



OPERATIONAL EVALUATION REPORT

HONDA AIRCRAFT COMPANY

HA-420 HONDAJET

GRUPO DE AVALIAÇÃO DE AERONAVES – GAA

BRAZILIAN AIRCRAFT EVALUATION GROUP

AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL

BRAZIL

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Revision Control

REVISION	DATE	HIGHLIGHTS OF CHANGE
Original	May 26, 2017	Original report.
1	March 25, 2019	HA-420 HondaJet Elite: avionics upgrade with the Garmin 71.45 software load, increased weight/center of gravity (CG) envelope, aerodynamic improvements, added fuel, and optional interior enhancements.

Approval

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1 General

1.1 Evaluation Team

1.1.1. First issue team members

Name	Task	Organization
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1.1.2. Revision 1 team member

Name	Task	Organization
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1.2 Acronyms

AFCS	Automatic Flight Control System
AFM	Airplane Flight Manual
AIC	Aeronautical Information Circular
ANAC	<i>Agência Nacional de Aviação Civil</i> (Brazilian Civil Aviation Authority)
AOA	Angle of Attack
AP	Autopilot
CAS	Crew Alerting System
CDU	Control Display Unit
CFIT	Controlled Flight Into Terrain
CG	Center of Gravity
CPDLC	Controller-Pilot Data Link Communications
CRM	Crew Resource Management
DECEA	<i>Departamento de Controle do Espaço Aéreo</i> (Brazilian CNS/ATM Authority)
DTS	Desktop Simulator
EASA	European Aviation Safety Authority
ECL	Electronic Checklist
EFB	Electronic Flight Bag
EFIS	Electronic Flight Instrument System
EGPWS	Enhanced Ground Proximity Warning System
ESP	Electronic Stability and Protection
FAA	Federal Aviation Administration
FD	Flight Director
FFS	Full Flight Simulator
FMA	Flight Mode Annunciator
FMS	Flight Management System
FSB	Flight Standardization Board
FSTD	Flight Simulation Training Device
GAA	<i>Grupo de Avaliação de Aeronaves</i> – ANAC (Aircraft Evaluation Group)
GFS	Graphical Flight Deck Simulator
GGCP	<i>Gerência-Geral de Certificação de Produtos Aeronáuticos</i> (ANAC General Branch of Aeronautical Products Certification)

GPS	Global Positioning System
GTC	Garmin Touchscreen Controller
HDG	Heading
IAC	<i>Instrução de Aviação Civil – ANAC (Civil Aviation Instruction)</i>
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IS	<i>Instrução Suplementar (ANAC Supplementary Instruction)</i>
LOC	Localizer
MCC	Multi-Crew Coordination
MDR	Master Difference Requirements
MEL	Minimum Equipment List
MFD	Multi-Function Display
MMEL	Master Minimum Equipment List
MP	Multi-Pilot
MTOW	Maximum Takeoff Weight
NAV	Navigation
NWS	Nose Wheel Steering
ODR	Operator Differences Requirements
OSD	Operational Suitability Data
OTD	Other Training Device
PERF	Performance
PF	Pilot Flying
PFD	Primary Flight Display
PIC	Pilot in Command
PNF	Pilot Not Flying
POM	Pilot’s Operating Manual
QRH	Quick Reference Handbook
RBAC	<i>Regulamento Brasileiro de Aviação Civil (Brazilian Civil Aviation Regulation)</i>
RBHA	<i>Regulamento Brasileiro de Homologação Aeronáutica (Brazilian Aeronautical Homologation Regulation)</i>
SAR	<i>Superintendência de Aeronavegabilidade (ANAC Department of Airworthiness)</i>
SIC	Second in Command
SOP	Standard Operating Procedures
SP	Single-Pilot

SVS	Synthetic Vision System
TASE	Training Areas of Special Emphasis
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Alert and Collision Avoidance System
TOLD	Takeoff and Landing Data
TRTO	Type Rating Training Organization
USP	Underspeed Protection
V ₁	Takeoff Decision Speed
VNAV	Vertical Navigation

2 Introduction

2.1 Background

On May 2017 the ANAC Aircraft Evaluation Group (GAA) conducted an operational evaluation of HA-420 by documentation analysis using the information provided by the manufacturer, including the EASA OSD Flight Crew Data Report, Original Release, issued by Honda Aircraft Company on April 27th, 2016) and the Flight Standardization Board (FSB) Report Revision Original, issued by the Federal Aviation Administration (FAA) on January 15th, 2016. In addition, a technical visit to Honda Aircraft Company and FlightSafety International was arranged in order to perform technical meetings and familiarization flights in both HA-420 airplane and its full flight simulator level D.

