全情報については、必要に応じて TEM 分析を活用することにより、コンピテンシーに関連付けた分析を行い訓練に活用する。

（２）飛行データ

飛行データは、実運航において発生した事案の事実関係を容易に収集することができる情報源であるため、実運航で発生する脅威（Threat）等の分布等運航上の傾向を把握することに役立てることができる。

例）・不安定なアプローチの実施率及びそれによる着陸復行と着陸の割合
・ある脅威（Threat）やイベントの発生頻度
・運航と飛行経路の特殊性　　等

（３）コックピット・オブザーブによるデータ

コックピット・オブザーブは、LOSA を含めて、適切な訓練を受けた者が通常の運航をオブザーブすることにより、実運航で発生する脅威（Threat）及びエラー（Error）並びにそれらへの対応を把握するためのものである。なお、

このオブザーブは、資格の付与及び維持に関わるものではない。

コックピット・オブザーブを行うことにより、安全報告制度によるデータ及び飛行データによる分析結果を補足することが可能であり、事態の発生原因及びその対処結果についても記録されるため、有益なデータを収集することができる。

（4）運航上の課題

飛行経路の構成・長さ、注意を要する使用空港、特殊運航、複雑なアプローチ及び天候等の運航特性に係るデータを分析することにより、低減可能なリスクに焦点を当てた訓練を設定することに役立てることができる。

（5）機材データ

航空機製造事業者のデータを含めて、類似型式機体及び類似環境による運航における安全データの分析を行うことにより、機材毎の傾向や懸念される個々のリスクを把握することができる。

（6）訓練・審査データ

訓練・審査において航空機乗組員のコンピテンシーの評価に係るデータ分析を行うことにより、訓練効果を検証することができるとともに、コンピテンシーの分布を把握することにより、訓練内容の見直しに役立てることができる。

3－4－2　データの分析

（1）訓練・審査データについては、精査された指標に基づき分析を行うことにより有効な結果を得ることができるものであり、典型的な指標として次に掲げるものを含む。

・航空機型式別及び訓練・審査課題別の合格率の違い
・訓練シナリオと航空機型式別の評価の分布
・コンピテンシーの維持の状況
・教官・評価者の評価分布（評価の標準化を行う仕組みの有効性を測定するために重要である。しかしながら、教官・評価者の監視や評価付けの変更を強制することを意図するものではないため注意すること。）

（2）コンピテンシーの重要性は、実運航においてのみ判断できるものであるため、訓練・審査データの分析結果及び運航実態を示すデータを複合して分析することにより、CBTA プログラムの見直し内容の特定を行うこと。

３－４－３　プログラムの開発

Enhanced EBT では、安全上重要な訓練項目の決定、運航シナリオの作成及び航空機乗組員が対処する際に求められるコンピテンシー・評価基準の設定が必要であり、その手順は次に掲げるとおりである。

（１）データの収集・分析により、脅威（Threat）及びエラー（Error）を特定すること。

（２）特定した脅威及びエラーについて、そのリスク及び訓練との関連に係る分析を実施すること。

（３）上記の分析により得られた全ての脅威（Threat）及びエラー（Error）を含めたものでもよいが、各訓練課目や運航シナリオに対応したパフォーマンスの評価基準を設定すること。各訓練課目や運航シナリオには、それらに対処するために最も重要と考えられるコンピテンシーを付加すること。

（４）Enhanced EBT について、その全体像及びパフォーマンスの評価手法を設定すること。

３－５　データ管理

本紙４－10（２）に基づくデータについては、月例データを翌月中に航空局に提出すること。データの内容は、次表に定めるものを参考にしながら、航空運送事業者との協議により詳細を決定すること。

なお、次表に定めるデータの項目のうち、Measured Item は、操縦操作（Maneuver）、及びイベントセット（Event　set）等、データ分析を行うための主要な要素を意味している。

No.	データ項目	記載例
1	航空機乗組員 ID (Crewmember ID)	APP0001
2	航空機乗組員の年齢 (Age)	40、53
3	教官 ID (Instructor ID)	INS0001
4	評価者 ID (Evaluator ID)	EVA0001
5	航空局審査官・試験官 ID (JCAB Inspector ID)	JCAB0001
6	実施日 (Evaluation Date)	2017/4/1
7	職種 (Crew Position)	CAPT or FO or Trainee
8	PF 又は PM (Responsibility)	PF or PM
9	対象機種 ID (Type Rating ID)	B767、A320
10	使用機材 ID (Media ID)	FFS767_3
11	カリキュラム (Curriculum)	Periodic Training
12	訓練種の識別 ID	ADVT2016
13	主要項目名:Phase、課目、シナリオの名前 (Measured Item)	Landing
14	主要項目 ID:Phase、課目、シナリオの ID (Measured Item ID)	07.04.03
15	コンピテンシーの定義 (Competency)	Flight Pass Management Automation
16	コンピテンシーの定義 ID (Competency ID)	FA
17	評価 (Grading)	4
18	コメント (Comments)	－
19	結果 (Result)	Completed or Unachieved

カリキュラム作成ガイダンス
～第４世代（ジェット）～

１．別紙２の１－３に定める第４世代（ジェット）に分類されるような飛行機に関する定期訓練・定期審査の内容を付録１に示す。

２．このマトリックスを活用することにより、EBT の考え方を取り入れた訓練・審査の開発を行うことが可能であり、世界中の運航データ等の分析に基づく Baseline EBT の実施に役立つものである。

	Assessment and training topic+A2:O12	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Maneuvers training phase	Rejected take-off	A	TO	Engine failure after the application of take-off thrust and before reaching V1	Demonstrate manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detect deviations through instrument scanning Maintain spare mental capacity during manual aircraft control Maintain the aircraft within the flight envelope Apply knowledge of the relationship between aircraft attitude, speed and thrust	From initiation of take-off to complete stop (or as applicable to procedure)	X			X				
	Failure of critical engine between V1 & V2	A	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		Themaneuver is considered to be complete at a point when aircraft is stabilized at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement	X			X				
	Failure of critical engine between V1 & V2	B	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The maneuver is considered to be complete at a point when aircraft is stabilized in a clean configuration with engine-out procedures completed	X			X				
	Emergency descent	C	CRZ	Initiation of emergency descent from normal cruise altitude		The maneuver is considered to be completed once the aircraft is stabilized in emergency descent configuration (and profile)	X		X	X				
	Engine-out approach & go-around	A	APP	With a critical engine failed, manually flown normal precision approach to DA, followed by manually flown go-around, the whole maneuver to be flown without visual reference		This maneuver should be flown from intercept to centreline until acceleration after go-around. Themaneuver is considered to be complete at a point when aircraft is stabilized at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement* (describe generally critical part of maneuver)	X			X				
	Go-around	A	APP	Go-around, all engines operative		High energy, initiation during the approach at 150 to 300 m (500 to 1000 ft) below the missed approach level off altitude	X		X	X				
	Go-around	A	APP	Go-around, all engines operative followed by visual circuit, manually flown		Initiation of go-around from DA followed by visual circuit and landing	X		X	X				
	Go-around	A	APP	Go-around, all engines operative		During flare/rejected landing	X		X	X				
	Engine-out landing	A	LDG	With a critical engine failed, normal landing		Initiation in a stabilized engine-out configuration from not less than 3 NM final approach, until completion of roll-out	X			X				

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							Competency map							
Evaluation and scenario-based training phases	Adverse Weather	A	GND	Thunderstorm, heavy rain, turbulence, ice build up to include de-icing issues, as well as high temperature conditions. The proper use of use of anti-ice and de-icing systems should be included generally in appropriate scenarios.	Anticipate adverse weather Prepare for suspected adverse weather Recognize adverse weather Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Predictive wind shear warning before take-off, as applicable	X	X				X		
			TO			Adverse weather scenario, e.g. thunderstorm activity, precipitation, icing		X			X	X		X
			TO			Wind shear encounter during take-off, not predictive	X			X			X	
			TO			Predictive wind shear warning during take-off	X	X				X	X	
			TO			Crosswinds with or without strong gusts on take-off	X			X				
			CRZ			Wind shear encounter scenario during cruise	X		X			X	X	X
			APP			Reactive wind shear warning during approach or go-around	X		X	X			X	
			APP			Predictive wind shear warning during approach or go-around	X	X				X	X	
			APP			Thunderstorm encounter during approach or on missed approach	X					X	X	
			APP			Increasing tailwind on final (not reported)	X	X				X	X	
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				X		X	X	
			APP			Non-precision approach in cold temperature conditions, requiring altitude compensation for temperature, as applicable to type	X	X					X	
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing(within and beyond limits)	X			X		X		
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	X	X				X		

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							Competency map							
Evaluation and scenario-based training phases	Automation Management	A	ALL	The purpose of this topic is to encourage and develop effective flight path management through proficient and appropriate use of flight management system(s), guidance and automation including transitions between modes, monitoring, mode awareness, vigilance and flexibility needed to change from one mode to another. Included in this topic is the means of mitigating errors described as: mishandled auto flight systems, inappropriate mode selection, flight management system(s) and autopilot usage.	Know how and when to use flight management system(s), guidance and automation Demonstrate correct methods for engagement and disengagement of auto flight system(s) Demonstrate appropriate use of flight guidance, auto thrust and other automation systems Maintain mode awareness of auto flight system(s), including engagement and automatic transitions Revert to different modes when appropriate Detect deviations from the desired aircraft state (flight path, speed, attitude, thrust, etc.) and take appropriate action. Anticipate mishandled auto flight system Recognize mishandled auto flight system. Take appropriate action if necessary Restore correct auto flight state Identify and manage consequences	ACAS warning, recovery and subsequent engagement of automation	X		X					
			ALL			FMS tactical programming issues, e.g. step climb, runway changes, late clearances, destination re-programming, executing diversion	X		X					
			ALL			Recoveries from TAWS, management of energy state to restore automated flight	X		X	X				
			ALL			Amendments to ATC cleared levels during altitude capture modes, to force mode awareness and intervention	X		X				X	
			TO			Late ATC clearance to an altitude below acceleration altitude	X		X				X	
			TO APP			Engine-out special terrain procedures	X		X				X	
			CRZ			Forcing AP disconnect followed by re-engagement, recovery from low or high speed events in cruise	X		X	X			X	
			CRZ			Engine failure in cruise to onset of descent using automation	X		X					
			CRZ			Emergency descent	X		X					
			DES APP			Managing high energy descent capturing descent path from above(correlation with unstable approach training)	X		X				X	
			APP			No ATC clearance received prior to commencement of approach or final descent	X		X				X	
			APP			Reactive wind shear and recovery from the consequent high energy state	X		X				X	
			APP			Non precision or infrequently flown approaches using the maximum available level of automation	X		X					
			APP			Gear malfunction during approach		X				X		X
			APP			ATC clearances to waypoints beyond programmed descent point for a coded final descent point during an approach utilising a final descent that is commanded by the flight management system.	X		X				X	

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							Competency map							
Evaluation and scenario-based training phases	Competencies non-technical(CRM)	A	APP	This encapsulates communication; leadership and teamwork; problem solving and decision making; situation awareness; workload management. Emphasis should be placed on the development of leadership, shown by EBT data sources to be a highly effective competency in mitigating risk and improving safety through pilot performance	<u>Communication</u>: Demonstrate effective use of language, responsiveness to feedback and that plans are stated and ambiguities resolved. <u>Leadership and teamwork</u>: Use appropriate authority to ensure focus on the task. Support others in completing tasks. <u>Problem solving and decision making</u>: Detect deviations from the desired state, evaluate problems, identify risk, consider alternatives and select the best course of action. Continuously review progress and adjust plans. <u>Situation awareness</u>: Have an awareness of the aircraft state in its environment; project and anticipate changes. <u>Workload management</u>: Prioritize, delegate and receive assistance to maximize focus on the task. Continuously monitor the flight progress	GPS failure prior to commencement of approach associated with position drift and a terrain alert					X	X	X	
			DES			Cabin crew report of water noise below the forward galley indicating a possible toilet pipe leak, with consequent avionics failures					X	X	X	
			CRZ			Smoke removal but combined with a diversion until landing completed.		X			X	X	X	X
			CRZ			ACAS warning immediately following a go-around, with a descent maneuver required.		X			X	X	X	X
	Compliance	A	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOP). This is not intended to list scenarios, but instructors should ensure that observed non-compliances are taken as learning opportunities throughout the programme. In all modules of the programme, the FSTD should as far as possible be treated like an aircraft, and non-compliances should not be accepted simply for expediency.	Recognize that a compliance failure has occurred Make a verbal announcement Take appropriate action if necessary Restore safe flight path if necessary Manage consequences	The following are examples of potential compliance failures, and not intended to be developed as scenarios as part of an EBT Module: 1. Requesting flap beyond limit speed 2. Flaps or slats in the wrong position for phase of flight or approach 3. Omitting an action as part of a procedure 4. Failing to initiate or complete a checklist 5. Using the wrong checklist for the situation	Intentionally blank							