On March 2019 the GAA conducted an operational evaluation of HA-420 Elite by documentation analysis using the information provided by the manufacturer, including the Flight Standardization Board (FSB) Report Revision 2, issued by the Federal Aviation Administration (FAA) on February 13, 2019.

In case more detailed information is required, refer to the current FSB Report.

2.2 Objective

This report presents ANAC collection of results obtained from the operational evaluation of Honda Aircraft Company airplane model HA-420.

2.3 Purpose

The purpose of this report is to:

- a. Determine the pilot type rating assigned for the HA-420 airplane;
- b. Recommend the minimum requirements for initial, transition and recurrent training, checking and currency applicable to flight crew for the HA-420, and functionalities;
- c. Provide the Master Differences Requirements (MDR) for crews requiring differences qualification for mixed-fleet-flying;
- d. Provide an acceptable Operator Differences Requirements (ODR);

- e. Describe the qualification and/or characteristics of the Flight Simulation Training Device (FSTD) and Other Training Device (OTD) used for flight crew training, checking and currency.

2.4 Applicability

This report is applicable to:

- a. Brazilian-registered aircraft operators of Honda Aircraft Company model identified as HA-420 who operate under RBHA 91 and RBAC 135 rules;
- b. Approved Training Organizations certified under RBAC 142 (Type Rating Training Organizations - TRTO); and
- c. ANAC Inspectors related to operational and training certification, and safety oversight of model HA-420.

2.5 Cancelation

Not applicable.

3 Aircraft Description

3.1 General

The HA-420 HondaJet is a single-pilot certified, carbon fiber fuselage, all metal wing with a twin pylon mounted turbo fan Over-The-Wing Engine Mount configuration aircraft with a T-tail empennage. The landing gear is a fully retractable tricycle-type trailing link design with rudder pedal controlled steer-by-wire nose-wheel steering and an antiskid breaking system. Cabin environment is maintained using conditioned bleed air. The avionics are an integrated Garmin 3000 three-screen system with pedestal-mounted touch screen Control Display Units (CDU). A three-axis auto-flight system is included. The aircraft has a maximum of 7 seats (including for 1 or 2 pilots).

The HA-420 HondaJet Elite introduces changes, as follows: Garmin 3000 software enhancements which primarily included automatic flight control system (AFCS) coupled go-around with underspeed protection (USP); AFCS electronic stability and protection (ESP) with roll and angle of attack functions; and integrated takeoff and landing data (TOLD) and performance (PERF) calculations; minor design changes in the fuel, electrical, and hydraulic systems.

Model	Marketing Name	Serial numbers (S/N)
HA-420	HondaJet	S/N 42000012 thru 42000125
HA-420	HondaJet Elite	S/N 42000011, 42000126 and up

For the purpose of this report the term “HA-420” refers to both configurations, unless otherwise specified.

Training, checking, and currency requirements are listed in Appendix 3, Operator Differences Requirements tables.

3.2 Aircraft Approach Category

With reference to DECEA publication AIC N07/09 dated 12 Mar. 2009, the approach category for the HA-420 is as follows:

Aircraft	Category
HA-420	B

The category is based on the approach speed provided by the manufacturer and need to be reconsidered if operators increase the approach speed.

3.3 All Weather/ Low visibility Operations

The HA-420 is certified for operations to Category I minima.

3.4 Single Pilot – SP Operations

3.4.1 Maximum Altitude

The aircraft volume is very small and a decompression will lead to a fast reduction of pressure in the cabin and cockpit. When pressurization is lost, the time of useful consciousness without additional emergency oxygen decreases rapidly with increasing operating altitudes.

Operators should establish a maximum altitude for SP operations when not permanently wearing the oxygen mask.