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							Competency map							
Evaluation and scenario-based training phases	Go-around management	A	APP	Any threat or error which can result in circumstances which require a decision to go-around, in addition to the execution of the go-around. Go-around scenarios should be fully developed to encourage effective leadership and teamwork, in addition to problem solving and decision making, plus execution using manual aircraft control or flight management system(s) and automation as applicable. Design should include the element of surprise and scenario-based go-arounds should not be predictable and anticipated. This topic is completely distinct from the go-around maneuver listed in the maneuvers training section that is intended only to practice psychomotor skill and a simple application of the procedures		Adverse weather scenario leading to a reactive wind shear warning during approach	X	X					X	X
			APP			Adverse weather scenario leading to a predictive wind shear warning during approach or go-around	X	X					X	X
			APP			Adverse weather scenario, e.g. thunderstorm activity, heavy precipitation or icing forcing decision at or close to DA/MDA	X					X	X	X
			APP			DA with visual reference in heavy precipitation with doubt about runway surface braking capability	X					X	X	X
			APP			Adverse wind scenario resulting in increasing tailwind below DA (not reported)		X		X		X		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		X		X		X		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		X		X		X		
			APP			Lost or difficult communications resulting in no approach clearance prior to commencement of approach or final descent	X		X				X	
			APP			Birds: large flocks of birds below DA once visual reference has been established				X		X	X	
			APP			System malfunction, landing gear malfunction during the approach								

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							Competency map							
Evaluation and scenario-based training phases	Manual aircraft control	A	ALL	The competency description is "Maintains control of the aircraft in order to assure the successful outcome of a procedure or maneuver"	Desired competency outcome: Demonstrates manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detects deviations through instrument scanning Maintains spare mental capacity during Manual aircraft control Maintains the aircraft within the normal flight envelope Applies knowledge of the relationship between aircraft attitude, speed and thrust	Flight with unreliable airspeed, which may be recoverable or not recoverable	X			X			X	
			ALL			Alternate flight control modes according to malfunction characteristics	X			X				X
			ALL			ACAS RA to descend or ATC immediate descent	X	X		X				
			DES			TAWS warning when deviating from planned descent routing, requiring immediate response	X			X	X			
			TO			Scenario immediately after take-off which requires an immediate and overweight landing			X	X	X	X		
			TO			Adverse wind, crosswinds with or without strong gusts on take-off	X			X				
			TO			Adverse weather, wind shear, wind shear encounter during take-off, with or without reactive warnings	X			X			X	
			TO			Engine failure during initial climb, typically 30-60 m (100-200 ft)	X	X		X				X
			CRZ			Wind shear encounter scenario during cruise, significant and rapid change in windspeed or down/updrafts, without wind shear warning	X		X			X	X	X
			APP			Adverse weather, wind shear, wind shear encounter with or without warning during approach	X		X	X			X	

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							Competency map							
Evaluation and scenario-based training phases	Manual aircraft control	A	APP	The competency description is "Maintains control of the aircraft in order to assure the successful outcome of a procedure or maneuver"	Desired competency outcome: Demonstrates manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detects deviations through instrument scanning Maintains spare mental capacity during Manual aircraft control Maintains the aircraft within the normal flight envelope Applies knowledge of the relationship between aircraft attitude, speed and thrust	Adverse weather, deterioration in visibility or cloud base, or adverse wind, requiring a go-around from visual circling approach, during the visual segment	X	X	X	X		X	X	X
			APP LDG			Adverse wind, crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	X			X		X		
			APP LDG			Adverse weather, adverse wind, approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				X		X	X	
			APP LDG			Circling approach at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights								
			APP LDG			Runway incursion during approach, which can be triggered by ATC at various altitudes or by visual contact during the landing phase	X			X			X	
			LDG			Adverse wind, visibility, type specific, special consideration for long bodied aircraft, landing in minimum visibility for visual reference, with crosswind	X	X		X			X	
			LDG			System malfunction, auto flight failure at DA during a low visibility approach requiring a go-around flown manually	X		X	X			X	

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							Competency map							
Evaluation and scenario-based training phases	ISI Monitoring, cross checking, error management, mismanaged aircraft state	A	ALL	Developed scripted role-play scenarios encompassing the need to monitor flight path excursions from the instructor pilot (PF), detect errors and make appropriate interventions, either verbally or by taking control as applicable. The scenarios should be realistic and relevant, and are for the purpose of demonstration and reinforcement of effective flight path monitoring. Demonstrated role-play should contain realistic and not gross errors, leading at times to a mismanaged aircraft state, which can also be combined with upset management training	Recognize mismanaged aircraft state. Take appropriate action if necessary Restore desired aircraft state Identify and manage consequences	In-seat instruction: Deviations from the flight path, in pitch attitude, speed, altitude, bank angle		X					X	
			ALL			In-seat instruction: Simple automation errors (e.g. incorrect mode selection, attempted engagement without the necessary conditions, entering wrong altitude or speed, failure to execute the desired mode) culminating in a need for direct intervention from the PM, and where necessary taking control.		X					X	
			APP			In-seat instruction: Unstable approach or speed/path/vertical rate not congruent with required state for given flight condition	X	X					X	X
			LDG			In-seat instruction: Demonstration exercise — recovery from bounced landing, adverse wind, strong gusts during landing phase, resulting in a bounce and necessitating recovery action from the PM	X			X			X	
	Unstable approach	A	DES APP	Reinforce stabilized approach philosophy and adherence to defined parameters. Encourage go-arounds when crews are outside these parameters. Develop and sustain competencies related to the management of high energy situations		ATC or terrain related environment creating a high energy descent with the need to capture the optimum profile to complete the approach in a stabilized configuration	X		X				X	
			DES APP			ATC or terrain related environment creating a high energy descent leading to unstable conditions and requiring a go-around	X		X				X	
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				X		X	X	
			APP			Increasing tailwind on final (not reported)	X	X				X	X	
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	X			X			X	

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Adverse wind	B	TO	Adverse wind/crosswind. This includes tailwind but not ATC mis-reporting of the actual wind	Recognize adverse wind conditions Observe limitations Apply appropriate procedures Maintain directional control and safe flight path	Take-off with different crosswind/tailwind/gust conditions						X		X
			TO			Take-off with unreported tailwind		X			X			
			TO			Crosswinds with or without strong gusts on take-off	X			X				
			APP			Increasing tailwind on final (not reported)	X	X				X	X	
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswind including shifting wind directions				X		X	X	
			APP			Adverse wind scenario resulting in increasing tailwind below DA (not reported)		X		X		X		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		X		X		X		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		X		X		X		
			APP LDG			Crosswind with or without strong gusts on approach, final and landing (within and beyond limits)	X			X		X		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Aircraft system malfunctions, including operations under MEL	B	ALL	Any internal failure(s) apparent or not apparent to the crew Any item cleared by the MEL but having an impact upon flight operations. E.g. thrust reverser locked Malfunctions to be considered should have one or more of the following characteristics: Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	Recognize system malfunction Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences Apply crew operating procedure where necessary. Respond appropriately to additional system abnormals associated with MEL dispatch Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	For full details see the Malfunction Clustering methodology and results. At least one malfunction with each characteristic should be included every year. Combining characteristics should not reduce the number of malfunctions below 4 for each crewmember every year according to the EBT module cycle. （別紙2　3－1－3参照） System malfunctions requiring immediate and urgent crew intervention or decision, e.g. fire, smoke, loss of pressurisation at high altitude, failures during take-off, brake failure during landing. Example: Fire System malfunctions requiring complex procedures, e.g. multiple hydraulic system failures, smoke and fumes procedures Example: Major dual system electrical or hydraulic failure System malfunctions resulting in significant degradation of flight controls in combination with abnormal handling characteristics, e.g. jammed flight controls, certain degradation of FBW control Examples: Jammed horizontal stabilizer; Flaps and/or slats locked Malfunctions resulting in degraded flight controls System failures that require monitoring and management of the flight path using degraded or alternative displays Unreliable primary flight path information, unreliable airspeed. Example: Flight with unreliable airspeed System failures that require extensive management of their consequences (independent of operation or environment) Example: Fuel leak	Intentionally blank							

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							Competency map							
Evaluation and scenario-based training phases	Aircraft system malfunctions, including operations under MEL	B	TO	Any internal failure(s) apparent or not apparent to the crew Any item cleared by the MEL but having an impact upon flight operations. E.g. thrust reverser locked Malfunctions to be considered should have one or more of the following characteristics: Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	Recognize system malfunction Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences Apply crew operating procedure where necessary. Respond appropriately to additional system abnormals associated with MEL dispatch Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	MEL items with crew operating procedures applicable during take-off						X		
			TO			Response to an additional factor that is affected by MEL item (e.g. system failure, runway state)		X		X		X		
			GRD			Malfunction during pre-flight preparation and prior to departure	X					X	X	
			GRD			Malfunction after departure	X					X	X	
			GRD			Malfunctions requiring immediate attention (e.g. bleed fault during engine start, hydraulic failure during taxi)								
			TO			Take-off high speed below V1	X				X	X		
			TO			Take-off high speed above V1	X					X		
			TO			Initial climb	X					X		
			APP			On approach	X					X		X
			APP			Go-around	X					X		X
			LDG			During landing	X	X		X		X	X	
	Aircraft system management	B		Normal system operation according to defined instructions	This is not considered as a stand-alone topic. It links with the topic “compliance” Where a system is not managed according to normal or defined procedures, this is determined as a non-compliance	See “compliance” topic above. There are no defined scenarios, but the instructor should focus on learning opportunities when system management non-compliances manifest themselves during other scenarios. Underpinning knowledge of systems and their interactions should be developed and challenged, and not merely the application of normal procedures	Intentionally blank							

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							Competency map							
Evaluation and scenario-based training phases	Approach, visibility close to minimum	B	APP	Any situation where visibility becomes a threat	Recognize actual conditions Observe aircraft and/or procedural limitations Apply appropriate procedure if applicable Maintain directional control and safe flight path	Approach in poor visibility	X		X	X				X
			APP			Approach in poor visibility with deteriorations necessitating a decision to go-around	X		X	X				
			LDG			Landing in poor visibility				X		X	X	
	Landing	B	LDG	Pilots should have opportunities to practice landings in demanding situations at the defined frequency. Data indicates that landing problems have their roots in a variety of factors, including appropriate decision making, in addition to manual aircraft control skills if difficult environmental conditions exist. The purpose of this item is to ensure that pilots are exposed to this during the programme	Landing in demanding environmental conditions, with malfunctions as appropriate	This topic should be combined with the adverse weather topic, aircraft system malfunctions topic or any topic that can provide exposure to a landing in demanding conditions	Intentionally blank							
	Runway or taxiway condition	B	TO	Contamination or surface quality of the runway, taxiway, or tarmac including foreign objects	Recognize hazardous runway condition Observe limitations Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Planned anticipated hazardous conditions with dispatch information provided to facilitate planning and execution of appropriate procedures						X		
			TO			Unanticipated hazardous conditions, e.g. unexpected heavy rain resulting in flooded runway surface		X			X	X		
			TO			Stop / go decision in hazardous conditions					X	X		X

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							Competency map							
Evaluation and scenario-based training phases	Surprise	B	ALL	The data analysed during the development of this manual and of the EBT concept indicated substantial difficulties encountered by crews when faced with a threat or error, which was a surprise, or an unexpected event. The element of surprise should be distinguished from what is sometimes referred to as the "startle factor", the latter being a physiological reaction. Wherever possible, consideration should be given towards variations in the types of scenario, times of occurrences and types of occurrence, so that pilots do not become overly familiar with repetitions of the same scenarios. Variations should be the focus of EBT programme design, and not left to the discretion of individual instructors, in order to preserve programme integrity and fairness	Exposure to an unexpected event or sequence of events at the defined frequency	Intentionally blank	Intentionally blank							
	Terrain	B	ALL	Alert, warning, or conflict	Anticipate terrain threats Prepare for terrain threats Recognize unsafe terrain clearance Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Restore safe flight path Manage consequences	ATC clearance giving insufficient terrain clearance	X	X			X			
			ALL			Demonstration of terrain avoidance warning systems						X	X	X
			TO CLB			Engine failure where performance is marginal leading to TAWS warning		X		X				X
			DES			"Virtual mountain" meaning the surprise element of an unexpected warning. Care should be exercised in creating a level of realism, so this can best be achieved by an unusual and unexpected change of route during the descent						X	X	X

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Workload, distraction, pressure	B	ALL	This is not considered a topic for specific attention on its own, but more as a reminder to programme developers to ensure that pilots are exposed to immersive training scenarios which expose them to manageable high workload and distractions during the course of the EBT programme, at the defined frequency	Manage available resources efficiently to prioritize and perform tasks in a timely manner under all circumstances	Intentionally blank	Intentionally blank							
	ATC	C	ALL	ATC error. Omission, miscommunication, garbled, poor quality transmission. All of these act as distractions to be managed by the crew. The scenarios should be combined where possible with others of the same or higher weighting, the principle reason being to create distractions.	Respond to communications appropriately Recognize, clarify and resolve any ambiguities. Refuse or question unsafe instructions. Use standard phraseology whenever possible	ATC role-play: the instructor provides scripted instructions, as a distraction to the crew	X	X			X			
						Controller error, provided by the instructor according to a defined scripted scenario	X	X				X	X	
						Frequency congestion, with multiple aircraft using the same frequency		X						
						Poor quality transmissions		X						
	Engine failure	C	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that impacts performance. This is distinct from the engine-out maneuvers described in the maneuvers training section above, which are intended only for the practice of psychomotor skill and reinforcement of procedures in managing engine failures	Recognize engine failure Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Take-off low speed	X		X			X		X
			TO			Take-off high speed below V1	X		X			X		X
			TO			Take-off above V1	X					X	X	X
			TO			Initial climb	X					X	X	
			APP			Engine malfunction	X					X		X
			CRZ			Engine failure in cruise								
			LDG			On landing				X				

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Fire and smoke management	C	GRD	This includes engine, electric, pneumatic, cargo fire, smoke or fumes	Recognize fire, smoke or fumes Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Fire in cargo or cabin/cockpit at gate	X	X				X		X
			GRD			Fire during taxi	X	X				X		X
			GRD			Fire with no cockpit indication	X	X				X		X
			TO			Take-off low speed	X		X		X	X		
			TO			Take-off high speed below V1	X		X		X	X		
			TO			Take-off high speed above V1	X				X	X		
			TO			Initial climb	X				X	X		
			CRZ			Cargo fire						X	X	X
			APP			Engine fire in approach (extinguishable)		X				X		
			APP			Engine fire in approach (non-extinguishable)		X			X	X		
			APP			Flight deck or cabin fire		X			X	X		
	Loss of communications	C	GRD	Lost or difficult communications. Either through pilot mis-selection or a failure external to the aircraft. This could be for a few seconds or a total loss	Recognize loss of communications Take appropriate action Execute appropriate procedure as applicable Use alternative ways of communications Manage consequences	Loss of communications during ground maneuvering	X	X						
			TO			Loss of communications after take-off	X					X		
			APP			Loss of communications during approach phase, including go-around	X	X				X	X	
	Managing loading, fuel, performance errors	C	ALL	A calculation error by one or more pilots, or someone involved with the process, or the process itself, e.g. incorrect information on the load sheet	Anticipate the potential for errors in load/fuel/performance data Recognize inconsistencies Manage/avoid distractions Make changes to paperwork/aircraft system(s) to eliminate error Identify and manage consequences	This can be a demonstrated error, in that the crew may be instructed to deliberately insert incorrect data, for example to take-off from an intersection with full length performance information. The crew will be asked to intervene when acceleration is sensed to be lower than normal, and this may be part of the operator procedures, especially when operating mixed fleets with considerable variations in MTOM	X	X						X

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Navigation	C	GRD	External NAV failure. Loss of GPS satellite, ANP exceeding RNP, loss of external NAV source(s)	Recognize a NAV degradation. Take appropriate action Execute appropriate procedure as applicable Use alternative NAV guidance Manage consequences	External failure or a combination of external failures degrading aircraft navigation performance	X		X			X	X	
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance		X			X	X	X	
	Operations or type specific	C		Intentionally blank	Intentionally blank	Intentionally blank	Intentionally blank							
	Pilot incapacitation	C	TO	Consequences for the non-incapacitated pilot	Recognize incapacitation Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences	During take-off	X	X			X	X		
			APP			During approach	X			X				X
	Traffic	C	CLB CRZ DES	Traffic conflict. ACAS RA or TA, or visual observation of conflict, which requires evasive maneuvering	Anticipate potential loss of separation Recognize loss of separation Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	ACAS warning requiring crew intervention		X				X	X	X

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Upset recovery	C	ALL	An airplane upset is defined as an airplane in flight unintentionally exceeding the parameters normally experienced in line operations or training. 1. Pitch attitude greater than 25° nose up. 2. Pitch attitude greater than 10° nose down. 3. Bank angle greater than 45°. 4. Within pitch and bank angle normal parameters, but flying at airspeeds inappropriate for the conditions.	Recognize upset condition Take appropriate action Assure aircraft control Maintain or restore a safe flight path Assess consequential issues Manage outcomes	Upset recognition: Demonstration of the defined normal flight envelope and any associated changes in flight instruments, flight director systems, and protection systems. This should take the form of an instructor-led exercise to show the crew the points beyond which an upset condition could exist			X	X			X	X
			TO APP			Upset recognition and recovery — Severe wind shear or wake turbulence during take-off or approach			X	X		X	X	
			CLB DES			Upset recognition and recovery — as applicable and relevant to aircraft type, demonstration at a suitable intermediate level, with turbulence as appropriate; practice steep turns and note the relationship between bank angle, pitch and stalling speed				X			X	
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence to trigger overspeed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)			X	X		X	X	
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence and significant temperature rise to trigger low speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	X			X			X	
			CRZ			Upset recognition and recovery — demonstration at a normal cruising altitude, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	X			X			X	
			APP			Upset recognition and recovery — demonstration at an intermediate altitude during early stages of the approach, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	X			X			X	

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	ISI Upset recovery	C	CLB DES			Recovery: Demonstration, in-seat instruction: the instructor should position the aircraft within but close to the edge of the normal flight envelope before handing control to the trainee to demonstrate the restoration of normal flight. Careful consideration should be given to flying within the normal flight envelope				X			X	
	Wind shear recovery	C	TO	With or without warnings including predictive. A wind shear scenario is ideally combined into an adverse weather scenario containing other elements.	Anticipate potential for wind shear Avoid known wind shear or prepare for suspected wind shear Recognize wind shear encounter Take appropriate action Apply appropriate procedure correctly Assure aircraft control Recognize out of wind shear condition Maintain or restore a safe flight path Assess consequential issues and manage outcomes	Predictive wind shear warning during take-off					X	X			
			TO			Wind shear encounter during take-off	X				X	X			
			TO			Wind shear encounter after rotation						X		X
			TO			Predictive wind shear after rotation					X	X		
			APP			Predictive wind shear during approach	X				X	X		
			APP			Wind shear encounter during approach	X				X	X		

カリキュラム作成ガイダンス
～第３世代（ジェット）～

１．別紙２の１－３に定める第３世代（ジェット）に分類されるような飛行機に関する定期訓練・定期審査の内容を付録２に示す。

２．このマトリックスを活用することにより、EBT の考え方を取り入れた訓練・審査の開発を行うことが可能であり、世界中の運航データ等の分析に基づく Baseline EBT の実施に役立つものである。

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Maneuvers training phase	Rejected take-off	A	TO	Engine failure after the application of take-off thrust and before reaching V1	Demonstrate manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detect deviations through instrument scanning Maintain spare mental capacity during manual aircraft control Maintain the aircraft within the flight envelope Apply knowledge of the relationship between aircraft attitude, speed and thrust	From initiation of take-off to complete stop (or as applicable to procedure)	X			X				
	Failure of critical engine between V1 & V2	A	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The maneuver is considered to be complete at a point when aircraft is stabilized at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement	X			X				
	Failure of critical engine between V1 & V2	B	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The maneuver is considered to be complete at a point when aircraft is stabilized in a clean configuration with engine-out procedures completed	X			X				
	Emergency descent	C	CRZ	Initiation of emergency descent from normal cruise altitude		The maneuver is considered to be completed once the aircraft is stabilized in emergency descent configuration (and profile)	X		X	X				
	Engine-out approach & go-around	A	APP	With a critical engine failed, manually flown normal precision approach to DA, followed by manually flown go-around, the whole maneuver to be flown without visual reference		This maneuver should be flown from intercept to centreline until acceleration after go-around. The maneuver is considered to be complete at a point when aircraft is stabilized at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement* (describe generally critical part of maneuver)	X			X				
	Go-around	A	APP	Go-around, all engines operative		High energy, initiation during the approach at 150 to 300 m (500 to 1000 ft) below the missed approach level off altitude	X		X	X				
	Go-around	A	APP	Go-around, all engines operative followed by visual circuit, manually flown		Initiation of go-around from DA followed by visual circuit and landing	X		X	X				
	Go-around	A	APP	Go-around, all engines operative		During flare/rejected landing	X		X	X				
	Engine-out landing	A	LDG	With a critical engine failed, normal landing		Initiation in a stabilized engine-out configuration from not less than 3 NM final approach, until completion of roll-out	X			X				

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Adverse Weather	A	GND	Thunderstorm, heavy rain, turbulence, ice build up to include de-icing issues, as well as high temperature conditions. The proper use of use of anti-ice and de-icing systems should be included generally in appropriate scenarios.	Anticipate adverse weather Prepare for suspected adverse weather Recognize adverse weather Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Predictive wind shear warning before take-off, as applicable	X	X				X		
			TO			Adverse weather scenario, e.g. thunderstorm activity, precipitation, icing		X			X	X		X
			TO			Wind shear encounter during take-off, not predictive	X			X			X	
			TO			Predictive wind shear warning during take-off	X	X				X	X	
			TO			Crosswinds with or without strong gusts on take-off	X			X				
			CRZ			Wind shear encounter scenario during cruise	X		X			X	X	X
			APP			Reactive wind shear warning during approach or go-around	X		X	X			X	
			APP			Predictive wind shear warning during approach or go-around	X	X				X	X	
			APP			Thunderstorm encounter during approach or on missed approach	X					X	X	
			APP			Increasing tailwind on final (not reported)	X	X				X	X	
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				X		X	X	
			APP			Non-precision approach in cold temperature conditions, requiring altitude compensation for temperature, as applicable to type	X	X					X	
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	X			X		X		
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	X	X				X		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Automation Management	A	ALL	The purpose of this topic is to encourage and develop effective flight path management through proficient and appropriate use of flight management system(s), guidance and automation including transitions between modes, monitoring, mode awareness, vigilance and flexibility needed to change from one mode to another. Included in this topic is the means of mitigating errors described as: mishandled auto flight systems, inappropriate mode selection, flight management system(s) and autopilot usage.	Know how and when to use flight management system(s), guidance and automation Demonstrate correct methods for engagement and disengagement of auto flight system(s) Demonstrate appropriate use of flight guidance, auto thrust and other automation systems Maintain mode awareness of auto flight system(s), including engagement and automatic transitions Revert to different modes when appropriate Detect deviations from the desired aircraft state (flight path, speed, attitude, thrust, etc.) and take appropriate action. Anticipate mishandled auto flight system Recognize mishandled auto flight system. Take appropriate action if necessary Restore correct auto flight state Identify and manage consequences	ACAS warning, recovery and subsequent engagement of automation	X		X					
			ALL			FMS tactical programming issues, e.g. step climb, runway changes, late clearances, destination re-programming, executing diversion	X		X					
			ALL			Recoveries from TAWS, management of energy state to restore automated flight	X		X	X				
			ALL			Amendments to ATC cleared levels during altitude capture modes, to force mode awareness and intervention	X		X				X	
			TO			Late ATC clearance to an altitude below acceleration altitude	X		X				X	
			TO APP			Engine-out special terrain procedures	X		X				X	
			CRZ			Forcing AP disconnect followed by re-engagement, recovery from low or high speed events in cruise	X		X	X			X	
			CRZ			Engine failure in cruise to onset of descent using automation	X		X					
			CRZ			Emergency descent	X		X					
			DES APP			Managing high energy descent capturing descent path from above (correlation with unstable approach training)	X		X				X	
			APP			No ATC clearance received prior to commencement of approach or final descent	X		X				X	
			APP			Reactive wind shear and recovery from the consequent high energy state	X		X				X	
			APP			Non precision or infrequently flown approaches using the maximum available level of automation	X		X					
			APP			Gear malfunction during approach		X				X		X
			APP			ATC clearances to waypoints beyond programmed descent point for a coded final descent point during an approach utilising a final descent that is commanded by the flight management system.	X		X				X	