3.4.2 Autopilot

According to the HA-420 AFM for single pilot operations the autopilot must be operative and available.

3.4.3 Head-set & Chart Holder

For SP operations, a head-set and chart holder (cockpit clip-board is acceptable) should be carried for “hands free” communication and easy reference to documentation.

3.4.4 MMEL/MEL

SP operations require specific considerations of some items, such as:

- A serviceable autopilot is mandatory for dispatch of a SP operation;
- For flights above 10,000 feet automatic pressurization control must be available for SP operations;
- Weather radar must be available for IFR flights at night and to and along routes with detectable adverse weather conditions.

3.5 Abnormal and Emergency Procedures – SP and MP Operations

Normal and abnormal procedures are specifically designed for SP operations, to be conservative and simple, without cumbersome troubleshooting steps for abnormal procedures. There are no procedural differences between SP and MP operations in the AFM or QRH. Differentiation for MP operations should focus on incorporating the crew coordination of checklist execution in the operator's SOP. The POM gives suggestions for how to conduct crew coordination during MP checklist operations.

A QRH should be available for all operations.

3.6 Forward Observer Seat

HA-420 aircraft are not equipped with a dedicated forward observer seat. The HA-420 right cockpit seat has been evaluated and determined suitable for use during enroute inspections and for the administration of flight tests leading to pilot certification or operating privileges. The right cockpit seat is the primary seat in the HA-420 to meet the forward observer seat requirements. However, if that seat is occupied (i.e., for two-pilot crew operations), the side-facing seat across from the forward entry door is acceptable for conducting enroute inspections and line checks only. This is the only configuration that has been evaluated. The operator must provide a means for the inspector to monitor communications between the crew and those external to the aircraft.

Suitability for use of any other forward passenger seat for use in conducting enroute inspections will need to be determined by the Flight Standards Technical Branches or Inspector conducting enroute inspections.

3.7 Electronic Flight Bag (EFB)

The EFB evaluation determined chart display functions to be suitable as one source for electronic display of airport diagrams, approach plates, arrival procedures, and departure procedures. Since chart information cannot be displayed in the event of certain avionics failures, a suitable backup is required. Approved AFM provides operating limitations for the installation.

The G3000 includes “FliteChart” and optional “ChartView” electronic charts. A specific system description for the system configuration appropriate to the installation is available in the approved AFM and Garmin G3000 Integrated Avionics System Pilot’s Guide.

3.8 Electronic Checklist (ECL)

Checklists can be displayed on any display pane of the primary flight displays (PFD) or multifunction display (MFD), and checklist items can be selected/deselected. Selection of checklist items or checklist section can be accomplished using the Garmin Touchscreen Controller (GTC) or by a scroll wheel control on each yoke. The CHECKLIST control is an up/down scroll wheel switch with detents and a momentary push-action. Pushing the wheel displays the checklist on the on-side PFD display pane. Rotating the scroll wheel moves a selection box up/down on the display.

A paper/hard copy of the Honda Aircraft HA-420 normal procedures and emergency/abnormal procedures quick reference handbook (QRH) must be readily available during flight operations as a means of backup in case of ECL/MFD failure.

This checklist system was found to be operationally suitable for all flight operations.

4 Pilot Type Rating

Model HS-420 pilot type rating endorsements are “**HA-420**” and “**HA-420/D**”, as follows:

- **HA-420**, which is issued to a pilot who received training and demonstrated proficiency in the single pilot operation. This pilot will be able to act as the pilot in command (PIC) in both single and dual pilot operations, as described in this report; and
- **HA-420/D**, which is issued to a pilot who received training and demonstrated proficiency in the dual pilot operation. This type rating is issued either with pilot in command (PIC) or second in command (SIC) privileges depending on how the pilot was trained and evaluated.

Table 1 - Pilot Type Rating

Fabricante (Manufacturer)	Aeronave (Aircraft)		Observações (Remarks)	Designativo (Designative)
	Modelo (Model)	Nome (Name)		
HONDA AIRCRAFT COMPANY LCC	HA-420	HondaJet, HondaJet Elite	Relatório de Avaliação Operacional HA-420 ANAC Operational Evaluation Report HA-420	HA-420, HA-420/D

5 Master Difference Requirements (MDR)

The Master Difference Requirements matrix for HA-420 is shown in table 2. These provisions are applied when there are differences between models or configurations which affect crew knowledge, skills, or abilities related to flight safety (e.g., Level A or greater differences) for training, checking and currency, respectively, according to IS 00-007.

These are the minimum levels of training, checking and currency required, derived from the highest level in the Operator Difference Requirements (ODR) tables.

Table 2 – HA-420 MDR matrix

		FROM AIRPLANE	
		HA-420	HA-420 Elite
TO AIRPLANE	HA-420	---	B/B/A
	HA-420 Elite	C/B/A	---

6 Operator Difference Requirements (ODR)

Each operator of a mixed fleet of HondaJet and HondaJet Elite shall produce its own ODR, as required by IS 00-007.

Honda provided a sample of ODR tables, which was considered acceptable by ANAC. These ODR tables are presented in Appendix 3 of this report and may serve as a basis for the operator to develop its own ODR tables to address the differences indicated in the MDR.

These ODR tables are Honda generic and therefore may not include items that are applicable to particular operators.

7 Specifications for Training, Checking and Currency

Specifications for training, checking and currency are detailed on the FSB Report mentioned above.

7.1 Specifications for Pilot Training

For MP operations CRM and MCC aspects should be incorporated throughout the theoretical and practical training.

7.1.1 Pilot Prerequisites and Previous Experience

The pilot training referenced in this report assumes familiarity with EFIS, FMS and integrated avionics. Pilots without any previous experience in such systems should be offered additional training prior to entry into the training programs described in this report.

Early exposure to the FMA and FMS is recommended, especially for pilots with no previous EFIS or FMS experience. Establishing early confidence in manually flying the aircraft, converting from manual to automatic (FMS controlled) flight mode and vice versa, is equally important due to heavy reliance on the Automatic Flight Control System (AFCS). In the event of a flight path deviation due to input error or system malfunction, the flight crew must be able to comfortably transition from automatic to manual mode and vice versa, in an orderly fashion.

Pilots with low experience should receive specific and detailed briefings to prepare for practical training. These briefings should include a description of the:

- FD symbols (single cue, cross bars);
- AP/FD modes, emphasizing the role and importance of FMA monitoring;
- map displays (including range selection and north up or track up);
- NAV set up and the use of primary source information;
- limitations of the use of non-certified equipment/features;
- standardization of before take-off and before approach briefings;
- expected normal and emergency communications during the type rating training.

7.1.2 HA-420 Initial Type Rating Training

The theoretical knowledge curriculum is the same for pilot-in-command or co-pilot training. Successful completion of the theoretical training is a prerequisite for entering the flight training.

It is assumed that pilots undertaking HA-420 type rating training have a working knowledge and understanding of systems such as FMS, EFIS selection and displays, Automated Flight Guidance and Control, TAWS, TCAS, etc.

7.1.2.1 Theoretical Training

Ground School - Class Room (6 days / minimum 36 hrs. total).

The ground school should include:

- An optional course offered to pilots with low experience, before the start of the ground school to verify adequate level of aircraft system knowledge;
- Instructor-led classroom presentations of aircraft systems, including normal, abnormal and emergency procedures, as well as the GARMIN 3000 Integrated Avionics System;
- Classroom presentations on aircraft and system limitations;
- Classroom presentations on mass & balance and performance;
- Systems integration training on Desktop Simulators (DTS) and Graphical Flight Deck Simulators (GFS) to support classroom presentations (11hrs. per pilot);
- Written test, scheduled on the last day of ground school, consisting of 100 questions (multiple-choice answers) and a pass mark of 75%, to be completed prior to flight training.

7.1.2.2 Practical Training

7.1.2.2.1 Training in FFS (Level C or D)

The flight training should include:

- Normal manoeuvres/procedures, aircraft handling, and navigation;
- Abnormal/emergency manoeuvres/procedures, abnormal/emergency system operation;
- Landings;
- Wind shear training;

- Low visibility ground operations and takeoffs, as required.

For SP operations, flight training should consist of a minimum of 12 hours as PF in an FFS (Level C or D).