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Competencies non-technical(CRM)	A	APP	This encapsulates communication; leadership and teamwork; problem solving and decision making; situation awareness; workload management. Emphasis should be placed on the development of leadership, shown by EBT data sources to be a highly effective competency in mitigating risk and improving safety through pilot performance	<u>Communication</u>: Demonstrate effective use of language, responsiveness to feedback and that plans are stated and ambiguities resolved. <u>Leadership and teamwork</u>: Use appropriate authority to ensure focus on the task. Support others in completing tasks. <u>Problem solving and decision making</u>: Detect deviations from the desired state, evaluate problems, identify risk, consider alternatives and select the best course of action. Continuously review progress and adjust plans. <u>Situation awareness</u>: Have an awareness of the aircraft state in its environment; project and anticipate changes. <u>Workload management:</u> Prioritize, delegate and receive assistance to maximize focus on the task. Continuously monitor the flight progress	GPS failure prior to commencement of approach associated with position drift and a terrain alert					X	X	X	
			DES			Cabin crew report of water noise below the forward galley indicating a possible toilet pipe leak, with consequent avionics failures					X	X	X	
			CRZ			Smoke removal but combined with a diversion until landing completed.		X			X	X	X	X
			CRZ			ACAS warning immediately following a go-around, with a descent maneuver required.		X			X	X	X	X
	Compliance	A	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOP). This is not intended to list scenarios, but instructors should ensure that observed non-compliances are taken as learning opportunities throughout the programme. In all modules of the programme, the FSTD should as far as possible be treated like an aircraft, and non-compliances should not be accepted simply for expediency.	Recognize that a compliance failure has occurred Make a verbal announcement Take appropriate action if necessary Restore safe flight path if necessary Manage consequences	The following are examples of potential compliance failures, and not intended to be developed as scenarios as part of an EBT Module: 1. Requesting flap beyond limit speed 2. Flaps or slats in the wrong position for phase of flight or approach 3. Omitting an action as part of a procedure 4. Failing to initiate or complete a checklist 5. Using the wrong checklist for the situation	Intentionally blank							

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Go-around management	A	APP	Any threat or error which can result in circumstances which require a decision to go-around, in addition to the execution of the go-around. Go-around scenarios should be fully developed to encourage effective leadership and teamwork, in addition to problem solving and decision making, plus execution using manual aircraft control or flight management system(s) and automation as applicable. Design should include the element of surprise and scenario-based go-arounds should not be predictable and anticipated. This topic is completely distinct from the go-around maneuver listed in the maneuvers training section that is intended only to practice psychomotor skill and a simple application of the procedures		Adverse weather scenario leading to a reactive wind shear warning during approach	X	X					X	X
			APP			Adverse weather scenario leading to a predictive wind shear warning during approach or go-around	X	X					X	X
			APP			Adverse weather scenario, e.g. thunderstorm activity, heavy precipitation or icing forcing decision at or close to DA/MDA	X					X	X	X
			APP			DA with visual reference in heavy precipitation with doubt about runway surface braking capability	X					X	X	X
			APP			Adverse wind scenario resulting in increasing tailwind below DA (not reported)		X		X		X		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		X		X		X		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		X		X		X		
			APP			Lost or difficult communications resulting in no approach clearance prior to commencement of approach or final descent	X		X				X	
			APP			Birds: large flocks of birds below DA once visual reference has been established				X		X	X	
			APP			System malfunction, landing gear malfunction during the approach								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Manual aircraft control	A	ALL	The competency description is "Maintains control of the aircraft in order to assure the successful outcome of a procedure or maneuver"	Desired competency outcome: Demonstrates manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detects deviations through instrument scanning Maintains spare mental capacity during manual aircraft control Maintains the aircraft within the normal flight envelope Applies knowledge of the relationship between aircraft attitude, speed and thrust	Flight with unreliable airspeed, which may be recoverable or not recoverable	X			X			X	
			ALL			Alternate flight control modes according to malfunction characteristics	X			X				X
			ALL			ACAS RA to descend or ATC immediate descent	X	X		X				
			DES			TAWS warning when deviating from planned descent routing, requiring immediate response	X			X	X			
			TO			Scenario immediately after take-off which requires an immediate and overweight landing			X	X	X	X		
			TO			Adverse wind, crosswinds with or without strong gusts on take-off	X			X				
			TO			Adverse weather, wind shear, wind shear encounter during take-off, with or without reactive warnings	X			X			X	
			TO			Engine failure during initial climb, typically 30–60 m (100–200 ft)	X	X		X				X
			CRZ			Wind shear encounter scenario during cruise, significant and rapid change in windspeed or down/updrafts, without wind shear warning	X		X			X	X	X
			APP			Adverse weather, wind shear, wind shear encounter with or without warning during approach	X		X	X			X	

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Manual aircraft control	A	APP	The competency description is "Maintains control of the aircraft in order to assure the successful outcome of a procedure or maneuver"	Desired competency outcome: Demonstrates manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detects deviations through instrument scanning Maintains spare mental capacity during manual aircraft control Maintains the aircraft within the normal flight envelope Applies knowledge of the relationship between aircraft attitude, speed and thrust	Adverse weather, deterioration in visibility or cloud base, or adverse wind, requiring a go-around from visual circling approach, during the visual segment	X	X	X	X		X	X	X
			APP LDG			Adverse wind, crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	X			X		X		
			APP LDG			Adverse weather, adverse wind, approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				X		X	X	
			APP LDG			Circling approach at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights								
			APP LDG			Runway incursion during approach, which can be triggered by ATC at various altitudes or by visual contact during the landing phase	X			X			X	
			LDG			Adverse wind, visibility, type specific, special consideration for long bodied aircraft, landing in minimum visibility for visual reference, with crosswind	X	X		X			X	
			LDG			System malfunction, auto flight failure at DA during a low visibility approach requiring a go-around flown manually	X		X	X			X	

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	ISI Monitoring, cross checking, error management, mismanaged aircraft state	A	ALL	Developed scripted role-play scenarios encompassing the need to monitor flight path excursions from the instructor pilot (PF), detect errors and make appropriate interventions, either verbally or by taking control as applicable. The scenarios should be realistic and relevant, and are for the purpose of demonstration and reinforcement of effective flight path monitoring. Demonstrated role-play should contain realistic and not gross errors, leading at times to a mismanaged aircraft state, which can also be combined with upset management training	Recognize mismanaged aircraft state. Take appropriate action if necessary Restore desired aircraft state Identify and manage consequences	In-seat instruction: Deviations from the flight path, in pitch attitude, speed, altitude, bank angle		X					X	
			ALL			In-seat instruction: Simple automation errors (e.g. incorrect mode selection, attempted engagement without the necessary conditions, entering wrong altitude or speed, failure to execute the desired mode) culminating in a need for direct intervention from the PM, and where necessary taking control.		X					X	
			APP			In-seat instruction: Unstable approach or speed/path/vertical rate not congruent with required state for given flight condition	X	X					X	X
			LDG			In-seat instruction: Demonstration exercise — recovery from bounced landing, adverse wind, strong gusts during landing phase, resulting in a bounce and necessitating recovery action from the PM	X			X			X	
	Unstable approach	A	DES APP	Reinforce stabilized approach philosophy and adherence to defined parameters. Encourage go-arounds when crews are outside these parameters. Develop and sustain competencies related to the management of high energy situations		ATC or terrain related environment creating a high energy descent with the need to capture the optimum profile to complete the approach in a stabilized configuration	X		X				X	
			DES APP			ATC or terrain related environment creating a high energy descent leading to unstable conditions and requiring a go-around	X		X				X	
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				X		X	X	
			APP			Increasing tailwind on final (not reported)	X	X				X	X	
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	X			X		X		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Adverse wind	B	TO	Adverse wind/crosswind. This includes tailwind but not ATC mis-reporting of the actual wind	Recognize adverse wind conditions Observe limitations Apply appropriate procedures Maintain directional control and safe flight path	Take-off with different crosswind/tailwind/gust conditions						X		X
			TO			Take-off with unreported tailwind		X			X			
			TO			Crosswinds with or without strong gusts on take-off	X			X				
			APP			Increasing tailwind on final (not reported)	X	X				X	X	
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswind including shifting wind directions				X		X	X	
			APP			Adverse wind scenario resulting in increasing tailwind below DA (not reported)		X		X		X		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		X		X		X		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		X		X		X		
			APP LDG			Crosswind with or without strong gusts on approach, final and landing (within and beyond limits)	X			X		X		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Aircraft system malfunctions, including operations under MEL	B	ALL	Any internal failure(s) apparent or not apparent to the crew Any item cleared by the MEL but having an impact upon flight operations. E.g. thrust reverser locked Malfunctions to be considered should have one or more of the following characteristics: Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	Recognize system malfunction Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences Apply crew operating procedure where necessary. Respond appropriately to additional system abnormals associated with MEL dispatch Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	For full details see the Malfunction Clustering methodology and results. At least one malfunction with each characteristic should be included every year. Combining characteristics should not reduce the number of malfunctions below 4 for each crewmember every year according to the EBT module cycle.（別紙2　3－1－3参照）. System malfunctions requiring immediate and urgent crew intervention or decision, e.g. fire, smoke, loss of pressurisation at high altitude, failures during take-off, brake failure during landing. Example: Fire System malfunctions requiring complex procedures, e.g. multiple hydraulic system failures, smoke and fumes procedures Example: Major dual system electrical or hydraulic failure System malfunctions resulting in significant degradation of flight controls in combination with abnormal handling characteristics, e.g. jammed flight controls, certain degradation of FBW control Examples: Jammed horizontal stabilizer; Flaps and/or slats locked Malfunctions resulting in degraded flight controls System failures that require monitoring and management of the flight path using degraded or alternative displays Unreliable primary flight path information, unreliable airspeed. Example: Flight with unreliable airspeed System failures that require extensive management of their consequences (independent of operation or environment) Example: Fuel leak	Intentionally blank							

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Aircraft system malfunctions, including operations under MEL	B	TO	Any internal failure(s) apparent or not apparent to the crew Any item cleared by the MEL but having an impact upon flight operations. E.g. thrust reverser locked Malfunctions to be considered should have one or more of the following characteristics: Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	Recognize system malfunction Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences Apply crew operating procedure where necessary. Respond appropriately to additional system abnormals associated with MEL dispatch Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	MEL items with crew operating procedures applicable during take-off						X		
			TO			Response to an additional factor that is affected by MEL item (e.g. system failure, runway state)		X		X		X		
			GRD			Malfunction during pre-flight preparation and prior to departure	X					X	X	
			GRD			Malfunction after departure	X					X	X	
			GRD			Malfunctions requiring immediate attention (e.g. bleed fault during engine start, hydraulic failure during taxi)								
			TO			Take-off high speed below V1	X				X	X		
			TO			Take-off high speed above V1	X					X		
			TO			Initial climb	X					X		
			APP			On approach	X					X		X
			APP			Go-around	X					X		X
			LDG			During landing	X	X		X		X	X	
	Aircraft system management	B		Normal system operation according to defined instructions	This is not considered as a stand-alone topic. It links with the topic “compliance” Where a system is not managed according to normal or defined procedures, this is determined as a non-compliance	See “compliance” topic above. There are no defined scenarios, but the instructor should focus on learning opportunities when system management non-compliances manifest themselves during other scenarios	Intentionally blank							