For MP operations, flight training should consist of the training program for SP operations plus a minimum of 12 hours as PNF in an FFS (Level C or D).

7.1.2.2.2 Training in aircraft

In-aircraft flight training should be performed in exceptional circumstances only. The flight training program should include:

- Normal take-off;
- Stalls;
- Engine failure at or close to V1;
- One engine inoperative instrument approach;
- One engine inoperative missed approach;
- Missed approach on 2 engines;
- Circling approach;
- No flap approach and landing;
- One engine inoperative landing;
- Normal landing;
- Abnormal/emergency manoeuvres/procedures, and abnormal/emergency system operation, as far as safely possible during in-aircraft training.

For MP operations, the flight training program should consist of a minimum of 12 hours flight time in the aircraft. For SP operations, the flight training program should consist of a minimum of 6 x 2 hours flight time as PF in the aircraft.

In-aircraft training should be complemented by a minimum of 4 hours FSTD training to proficiency to include selected emergency/abnormal procedures, which cannot be safely performed in the aircraft.

7.1.2.3 Training Areas of Special Emphasis (TASE)

The following items should receive special emphasis in HA-420 Initial Type rating training, as specified:

Theoretical training

- High altitude physiology and use of oxygen mask
- High Altitude flight domain
- SP / MP resource management, as applicable
- Operation, limitations and failures of the Garmin Integrated Avionics System
- Performance calculations, including wet / contaminated runways
 - Contaminated runway performance data is not approved by ANAC but use of data provided by Honda Aircraft Company as guidance material by operators is recommended.
- Operations to / from High Altitude airports
- Mass & balance calculations, including use of balance sheet
- Stall Warning System
- Alternate Gear Release System
- Use of Standby Trim
- Operations in icing conditions
- Brake system. Brake antiskid logic
- Nose wheel steering (NWS). Nose wheel positioning and control logic at touchdown and rollout. Adverse interaction of asymmetrical braking with NWS
- Crosswind takeoff and landing. Unique limitations, cautions, warnings, and critical piloting techniques and procedures found in the AFM. Proper application of aircraft controls and hazards of incorrect aircraft controls application during two-engine and single-engine operations
- Discuss what leads to yaw, divergence, and a loss of control about the vertical axis during rollout and how to quickly regain control (i.e., what control inputs improve stability and control during landing rollout and what inputs lead to divergence)
- Emergency descent mode
- Traffic Alert and Collision Avoidance System (TCAS) and Terrain Awareness and Warning System (TAWS)

- Weather radar
- Vertical navigation (VNAV) departure and arrival procedures
- Operation with emergency power only
- Use of the QRH (including V speeds and trim setting information)
- Emergency/abnormal QRH procedures
- Master Minimum Equipment List (MMEL)/minimum equipment list (MEL)
- Single-Pilot Resource Management and/or Crew Resource Management (CRM)
- ECL
- Synthetic Vision System (SVS) operation
- Risk assessment and risk management

Practical training

- Pitch rotation forces with different CGs
- Use and setup of Garmin integrated avionics, PFD and MFD, including display selections and (multiple) overlays of System Synoptic, Map, Weather Radar, and NAV
- Moving Map displays
- Synthetic Vision System (SVS), if installed, and Aircraft position on charts as valuable tools for situational awareness only, not intended to be used for navigational purposes
- Use of Flight Director and Autopilot, monitoring of modes
- Loss of cabin pressure control, use of oxygen masks and Emergency Descent procedures
- Unreliable airspeed indication
- ILS approaches, including intercepting the Localizer from a GPS lateral path (not from vectors, flown in the HDG mode), switching from GPS to LOC, availability of Glide Slope information
- Use of standby trim system
- Smoke procedures, including smoke removal

- Stall Warning and Stick Pusher system, close to stall speed and in relation with de-icing system
- Approach and Landing with reduced flap settings
- Yaw damper disconnect procedure for landing, functionality of the AFCS/TRIM MASTER button
- Emergency Procedures to include an approach simulating using emergency power only
- Flight Operations in the Reversionary Display Modes
- Windmilling airstart (due to the restricted envelop)
- Single engine landing Flap configuration considerations (landing assured)
- Pitch trim adjustment for takeoff
- TCAS and TAWS
- VNAV departure and arrival procedures
- Emergency/abnormal QRH
- Single-Pilot Resource Management and/or CRM
- ECL
- Crosswind takeoffs and landings. Adherence to cautions, warnings, and critical crosswind piloting techniques and procedures in the AFM (AFM limitations must not be exceeded). Including but not limited to:
 - Crosswind takeoffs and landings – two-engine and single-engine operations; and
 - Crosswind rejected takeoff before takeoff decision speed (V1)
- Demonstrate (simulator only) what leads to yaw, divergence, and a loss of control about the vertical axis during rollout and how to quickly regain control (i.e., what control inputs improve stability and control during landing rollout and what inputs lead to divergence)

NOTE: When conducting crosswind training, the crosswind limitation and handling characteristics of the aircraft must be considered. Exposure to progressively increasing crosswind components should be weighed to ensure safe operation of the aircraft. Requirement for brake cooling during multiple takeoffs and landings should be emphasized.

Establishing early confidence in manually flying the aircraft, converting from manual to automatic flight mode and back is equally important due to heavy reliance on the Automatic Flight Control System (AFCS). In the event of a flight path deviation due to input error or system malfunction, the flight crew must be able to comfortably transition from automatic to manual mode and back in an orderly fashion.

7.1.3 HA-420 Transition Training SP to MP (and vice-versa)

Theoretical and practical transition training is recommended for SP to MP operations and vice versa, if not incorporated in initial training. Further details are shown at Appendix 1.

SP to MP transition training and vice versa, should be followed by a demonstration of proficiency, based on the skill test requirements for the initial type rating training with emphasis on the MP or SP tasks, respectively.

7.1.4 CPDLC Functionality

CPDLC training should be integrated into initial type rating training, if applicable and required, so that CPDLC procedures are applied with their corresponding actions for aircraft operation (if applicable).

Pilots should use CPDLC functionalities within a 12-month period, either during normal operations, training or checking.

7.1.5 Long Range/Extended Range/Overwater Flights.

Due to criticality of fuel computations, flight crews should be familiar with all aspects of fuel management to include normal and abnormal procedures, published flight planning information, and the manner in which fuel computations are made.

7.1.6 Special Events Training

Special events training is recommended to improve basic crew understanding and confidence regarding aircraft handling qualities, options and procedures as these relate to design characteristics and limitations. This training should include the following:

- recovery from unusual attitudes;
- manual flight with minimum use of automation, including flight under degraded levels of automation;
- handling qualities and procedures during recovery from an upset condition (e.g. wake vortex encounter, loss of control incident);

- operation of aircraft in icing environments;
- high altitude high and low speed buffet margins and flight characteristics;
- wind shear;
- Controlled Flight Into Terrain (CFIT), TCAS, EGPWS (emphasis on avoidance and escape manoeuvres, altitude awareness, TCAS/EGPWS warnings, situational awareness and crew coordination, as appropriate).

7.1.7 Seat Dependent Tasks Training

No seat dependent tasks were identified for the HA-420. However, the minimum crew determination listed in the AFM and the TCDS is one pilot in the left seat. As such, the pilot must occupy the left pilot seat for all pilot in command (PIC) training as a single pilot.

7.1.8 Recurrent Training

Recurrent training should incorporate special events training as described in this report, on a rotational basis.

7.1.9 Differences Training

Differences training is applicable between the HA-420 and HA-420 Elite. The level of training is specified in Appendix 3.

7.2 Skill Test following Initial Type Rating Training (SP or MP)

In the case of MP operations, the skill test shall be performed in a multi-crew environment to include a representative portion as PNF.

In the case of a skill test for SP operations, the skill test shall be performed as single pilot.

The following areas of emphasis should be addressed during checks as necessary:

- Proficiency with manual and automatic flight should be demonstrated.
- Proper selection and use of PFD/MFD displays, raw data, flight director, and Flight Guidance System modes should be demonstrated, particularly during instrument approaches.

- Proper outside visual scan without prolonged fixation on FMS operation should be demonstrated, and failure of component(s) of the FMS should be addressed.

7.3 Currency

No type-specific requirements for currency have been established for the HA-420.