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Approach, visibility close to minimum	B	APP	Any situation where visibility becomes a threat	Recognize actual conditions Observe aircraft and/or procedural limitations Apply appropriate procedure if applicable Maintain directional control and safe flight path	Approach in poor visibility	X		X	X				X
			APP			Approach in poor visibility with deteriorations necessitating a decision to go-around	X		X	X				
			LDG			Landing in poor visibility				X		X	X	
	Landing	B	LDG	Pilots should have opportunities to practice landings in demanding situations at the defined frequency. Data indicates that landing problems have their roots in a variety of factors, including appropriate decision making, in addition to manual aircraft control skills if difficult environmental conditions exist. The purpose of this item is to ensure that pilots are exposed to this during the programme	Landing in demanding environmental conditions, with malfunctions as appropriate	This topic should be combined with the adverse weather topic, aircraft system malfunctions topic or any topic that can provide exposure to a landing in demanding conditions	Intentionally blank							

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Surprise	B	ALL	The data analysed during the development of this manual and of the EBT concept indicated substantial difficulties encountered by crews when faced with a threat or error, which was a surprise, or an unexpected event. The element of surprise should be distinguished from what is sometimes referred to as the "startle factor", the latter being a physiological reaction. Wherever possible, consideration should be given towards variations in the types of scenario, times of occurrences and types of occurrence, so that pilots do not become overly familiar with repetitions of the same scenarios. Variations should be the focus of EBT programme design, and not left to the discretion of individual instructors, in order to preserve programme integrity and fairness	Exposure to an unexpected event or sequence of events at the defined frequency	Intentionally blank	Intentionally blank							
	Wind shear recovery	B	TO	With or without warnings including predictive. A wind shear scenario is ideally combined into an adverse weather scenario containing other elements	Anticipate potential for wind shear Avoid known wind shear or prepare for suspected wind shear Recognize wind shear encounter Take appropriate action Apply appropriate procedure correctly Assure aircraft control recognize out of wind shear condition Maintain or restore a safe flight path Assess consequential issues and manage outcomes	Predictive wind shear warning during take-off					X	X		
			TO			Wind shear encounter during take-off	X				X	X		
			TO			Wind shear encounter after rotation						X		X
			TO			Predictive wind shear after rotation					X	X		
			APP			Predictive wind shear during approach	X				X	X		
			APP			Wind shear encounter during approach	X				X	X		

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Workload, distraction, pressure	B	ALL	This is not considered a topic for specific attention on its own, but more as a reminder to programme developers to ensure that pilots are exposed to immersive training scenarios which expose them to manageable high workload and distractions during the course of the EBT programme, at the defined frequency	Manage available resources efficiently to prioritize and perform tasks in a timely manner under all circumstances	Intentionally blank	Intentionally blank							
	ATC	C	ALL	ATC error. Omission, miscommunication, garbled, poor quality transmission. All of these act as distractions to be managed by the crew. The scenarios should be combined where possible with others of the same or higher weighting, the principle reason being to create distractions	Respond to communications appropriately Recognize, clarify and resolve any ambiguities Refuse or question unsafe instructions Use standard phraseology whenever possible	ATC role-play: the instructor provides scripted instructions, as a distraction to the crew	X	X			X			
						Controller error, provided by the instructor according to a defined scripted scenario	X	X				X	X	
						Frequency congestion, with multiple aircraft using the same frequency		X						
						Poor quality transmissions		X						
	Engine failure	C	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that impacts performance. This is distinct from the engine-out maneuvers described in the maneuvers training section above, which are intended only for the practice of psychomotor skill and reinforcement of procedures in managing engine failures	Recognize engine failure Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Take-off low speed	X		X			X		X
			TO			Take-off high speed below V1	X		X			X		X
			TO			Take-off above V1	X					X	X	X
			TO			Initial climb	X					X	X	
			APP			Engine malfunction	X					X		X
			CRZ			Engine failure in cruise								
			LDG			On landing				X				

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Fire and smoke management	C	GRD	This includes engine, electric, pneumatic, cargo fire, smoke or fumes	Recognize fire, smoke or fumes Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Fire in cargo or cabin/cockpit at gate	X	X				X		X
			GRD			Fire during taxi	X	X				X		X
			GRD			Fire with no cockpit indication	X	X				X		X
			TO			Take-off low speed	X		X		X	X		
			TO			Take-off high speed below V1	X		X		X	X		
			TO			Take-off high speed above V1	X				X	X		
			TO			Initial climb	X				X	X		
			CRZ			Cargo fire						X	X	X
			APP			Engine fire in approach (extinguishable)		X				X		
			APP			Engine fire in approach (non-extinguishable)		X			X	X		
			APP			Flight deck or cabin fire		X			X	X		
	Loss of communications	C	GRD	Lost or difficult communications. Either through pilot mis-selection or a failure external to the aircraft. This could be for a few seconds or a total loss	Recognize loss of communications Take appropriate action Execute appropriate procedure as applicable Use alternative ways of communications Manage consequences	Loss of communications during ground maneuvering	X	X						
			TO			Loss of communications after take-off	X					X		
			APP			Loss of communications during approach phase, including go-around	X	X				X	X	
	Managing loading, fuel, performance errors	C	ALL	A calculation error by one or more pilots, or someone involved with the process, or the process itself, e.g. incorrect information on the load sheet	Anticipate the potential for errors in load/fuel/performance data Recognize inconsistencies Manage/avoid distractions Make changes to paperwork/aircraft system(s) to eliminate error Identify and manage consequences	This can be a demonstrated error, in that the crew may be instructed to deliberately insert incorrect data, for example to take-off from an intersection with full length performance information. The crew will be asked to intervene when acceleration is sensed to be lower than normal, and this may be part of the operator procedures, especially when operating mixed fleets with considerable variations in MTOM	X	X						X

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Navigation	C	GRD	External NAV failure. Loss of GPS satellite, ANP exceeding RNP, loss of external NAV source(s)	Recognize a NAV degradation. Take appropriate action Execute appropriate procedure as applicable Use alternative NAV guidance Manage consequences	External failure or a combination of external failures degrading aircraft navigation performance	X		X			X	X	
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance		X			X	X	X	
	Operations or type specific	C		Intentionally blank	Intentionally blank	Intentionally blank	Intentionally blank							
	Pilot incapacitation	C	TO	Consequences for the non-incapacitated pilot	Recognize incapacitation Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences	During take-off	X	X			X	X		
			APP			During approach	X			X				X
	Runway or taxiway condition	C	TO	Contamination or surface quality of the runway, taxiway, or tarmac including foreign objects	Recognize hazardous runway condition Observe limitations Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Planned anticipated hazardous conditions with dispatch information provided to facilitate planning and execution of appropriate procedures						X		
			TO			Unanticipated hazardous conditions, e.g. unexpected heavy rain resulting in flooded runway surface		X			X	X		
			TO			Stop / go decision in hazardous conditions					X	X		X
	Terrain	C	ALL	Alert, warning, or conflict	Anticipate terrain threats Prepare for terrain threats Recognize unsafe terrain clearance Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Restore safe flight path Manage consequences	ATC clearance giving insufficient terrain clearance	X	X			X			
			ALL			Demonstration of terrain avoidance warning systems						X	X	X
			TO CLB			Engine failure where performance is marginal leading to TAWS warning		X		X				X
			DES			"Virtual mountain" meaning the surprise element of an unexpected warning. Care should be exercised in creating a level of realism, so this can best be achieved by an unusual and unexpected change of route during the descent						X	X	X
	Traffic	C	CLB CRZ DES	Traffic conflict. ACAS RA or TA, or visual observation of conflict, which requires evasive maneuvering	Anticipate potential loss of separation Recognize loss of separation Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	ACAS warning requiring crew intervention		X				X	X	X

	Assessment and training topic	Frequency	Flight phase for activation	Description (include type of topic, being threat, error or focus)	Desired outcome (includes performance criteria OR training outcome)	Example scenario elements	Competency map: Application of procedures	Communication	Flight path management, automation	Flight path management, manual control	Leadership and teamwork	Problem solving and decision making	Situation awareness	Workload management
Evaluation and scenario-based training phases	Upset recovery	C	ALL	An airplane upset is defined as an airplane in flight unintentionally exceeding the parameters normally experienced in line operations or training. 1. Pitch attitude greater than 25° nose up. 2. Pitch attitude greater than 10° nose down. 3. Bank angle greater than 45°. 4. Within pitch and bank angle normal parameters, but flying at airspeeds inappropriate for the conditions.	Recognize upset condition Take appropriate action Assure aircraft control Maintain or restore a safe flight path Assess consequential issues Manage outcomes	Upset recognition: Demonstration of the defined normal flight envelope and any associated changes in flight instruments, flight director systems, and protection systems. This should take the form of an instructor-led exercise to show the crew the points beyond which an upset condition could exist			X	X			X	X
			TO APP			Upset recognition and recovery — Severe wind shear or wake turbulence during take-off or approach			X	X		X	X	
			CLB DES			Upset recognition and recovery — as applicable and relevant to aircraft type, demonstration at a suitable intermediate level, with turbulence as appropriate; practice steep turns and note the relationship between bank angle, pitch and stalling speed				X			X	
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence to trigger overspeed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)			X	X		X	X	
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence and significant temperature rise to trigger low speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	X			X			X	
			CRZ			Upset recognition and recovery — demonstration at a normal cruising altitude, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	X			X			X	
			APP			Upset recognition and recovery — demonstration at an intermediate altitude during early stages of the approach, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	X			X			X	
	ISI Upset recovery		CLB DES			Recovery: Demonstration, in-seat instruction: the instructor should position the aircraft within but close to the edge of the normal flight envelope before handing control to the trainee to demonstrate the restoration of normal flight. Careful onsideration should be given to flying within the normal flight envelope				X			X	

カリキュラム作成ガイダンス
～第３世代（ターボプロップ）～

１．別紙２の１－３に定める第３世代（ターボプロップ）に分類されるような飛行機に関する定期訓練・定期審査の内容を付録２に示す。

２．このマトリックスを活用することにより、EBT の考え方を取り入れた訓練・審査の開発を行うことが可能であり、世界中の運航データ等の分析に基づく Baseline EBT の実施に役立つものである。

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Maneuvers training phase	Rejected take-off	A	TO	Engine failure after the application of take-off thrust and before reaching V1	Demonstrate manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detect deviations through instrument scanning Maintain spare mental capacity during manual aircraft control Maintain the aircraft within the flight envelope Apply knowledge of the relationship between aircraft attitude, speed and thrust	From initiation of take-off to complete stop (or as applicable to procedure)	X			X				
	Failure of critical engine between V1 & V2	A	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The maneuver is considered to be complete at a point when aircraft is stabilized at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement	X			X				
	Failure of critical engine between V1 & V2	B	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The maneuver is considered to be complete at a point when aircraft is stabilized in a clean configuration with engine-out procedures completed	X			X				
	Emergency descent	C	CRZ	Initiation of emergency descent from normal cruise altitude		The maneuver is considered to be completed once the aircraft is stabilized in emergency descent configuration (and profile)	X		X	X				
	Engine-out approach & go-around	A	APP	With a critical engine failed, manually flown normal precision approach to DA, followed by manually flown go-around, the whole maneuver to be flown without visual reference		This maneuver should be flown from intercept to centreline until acceleration after go-around. The maneuver is considered to be complete at a point when aircraft is stabilized at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement* (describe generally critical part of maneuver)	X			X				
	Go-around	A	APP	Go-around, all engines operative		High energy, initiation during the approach at 150 to 300 m (500 to 1000 ft) below the missed approach level off altitude	X		X	X				
	Go-around	A	APP	Go-around, all engines operative followed by visual circuit, manually flown		Initiation of go-around from DA followed by visual circuit and landing	X		X	X				
	Go-around	A	APP	Go-around, all engines operative		During flare/rejected landing	X		X	X				
	Engine-out landing	A	LDG	With a critical engine failed, normal landing		Initiation in a stabilized engine-out configuration from not less than 3 NM final approach, until completion of roll-out	X			X				