8 Compliance to RBHA 91 and RBAC 135

No regulatory compliance checklists were provided by the manufacturer.

9 Technical Publications

9.1 Master Minimum Equipment List - MMEL

Brazilian operators shall use the FAA approved MMEL as a basis for developing their MEL (according to IAC 3507).

9.2 Airplane Flight Manual - AFM

The HA-420 AFM approved by GGCP/SAR shall be used by Brazilian operators as a basis for developing their Operator Airplane Operations Manual.

10 Flight Simulation Training Device – FSTD

There are no specific systems, procedures, or maneuvers that are unique to the HA-420 that require a specific FSTD for training.

Appendix 1

HA-420 Transition Training SP to MP (and vice-versa)

The following syllabus contains the recommended training for pilots when transitioning from SP to MP operations on the HA-420 (and vice versa).

1. SP to MP Transition

MCC procedures should be defined in the operations manual and be introduced during the transition training. This training is optional.

1.1 Theoretical Training (4 hours)

- The transition course should start with theoretical training to address the following subjects:
- Multi Crew psychology, decision making, communications and limitations;
- Multi Crew task, resource and workload management and organization, MCC procedures;
- MP operation and management of GARMIN, including ECL and Charts;
- Differences between SP and MP Abnormal and Emergency procedures;
- Emergency Phraseology;
- CRM

1.2 Flight training, normally using an FFS (2 hours as PF and 2 hours as PNF)

The flight training should address the following subjects:

- Use and setup of GARMIN integrated avionics, PFD and MFD, including selection of display (System Synoptic, Map, Weather Radar and Electronic Check List)
- Use of FD and AP, monitoring of modes

- MCC Procedures
- Operation of TCAS I/II, as applicable.
- Loss of cabin pressure control and Emergency descent procedures
- Instrument flying on standby instruments
- Use of Standby trim system
- Smoke procedures, including smoke removal
- Stick pusher system, relation with ice protection system
- Engine Fire on the Ground
- Emergency Evacuation

2. MP to SP Transition

2.1 Theoretical Training (4 hours)

The transition course should start with theoretical training to address the following subjects:

- Single Pilot psychology, decision making, communications and limitations
- Single Pilot task, resource and workload management and personal organization
- Single Pilot operation and management of GARMIN, including ECL and Charts
- Differences between MP and SP Abnormal and Emergency procedures
- Emergency Phraseology
- SP recurrency

2.2 Flight training, normally using an FFS (4 hours)

The flight training should include the following subjects:

- Use and setup of GARMIN integrated avionics, PFD and MFD, including selection of display (System Synoptic, Map, Weather Radar and Electronic Check List)
- Use of Flight Director and Autopilot, monitoring of modes

- Engine failure after take-off
- In flight restart of failed engine
- Operation of TCAS I/II, as applicable.
- Loss of cabin pressure control and Emergency Descent procedures
- Use of Pitch standby trim system
- Smoke procedures, including smoke removal
- Stick pusher system, relation with de-icing system
- Approaches/Landing with reduced flap setting
- Approaches/Landing with failed engine
- Engine Fire on the Ground
- Emergency Evacuation

Appendix 2

Desktop Simulator

During ground school a touchscreen-based Graphical Flight Deck Simulator (GFS) or Desktop Simulator (DTS) may provide simulation and deeper knowledge of the aircraft systems.

It should allow crews to practice procedures and crew resource management and provide in combination with academic training an effective system understanding.

A Desktop Simulator for HA-420 training should possess the following characteristics:

- Be available for instructor-led or self-paced learning
- Support system integration and CRM training
- Reproduce aircraft sound and audible warnings
- Provide access to schematics, malfunctions, repositions and other aircraft panels
- Include tactile panels like FMS CDUs, cursor control device and flight guidance control panels
- Deliver realistic safety training from routine to full range of emergency procedures.

Appendix 3

Operator Differences Requirements (ODR) Tables

The ODR tables presented in this appendix were proposed by Honda Aircraft and validated by the ANAC. These tables list the minimum differences levels training, checking and currency for flightcrew members.

NOTE: Optional equipment is delineated with a double asterisk **. Training, checking and currency differences levels do not apply if equipment is not installed on the operator's aircraft.