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Adverse Weather	A	GND	Thunderstorm, heavy rain, turbulence, ice buildup to include de-icing issues, as well as high temperature conditions. The proper use of use of anti-ice and de-icing systems should be included generally in appropriate scenarios.	Anticipate adverse weather Prepare for suspected adverse weather Recognize adverse weather Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Predictive wind shear warning before take-off, as applicable	X	X				X		
			TO			Adverse weather scenario, e.g. thunderstorm activity, precipitation, icing		X			X	X		X
			TO			Wind shear encounter during take-off, not predictive	X			X			X	
			TO			Predictive wind shear warning during take-off	X	X				X	X	
			TO			Crosswinds with or without strong gusts on take-off	X			X				
			CRZ			Wind shear encounter scenario during cruise	X		X			X	X	X
			APP			Reactive wind shear warning during approach or go-around	X		X	X			X	
			APP			Predictive wind shear warning during approach or go-around	X	X				X	X	
			APP			Thunderstorm encounter during approach or on missed approach	X					X	X	
			APP			Increasing tailwind on final (not reported)	X	X				X	X	
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				X		X	X	
			APP			Non-precision approach in cold temperature conditions, requiring altitude compensation for temperature, as applicable to type	X	X					X	
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	X			X		X		
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	X	X				X		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Automation management	A	ALL	The purpose of this topic is to encourage and develop effective flight path management through proficient and appropriate use of flight management system(s), guidance and automation including transitions between modes monitoring, mode awareness, vigilance and flexibility needed to change from one mode to another. Included in this topic is the means of mitigating errors described as: mishandled auto flight systems, inappropriate mode selection, flight management system(s) and autopilot usage.	Know how and when to use flight management system(s), guidance and automation Demonstrate correct methods for engagement and disengagement of auto flight system(s) Demonstrate appropriate use of flight guidance, auto thrust and other automation systems Maintain mode awareness of auto flight system(s), including engagement and automatic transitions Revert to different modes when appropriate Detect deviations from the desired aircraft state (flight path, speed, attitude, thrust, etc.) and take appropriate action. Anticipate mishandled auto flight system Recognize mishandled auto flight system. Take appropriate action if necessary Restore correct auto flight state Identify and manage consequences	ACAS warning, recovery and subsequent engagement of automation	X		X					
			ALL			FMS tactical programming issues, e.g. step climb, runway changes, late clearances, destination re-programming, executing diversion	X		X					
			ALL			Recoveries from TAWS, management of energy state to restore automated flight	X		X	X				
			ALL			Amendments to ATC cleared levels during altitude capture modes, to force mode awareness and intervention	X		X				X	
			TO			Late ATC clearance to an altitude below acceleration altitude	X		X				X	
			TO APP			Engine-out special terrain procedures	X		X				X	
			CRZ			Forcing AP disconnect followed by re-engagement, recovery from low or high speed events in cruise	X		X	X			X	
			CRZ			Engine failure in cruise to onset of descent using automation	X		X					
			CRZ			Emergency descent	X		X					
			DES APP			Managing high energy descent capturing descent path from above (correlation with unstable approach training)	X		X				X	
			APP			No ATC clearance received prior to commencement of approach or final descent	X		X				X	
			APP			Reactive wind shear and recovery from the consequent high energy state	X		X				X	
			APP			Non precision or infrequently flown approaches using the maximum available level of automation	X		X					
			APP			Gear malfunction during approach		X				X		X
			APP			ATC clearances to waypoints beyond programmed descent point for a coded final descent point during an approach utilising a final descent that is commanded by the flight management system.	X		X				X	

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Competencies non-technical(CRM)	A	APP	This encapsulates communication; leadership and teamwork; problem solving and decision making; situation awareness; workload management. Emphasis should be placed on the development of leadership, shown by EBT data sources to be a highly effective competency in mitigating risk and improving safety through pilot performance	<u>Communication:</u> Demonstrate effective use of language, responsiveness to feedback and that plans are stated and ambiguities resolved. <u>Leadership and teamwork:</u> Use appropriate authority to ensure focus on the task. Support others in completing tasks. <u>Problem solving and decision making:</u> Detect deviations from the desired state, evaluate problems, identify risk, consider alternatives and select the best course of action. Continuously review progress and adjust plans. <u>Situation awareness:</u> Have an awareness of the aircraft state in its environment; project and anticipate changes. <u>Workload management:</u> Prioritize, delegate and receive assistance to maximize focus on the task. Continuously monitor the flight progress	GPS failure prior to commencement of approach associated with position drift and a terrain alert					X	X	X	
			DES			Cabin crew report of water noise below the forward galley indicating a possible toilet pipe leak, with consequent avionics failures					X	X	X	
			CRZ			Smoke removal but combined with a diversion until landing completed.		X			X	X	X	X
			CRZ			ACAS warning immediately following a go-around, with a descent maneuver required.		X			X	X	X	X
	Compliance	A	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOP). This is not intended to list scenarios, but instructors should ensure that observed non-compliances are taken as learning opportunities throughout the programme. In all modules of the programme, the FSTD should as far as possible be treated like an aircraft, and non-compliances should not be accepted simply for expediency.	Recognize that a compliance failure has occurred Make a verbal announcement Take appropriate action if necessary Restore safe flight path if necessary Manage consequences	The following are examples of potential compliance failures, and not intended to be developed as scenarios as part of an EBT Module: 1. Requesting flap beyond limit speed 2. Flaps or slats in the wrong position for phase of flight or approach 3. Omitting an action as part of a procedure 4. Failing to initiate or complete a checklist 5. Using the wrong checklist for the situation	Intentionally blank							

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Go-around management	A	APP	Any threat or error which can result in circumstances which require a decision to go-around, in addition to the execution of the go-around. Go-around scenarios should be fully developed to encourage effective leadership and teamwork, in addition to problem solving and decision making, plus execution using manual aircraft control or flight management system(s) and automation as applicable. Design should include the element of surprise and scenario-based go-arounds should not be predictable and anticipated. This topic is completely distinct from the go-around maneuver listed in the maneuvers training section that is intended only to practice psychomotor skill and a simple application of the procedures		Adverse weather scenario leading to a reactive wind shear warning during approach	X	X					X	X
			APP			Adverse weather scenario leading to a predictive wind shear warning during approach or go-around	X	X					X	X
			APP			Adverse weather scenario, e.g. thunderstorm activity, heavy precipitation or icing forcing decision at or close to DA/MDA	X					X	X	X
			APP			DA with visual reference in heavy precipitation with doubt about runway surface braking capability	X					X	X	X
			APP			Adverse wind scenario resulting in increasing tailwind below DA (not reported)		X		X		X		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		X		X		X		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		X		X		X		
			APP			Lost or difficult communications resulting in no approach clearance prior to commencement of approach or final descent	X		X				X	
			APP			Birds: large flocks of birds below DA once visual reference has been established				X		X	X	
			APP			System malfunction, landing gear malfunction during the approach								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Manual aircraft control	A	ALL	The competency description is "Maintains control of the aircraft in order to assure the successful outcome of a procedure or maneuver"	Desired competency outcome: Demonstrates manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detects deviations through instrument scanning Maintains spare mental capacity during manual aircraft control Maintains the aircraft within the normal flight envelope Applies knowledge of the relationship between aircraft attitude, speed and thrust	Flight with unreliable airspeed, which may be recoverable or not recoverable	X			X			X	
			ALL			Alternate flight control modes according to malfunction characteristics	X			X				X
			ALL			ACAS RA to descend or ATC immediate descent	X	X		X				
			DES			TAWS warning when deviating from planned descent routing, requiring immediate response	X			X	X			
			TO			Scenario immediately after take-off which requires an immediate and overweight landing			X	X	X	X		
			TO			Adverse wind, crosswinds with or without strong gusts on take-off	X			X				
			TO			Adverse weather, wind shear, wind shear encounter during take-off, with or without reactive warnings	X			X			X	
			TO			Engine failure during initial climb, typically 30-60 m (100-200 ft)	X	X		X				X
			CRZ			Wind shear encounter scenario during cruise, significant and rapid change in windspeed or down/updrafts, without wind shear warning	X		X			X	X	X
			APP			Adverse weather, wind shear, wind shear encounter with or without warning during approach	X		X	X			X	

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Manual aircraft control	A	APP	The competency description is "Maintains control of the aircraft in order to assure the successful outcome of a procedure or maneuver"	Desired competency outcome: Demonstrates manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detects deviations through instrument scanning Maintains spare mental capacity during manual aircraft control Maintains the aircraft within the normal flight envelope Applies knowledge of the relationship between aircraft attitude, speed and thrust	Adverse weather, deterioration in visibility or cloud base, or adverse wind, requiring a go-around from visual circling approach, during the visual segment	X	X	X	X		X	X	X
			APP LDG			Adverse wind, crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	X			X		X		
			APP LDG			Adverse weather, adverse wind, approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				X		X	X	
			APP LDG			Circling approach at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights								
			APP LDG			Runway incursion during approach, which can be triggered by ATC at various altitudes or by visual contact during the landing phase	X			X			X	
			LDG			Adverse wind, visibility, type specific, special consideration for long bodied aircraft, landing in minimum visibility for visual reference, with crosswind	X	X		X			X	
			LDG			System malfunction, auto flight failure at DA during a low visibility approach requiring a go-around flown manually	X		X	X			X	

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	ISI Monitoring, cross checking, error management, mismanaged aircraft state	A	ALL	Developed scripted role-play scenarios encompassing the need to monitor flight path excursions from the instructor pilot (PF), detect errors and make appropriate interventions, either verbally or by taking control as applicable. The scenarios should be realistic and relevant, and are for the purpose of demonstration and reinforcement of effective flight path monitoring. Demonstrated role-play should contain realistic and not gross errors, leading at times to a mismanaged aircraft state, which can also be combined with upset management training	Recognize mismanaged aircraft state. Take appropriate action if necessary Restore desired aircraft state Identify and manage consequences	In-seat instruction: Deviations from the flight path, in pitch attitude, speed, altitude, bank angle		X					X	
			ALL			In-seat instruction: Simple automation errors (e.g. incorrect mode selection, attempted engagement without the necessary conditions, entering wrong altitude or speed, failure to execute the desired mode) culminating in a need for direct intervention from the PM, and where necessary taking control.		X					X	
			APP			In-seat instruction: Unstable approach or speed/path/vertical rate not congruent with required state for given flight condition	X	X					X	X
			LDG			In-seat instruction: Demonstration exercise – recovery from bounced landing, adverse wind, strong gusts during landing phase, resulting in a bounce and necessitating recovery action from the PM	X			X			X	
	Unstable approach	A	DES APP	Reinforce stabilized approach philosophy and adherence to defined parameters. Encourage go-arounds when crews are outside these parameters. Develop and sustain competencies related to the management of high energy situations		ATC or terrain related environment creating a high energy descent with the need to capture the optimum profile to complete the approach in a stabilized configuration	X		X				X	
			DES APP			ATC or terrain related environment creating a high energy descent leading to unstable conditions and requiring a go-around	X		X				X	
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				X		X	X	
			APP			Increasing tailwind on final (not reported)	X	X				X	X	
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	X			X		X		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Aircraft system malfunctions, including operations under MEL	B	ALL	Any internal failure(s) apparent or not apparent to the crew Any item cleared by the MEL but having an impact upon flight operations. E.g. thrust reverser locked Malfunctions to be considered should have one or more of the following characteristics: Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	Recognize system malfunction Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences Apply crew operating procedure where necessary. Respond appropriately to additional system abnormals associated with MEL dispatch Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	For full details see the Malfunction Clustering methodology and results. At least one malfunction with each characteristic should be included every year. Combining characteristics should not reduce the number of malfunctions below 4 for each crewmember every year according to the EBT module cycle. （別紙2　3－1－3参照） System malfunctions requiring immediate and urgent crew intervention or decision, e.g. fire, smoke, loss of pressurisation at high altitude, failures during take-off, brake failure during landing. Example: Fire System malfunctions requiring complex procedures, e.g. multiple hydraulic system failures, smoke and fumes procedures Example: Major dual system electrical or hydraulic failure System malfunctions resulting in significant degradation of flight controls in combination with abnormal handling characteristics, e.g. jammed flight controls, certain degradation of FBW control Examples: Jammed horizontal stabilizer; Flaps and/or slats locked Malfunctions resulting in degraded flight controls System failures that require monitoring and management of the flight path using degraded or alternative displays Unreliable primary flight path information, unreliable airspeed. Example: Flight with unreliable airspeed System failures that require extensive management of their consequences (independent of operation or environment) Example: Fuel leak	Intentionally blank							

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Aircraft system malfunctions, including operations under MEL	B	TO	Any internal failure(s) apparent or not apparent to the crew Any item cleared by the MEL but having an impact upon flight operations. E.g. thrust reverser locked Malfunctions to be considered should have one or more of the following characteristics: Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	Recognize system malfunction Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences Apply crew operating procedure where necessary. Respond appropriately to additional system abnormals associated with MEL dispatch Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	MEL items with crew operating procedures applicable during take-off						X		
			TO			Response to an additional factor that is affected by MEL item (e.g. system failure, runway state)		X		X		X		
			GRD			Malfunction during pre-flight preparation and prior to departure	X					X	X	
			GRD			Malfunction after departure	X					X	X	
			GRD			Malfunctions requiring immediate attention (e.g. bleed fault during engine start, hydraulic failure during taxi)								
			TO			Take-off high speed below V1	X				X	X		
			TO			Take-off high speed above V1	X					X		
			TO			Initial climb	X					X		
			APP			On approach	X					X		X
			APP			Go-around	X					X		X
			LDG			During landing	X	X		X		X	X	
	Aircraft system management	B		Normal system operation according to defined instructions	This is not considered as a stand-alone topic. It links with the topic "compliance" Where a system is not managed according to normal or defined procedures, this is determined as a non-compliance	See "compliance" topic above. There are no defined scenarios, but the instructor should focus on learning opportunities when system management non-compliances manifest themselves during other scenarios	Intentionally blank							

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Approach, visibility close to minimum	B	APP	Any situation where visibility becomes a threat	Recognize actual conditions Observe aircraft and/or procedural limitations Apply appropriate procedure if applicable Maintain directional control and safe flight path	Approach in poor visibility	X		X	X				X
			APP			Approach in poor visibility with deteriorations necessitating a decision to go-around	X		X	X				
			LDG			Landing in poor visibility				X		X	X	
	Landing	B	LDG	Pilots should have opportunities to practise landings in demanding situations at the defined frequency. Data indicates that landing problems have their roots in a variety of factors, including appropriate decision making, in addition to manual aircraft control skills if difficult environmental conditions exist. The purpose of this item is to ensure that pilots are exposed to this during the programme	Landing in demanding environmental conditions, with malfunctions as appropriate	This topic should be combined with the adverse weather topic, aircraft system malfunctions topic or any topic that can provide exposure to a landing in demanding conditions	Intentionally blank							

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Surprise	B	ALL	The data analysed during the development of this manual and of the EBT concept indicated substantial difficulties encountered by crews when faced with a threat or error, which was a surprise, or an unexpected event. The element of surprise should be distinguished from what is sometimes referred to as the "startle factor", the latter being a physiological reaction. Wherever possible, consideration should be given towards variations in the types of scenario, times of occurrences and types of occurrence, so that pilots do not become overly familiar with repetitions of the same scenarios. Variations should be the focus of EBT programme design, and not left to the discretion of individual instructors, in order to preserve programme integrity and fairness	Exposure to an unexpected event or sequence of events at the defined frequency	Intentionally blank	Intentionally blank							
	Terrain	C	ALL	Alert, warning, or conflict	Anticipate terrain threats Prepare for terrain threats Recognize unsafe terrain clearance Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Restore safe flight path Manage consequences	ATC clearance giving insufficient terrain clearance	X	X			X			
			ALL			Demonstration of terrain avoidance warning systems						X	X	X
			TO CLB			Engine failure where performance is marginal leading to TAWS warning		X		X				X
			DES			"Virtual mountain" meaning the surprise element of an unexpected warning. Care should be exercised in creating a level of realism, so this can best be achieved by an unusual and unexpected change of route during the descent						X	X	X

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Upset recovery	C	ALL	An airplane upset is defined as an airplane in flight unintentionally exceeding the parameters normally experienced in line operations or training. 1. Pitch attitude greater than 25° nose up. 2. Pitch attitude greater than 10° nose down. 3. Bank angle greater than 45°. 4. Within pitch and bank angle normal parameters, but flying at airspeeds inappropriate for the conditions.	Recognize upset condition Take appropriate action Assure aircraft control Maintain or restore a safe flight path Assess consequential issues Manage outcomes	Upset recognition: Demonstration of the defined normal flight envelope and any associated changes in flight instruments, flight director systems, and protection systems. This should take the form of an instructor-led exercise to show the crew the points beyond which an upset condition could exist			X	X			X	X
			TO APP			Upset recognition and recovery — Severe wind shear or wake turbulence during take-off or approach			X	X		X	X	
			CLB DES			Upset recognition and recovery — as applicable and relevant to aircraft type, demonstration at a suitable intermediate level, with turbulence as appropriate; practice steep turns and note the relationship between bank angle, pitch and stalling speed				X			X	
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence to trigger overspeed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)			X	X		X	X	
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence and significant temperature rise to trigger low speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	X			X			X	
			CRZ			Upset recognition and recovery — demonstration at a normal cruising altitude, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	X			X			X	
			APP			Upset recognition and recovery — demonstration at an intermediate altitude during early stages of the approach, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	X			X			X	
	ISI Upset recovery		CLB DES			Recovery: Demonstration, in-seat instruction: the instructor should position the aircraft within but close to the edge of the normal flight envelope before handing control to the trainee to demonstrate the restoration of normal flight. Careful consideration should be given to flying within the normal flight envelope				X			X	

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Workload, distraction, pressure	B		This is not considered a topic for specific attention on its own, but more as a reminder to programme developers to ensure that pilots are exposed to immersive training scenarios which expose them to manageable high workload and distractions during the course of the EBT programme, at the defined frequency	Manage available resources efficiently to prioritize and perform tasks in a timely manner under all circumstances	Intentionally blank	Intentionally blank							
	Adverse wind	C	TO	Adverse wind/crosswind. This includes tailwind but not ATC mis-reporting of the actual wind	Recognize adverse wind conditions Observe limitations Apply appropriate procedures Maintain directional control and safe flight path	Take-off with different crosswind/tailwind/gust conditions						X		X
			TO			Take-off with unreported tailwind		X			X			
			TO			Crosswinds with or without strong gusts on take-off	X			X				
			APP			Increasing tailwind on final (not reported)	X	X				X	X	
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswind including shifting wind directions				X		X	X	
			APP			Adverse wind scenario resulting in increasing tailwind below DA (not reported)		X		X		X		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		X		X		X		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		X		X		X		
			APP LDG			Crosswind with or without strong gusts on approach, final and landing (within and beyond limits)	X			X		X		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Engine failure	C	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that impacts performance. This is distinct from the engine-out maneuvers described in the maneuvers training section above, which are intended only for the practice of psychomotor skill and reinforcement of procedures in managing engine failures	Recognize engine failure Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Take-off low speed	X		X			X		X
			TO			Take-off high speed below V1	X		X			X		X
			TO			Take-off above V1	X					X	X	X
			TO			Initial climb	X					X	X	
			APP			Engine malfunction	X					X		X
			CRZ			Engine failure in cruise								
			LDG			On landing				X				
	Fire and smoke management	C	GRD	This includes engine, electric, pneumatic, cargo fire, smoke or fumes	Recognize fire, smoke or fumes Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Fire in cargo or cabin/cockpit at gate	X	X				X		X
			GRD			Fire during taxi	X	X				X		X
			GRD			Fire with no cockpit indication	X	X				X		X
			TO			Take-off low speed	X		X		X	X		
			TO			Take-off high speed below V1	X		X		X	X		
			TO			Take-off high speed above V1	X				X	X		
			TO			Initial climb	X				X	X		
			CRZ			Cargo fire						X	X	X
			APP			Engine fire in approach (extinguishable)		X				X		
			APP			Engine fire in approach (non-extinguishable)		X			X	X		
			APP			Flight deck or cabin fire		X			X	X		
	Loss of communications	C	GRD	Lost or difficult communications. Either through pilot mis-selection or a failure external to the aircraft. This could be for a few seconds or a total loss	Recognize loss of communications Take appropriate action Execute appropriate procedure as applicable Use alternative ways of communications Manage consequences	Loss of communications during ground maneuvering	X	X						
			TO			Loss of communications after take-off	X					X		
			APP			Loss of communications during approach phase, including go-around	X	X				X	X	

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Managing loading, fuel, performance errors	C	ALL	A calculation error by one or more pilots, or someone involved with the process, or the process itself, e.g. incorrect information on the load sheet	Anticipate the potential for errors in load/fuel/performance data Recognize inconsistencies Manage/avoid distractions Make changes to paperwork/aircraft system(s) to eliminate error Identify and manage consequences	This can be a demonstrated error, in that the crew may be instructed to deliberately insert incorrect data, for example to take-off from an intersection with full length performance information. The crew will be asked to intervene when acceleration is sensed to be lower than normal, and this may be part of the operator procedures, especially when operating mixed fleets with considerable variations in MTOM	X	X						X
	Navigation	C	GRD	External NAV failure. Loss of GPS satellite, ANP exceeding RNP, loss of external NAV source(s)	Recognize a NAV degradation. Take appropriate action Execute appropriate procedure as applicable Use alternative NAV guidance Manage consequences	External failure or a combination of external failures degrading aircraft navigation performance	X		X			X	X	
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance		X			X	X	X	
	Operations or type specific	C		Intentionally blank	Intentionally blank	Intentionally blank	Intentionally blank							
	Pilot incapacitation	C	TO	Consequences for the non-incapacitated pilot	Recognize incapacitation Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences	During take-off	X	X			X	X		
			APP			During approach	X			X				X
	Runway or taxiway condition	C	TO	Contamination or surface quality of the runway, taxiway, or tarmac including foreign objects	Recognize hazardous runway condition Observe limitations Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Planned anticipated hazardous conditions with dispatch information provided to facilitate planning and execution of appropriate procedures						X		
			TO			Unanticipated hazardous conditions, e.g. unexpected heavy rain resulting in flooded runway surface		X			X	X		
			TO			Stop / go decision in hazardous conditions					X	X		X

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
							Competency map							
Evaluation and scenario-based training phases	Traffic	C	CLB CRZ DES	Traffic conflict. ACAS RA or TA, or visual observation of conflict, which requires evasive maneuvering	Anticipate potential loss of separation Recognize loss of separation Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	ACAS warning requiring crew intervention		X				X	X	X
	Wind shear recovery	B	TO	With or without warnings including predictive. A wind shear scenario is ideally combined into an adverse weather scenario containing other elements.	Anticipate potential for wind shear Avoid known wind shear or prepare for suspected wind shear Recognize wind shear encounter Take appropriate action Apply appropriate procedure correctly Assure aircraft control Recognize out of wind shear condition Maintain or restore a safe flight path Assess consequential issues and manage outcomes	Predictive wind shear warning during take-off					X	X		
			TO			Wind shear encounter during take-off	X				X	X		
			TO			Wind shear encounter after rotation						X		X
			TO			Predictive wind shear after rotation					X	X		
			APP			Predictive wind shear during approach	X				X	X		
			APP			Wind shear encounter during approach	X				X	X		

（別紙３）運航シナリオの設定に係る指針

運航シナリオの設定に係る指針
(Scenario-Based/Event-set-Based Training and Assessment)

第１章　総則

１－１　目的

Competency-Based Training and Assessment Program（CBTA プログラム）は、訓練・審査を安全管理システムの取り組みの一貫として位置づけることにより、安全上の支障を及ぼす事態を未然に防ぐという予防安全の観点から、実運航で発生しうるイベントに対する対処力を向上させるためのコンピテンシーの醸成に重点を置いたものである。

CBTA プログラムでは、運航シナリオを活用した訓練・審査として、次に掲げる内容を実施する必要がある。

・運航シナリオ訓練（Scenario-Based Training）:
　航空機乗組員として求められるコンピテンシーの醸成を目的に実施されるものである。

・コンピテンシー評価（Evaluation）:
　航空機乗組員として求められるコンピテンシーを有しているかどうかの評価を行い、個人の訓練ニーズを把握することを目的に実施されるものである。

・技能審査：
　技能証明や機長認定等の資格の付与及び維持に必要な航空機乗組員として求められるコンピテンシーを有しているかどうかを評価するとともに、発揮されたパフォーマンスについて合否判定を行うものである。

この別紙３は、CBTA プログラムにおける運航シナリオ訓練、コンピテンシー評価及び技能審査で活用する運航シナリオの設定に関する指針を示すことを目的としたものである。

１－２　関連基準

米国 Federal Aviation Administration（FAA）は、Advisory Circular 120-35D（AC120-35D）を発行し、Line-Oriented Flight Training（LOFT）、Special Purpose Operational Training（SPOT）及び Line Operational Evaluation（LOE）を含めた Line Operational Simulations（LOS）の設定等に関する指針を示している。この AC120-35D に関連して、ATA（Air Transport Association of America）は、航空運送事業者の視点から、具体的な運航シナリオの設定等に関するガイダンス（LINE OPARATIONAL SIMULATIONS：LOFT Scenario

Design, Conduct and Validation）を発行している。AQPを参考にしたCBTAプログラムを導入する場合には、運航シナリオの検討において有効であるため、参考にすること。

さらに、FAAは、Advisory Circular 120-51E（AC120-51E）を発行し、テクニカルスキルとノンテクニカルスキルの醸成に有効なCrew Resource Managementに重点を置いた訓練の開発・実施等に関する指針を示しているため、必要に応じて参考にすること。

第２章　運航シナリオの設定

次に掲げる指針に従って、本紙４－７－２に定める「運航シナリオ訓練」及び「コンピテンシー評価」並びに本紙４－７－２及び４－７－３に定める「技能審査」において活用する運航シナリオを設定すること。

（１）運航の模擬

運航シナリオは、運航を模擬したものであることが重要であるため、運航実態の分析を踏まえた訓練・審査の優先度等を考慮し、実際の運航で発生している重要な課題等を含めた運航シナリオを設定すること。

シミュレーターによる運航の模擬は、ランプアウトからランプインまでを基本とすること。ただし、訓練及び審査の目的に応じて、長大路線において予定飛行経路に沿ってポジションを移動させること、又は、特定の目的に焦点を当てた運航の模擬など、ランプアウトからランプインまでの模擬でなくとも差し支えないものとする。この場合には、航空機乗組員が対応できるよう、十分な時間的余裕を確保すること。

運航シナリオを構成するイベントセットについては、次に掲げる例が挙げられる。

- 航空機乗組員が飛行計画の変更及び操縦室での準備の間に対処しなければならない雪氷又は貨物積載異常等の要素を含んだ飛行前業務
- 滑走路誤進入を防止するための標識及びチャートを使用しながら、ゲートから滑走路又は滑走路からゲートまでの地上滑走業務
- エンルート（出発地、経路及び目的地（進入の難しい空港等））
- 予定外の滑走路変更といった到着経路の変更
- 飛行管理装置（Flight Management System：FMS）の修正操作
- 単純な条件又は運航全般にわたって継続して発生する複雑な条件を含む異常時及び緊急時の条件
- 悪天候
- 飛行管理装置（FMS）の部分的又は完全な喪失

（2）難易度

航空機乗組員がオーバーロードになるまで継続的にワークロードを増やしていくような運航シナリオは、訓練効果及び適切な審査を阻害することになる。また、同じイベントセットであったとしても、そのイベントセットが発生するタイミングによっても難易度は変化することがある。このような点を考慮しながら、非現実的なレベルのものにならないよう、各イベントセットの難易度を踏まえて運航シナリオ全体の難易度の調整を行うこと。

運航シナリオ訓練については、コンピテンシーの醸成に効果的な難易度のイベントセットで構成された運航シナリオを設定すること。

コンピテンシー評価については、航空機乗組員としてのコンピテンシーを適切に評価できるよう、コンピテンシーの要素を均等に盛り込んだ適切な難易度のイベントセットで構成された運航シナリオを設定すること。

技能審査については、資格の付与及び維持に必要な航空機乗組員としてのコンピテンシーを適切に評価できるよう、コンピテンシーの要素を均等に盛り込んだ適切な難易度のイベントセットで構成された運航シナリオを設定すること。

（3）オープンコミュニケーション

航空機乗組員が必要なタイミングで必要な情報を伝えるため、双方向の円滑なコミュニケーションを行うことが促されるよう、イベントセットを設定すること。

また、意思決定のプロセスや航空機乗組員による行動や決定に対する積極的な関与が促されるよう、イベントセットを設定すること。

（4）運航シナリオを活用した訓練・審査の実施における留意点

ａ）ブリーフィング

効果的・効率的・魅力的な訓練・審査を実施することを目的に、その内容や目的を訓練対象者に明確に説明するためのブリーフィングを行うこと。

ｂ）訓練の実施

CBTA プログラムにおける訓練・審査が安全管理システムの取り組みの一貫であることを十分に理解し、予防安全の観点から、安全上の支障を及ぼす事態に至らないように、Threat and Error Management（TEM）を行うためのコンピテンシーの醸成を重視しながら訓練を行うこと。

例えば、CBTA プログラムにおいて、航空機衝突防止装置の回避指示（TCAS RA）に関連するイベントセットを盛り込む場合には、TCAS が作動した際の対応(UAS Management)に係る訓練はもとより、混雑空域での進入中において TCAS が作動しないよう事前の対処（Threat Management）を行うことを目的とした訓練を行うといったことが可能になる。

さらに、運航シナリオ訓練（Scenario-Based Training）においては、コンピテンシーの醸成を目的とした訓練であることから、教官は、運航シナリオの途中で介入しながらファシリテーション技法等を駆使した指導を行うことができるものとする。一方、コンピテンシー評価（Evaluation）においては、個人の訓練ニーズの把握を目的としていることから、教官は原則として運航シナリオの途中での介入はできないものとする。

c）審査の実施

審査は資格の付与又は維持のために実施されるものであり、TEM を実践するパフォーマンスが発揮され、必要なコンピテンシーを有しているかどうかの評価を行うとともに、合否判定もあわせて行うこと。

審査では合否判定を行うことに重点が置かれがちであるが、CBTA プログラムでは、審査であっても航空機乗組員に新たな気づきを与えることができるよう、課題となるパフォーマンスの根本原因の特定及びそれに対するデブリーフィングが必要であることに留意すること。

d）デブリーフィング

訓練・審査で発揮されたパフォーマンスを検証し、振り返りを行うためのデブリーフィングを行うこと。CBTA プログラムにおいて、デブリーフィングは特に重要な部分であり、教官・評価者の役割が重要である。デブリーフィングでは、航空機乗組員のパフォーマンスについて、課題となるパフォーマンスと同様に、良いパフォーマンスについても強調されるべきである。これにより、評価を受けた航空機乗組員は、自分のパフォーマンスを分析し、重要なポイントの振り返りを行うことにより、気づきを得る機会が与えられることになる。

（5）運航シナリオの数

航空機乗組員のレベルに応じて効果的・効率的・魅力的な訓練・審査を実施できるよう、複数の運航シナリオを設定し、航空局に報告を行うこと。

また、運航フェーズ毎に複数のイベントセットを作成し、これらのイベントセットを適切な組み合わせで選択することにより、複数の運航シナリオの設定を可能とする方法も用いることができる。この場合には、各イベントセットについて航空局に報告を行うこと。

（6）運航シナリオの更新

航空機乗組員としてのコンピテンシーの維持・向上を促進させるため、定期的に運航シナリオの見直しを行うこと。

本紙４－７－２及び４－７－３に定める「技能審査」について、機長認定に係る技能審査及び定期技能審査の運航シナリオは首席運航審査官に報告を行うこと。

本紙４－７－３に定める指定航空従事者養成施設における技能審査の運航シナリオは首席航空従事者試験官の了承を受けること。

本紙４－７－２に定める「運航シナリオ訓練」及び「コンピテンシー評価」の運航シナリオについては、首席運航審査官に報告を行うこと。

（７）運航シナリオの検証

イベントセットの難易度や評価を行うコンピテンシーの要素の割り振り等、必要に応じて、本紙４－７－２及び４－７－３に定める技能審査において活用する運航シナリオの妥当性を検証すること。

（別紙４）定義

定　義

Competency-Based Training and Assessment：パフォーマンスの向上を目指すこと、パフォーマンス要件及びその測定が重視されること、設定されたパフォーマンス要件を達成するための訓練の開発を行うことを特徴とする訓練・審査

コンピテンシー（Competency）：業務において期待される成果を得るために求められる人間の行動指標（所定の基準に従ってタスクを実施するために求められる「スキル（Skills：Technical Skills 及び Non-technical Skills を含む）」、「知識（Knowledge）」及び「姿勢（Attitude）」の組合せ）

パフォーマンス：航空機乗組員が有するコンピテンシーを活用し、実運航、訓練・審査の際に発揮される行動

スキル（Skills）：行動や動作を実施する能力。一般的に、運動技能（Motor Skills）、認知技能（Cognitive Skills）及びメタ認知技能（Metacognitive Skills）のカテゴリーに分けられる

テクニカルスキル（Technical Skills）：高い精神運動性の要素を持つ操縦操作に係る能力、所定の手順を行う能力及びその他の行動に係る能力

ノンテクニカルスキル（Non-technical Skills）：高い認知的な要素を持つ状況認識、意思決定及び業務管理等に係る能力や対人的な要素を持つコミュニケーション及びチームワーク等に係る能力（CRM スキルとも表現されることがある）

Crew Resource Management（CRM）：安全で効率的な運航を達成するために、全ての人的リソース、ハードウェア及び情報等を効果的に活用すること

知識（Knowledge）：業務の中で、事実を思い出す、概念を認識する、ルールや原理を活用する、問題を解決する及び創造的に物事を考える、といったことを行うスキルや姿勢のために必要な具体的情報

姿勢（Attitude）：ある対象、人物又は事象等に対して個人が行う行動の選択に影響を与えるとともに学ぶことができる内面の心理状態又は気質

脅威（Threat）：航空機乗組員が直接関与していない領域で発生し、運航の複雑度が増すようなイベント又はエラーであり、安全マージンを維持するために対応されなければならないもの

エラー（Error）：組織又は航空機乗組員が意図又は期待する状態からの逸脱に至る航空機乗組員の行動又は無行動

航空機の安全レベルが低下した状態（Undesired Aircraft State：UAS）：航空機乗組員によって引き起こされ、安全マージンの低下を伴うような、航空機の位置や速度の逸脱、不適切に操作された操縦系統、誤ったシステムコンフィギュレーション

業務（Job）：業務中の個人により実施され、タスク（Task）及びサブタスク（Subtask）として識別される機能の集合体

タスク（Task）：識別可能な始点と終点が存在し、測定可能な成果が現れる業務の構成単位

サブタスク（Subtask）：タスク（Task）を達成するために必要な特定の分割された段階の動作

作業（Element）：訓練の分析及び設計の構成要素

イベント（Event）：タスク（Task）又はサブタスク（Subtask）及びそれらが実施される条件の組合せ

イベントセット（Event Set）：イベント、イベントを引き起こすトリガー（Event Trigger）、イベントからの注意を逸らす条件（Possible Distracters）又は関連イベント（Supporting Event）で構成される独立したシナリオの区分

附　則（平成 29 年３月 30 日）

１．この細則は、平成 29 年４月１日から適用する。

２．Competency-Based Training and Assessment に関する国際的な動向等を勘案しつつ、必要に応じて本細則を改正するものとする。

附　則（平成 31 年４月１日）

この細則は、平成 31 年４月１日から適用する。

附　則（令和４年３月 29 日）

この細則は、令和４年４月１日から適用する。

附　則（令和７年11月27日　国空安政第1903号）異常な姿勢の予防及び異常な姿勢からの回復を行う飛行に係る訓練に関する改正

本細則は、令和７年11月27日から適用する。