DESIGN OPERATOR DIFFERENCE REQUIREMENTS TABLE						
FROM BASE AIRCRAFT: HA-420 TO RELATED AIRCRAFT: HA-420 Elite				COMPLIANCE METHOD		
DESIGN FEATURE	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING	CURRENCY
Limitations	Increased maximum takeoff weight (MTOW) by 100 lb. Weight limit increase for fuel and baggage. Center of gravity (CG) envelope expansion.	No	Yes	B	B	A
Performance	Revised takeoff performance information.	No	No	A	A	A
Performance	Integrated takeoff and landing data (TOLD) and performance (PERF) calculation.	No	Yes	B	B	A

ATA 22 Autoflight	**Electronic Stability and Protection (ESP). **Coupled go-around with underspeed protection (USP).	No	Yes	C	B	A
Dimensions	Horizontal stabilizer is 6 inches longer.	No	No	A	A	A
Indication	Revised Crew Alert System (CAS) logic. CAS messages were added for new functionality with TOLD and ESP, and for the fuel system.	No	Yes	B	B	A
Indication	The new software includes a pilot-selectable angle of attack (AOA) indicator situated on the primary flight display (PFD) below the airspeed tape.	No	No	A	A	A
ATA 24 Electrical Power	The #1 (system) battery was changed from 28Ah to 17Ah, USB charging ports added at each pilot station and each club seat, and power feeds were added to accommodate new galley and future cabin systems.	No	No	B	A	A
ATA 28 Fuel	Increase in fuel capacity. Remove outside fueling gage and added “Fuel Slowly” light.	No	Yes	B	A	A
ATA 29 Hydraulic Power	Volume compensator was installed in the master cylinder command lines, and brake shutoff valve modified to prevent pilot-commanded brake applications during gear retraction. This improves brake feel during initial application. There is no change to braking performance.	No	No	B	A	A

MANEUVER OPERATOR DIFFERENCE REQUIREMENTS TABLE						
FROM BASE AIRCRAFT: HA-420 TO RELATED AIRCRAFT: HA-420 Elite				COMPLIANCE METHOD		
MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING	CURRENCY
Preflight Inspection	Changes in horizontal tail, elevator, removal of wingtip triangles.	No	No	A	A	A
Cockpit Preparation	Integrated TOLD and PERF calculation.	No	Yes	B	B	A
Navigation-Approach	Added visual approach as a selection in the Garmin 3000 database.	No	Yes	B	A	A
Approach	**Coupled go-around with USP.	No	Yes	C	B	A
All Phases of Flight	**Automatic Flight Control System (AFCS) protection modes USP and ESP.	No	Yes	C	B	A

DESIGN OPERATOR DIFFERENCE REQUIREMENTS TABLE						
FROM BASE AIRCRAFT: HA-420 Elite TO RELATED AIRCRAFT: HA-420				COMPLIANCE METHOD		
DESIGN FEATURE	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING	CURRENCY
Limitations	Decreased MTOW by 100 lb. Weight limit decrease for fuel and baggage. CG Envelope change.	No	Yes	B	B	A
Performance	Revised takeoff performance information.	No	Yes	A	A	A
Performance	**Integrated TOLD and PERF calculation is optional.	No	Yes	B	B	A
ATA 22 Autoflight	**AFCS coupled go-around, USP, and ESP not available.	No	Yes	B	A	A
Dimensions	Horizontal stabilizer is 6 inches shorter.	No	No	A	A	A
Indication	Revised CAS logic. Removed CAS messages for functionality with TOLD and ESP, and for the fuel system.	No	Yes	B	B	A
Indication	Pilot-selectable AOA indicator not available.	No	No	A	A	A

ATA 24 Electrical Power	The #1 (system) battery was changed from 17Ah to 28Ah. USB charging ports not installed. Power feeds not installed. New galley and future cabin systems not available.	No	No	B	A	A
ATA 28 Fuel	Decrease in fuel capacity. “Fuel Slowly” light is not installed.	No	Yes	B	A	A
ATA 29 Hydraulic Power	Volume compensator not installed in the master cylinder command lines, and brake shutoff valve not modified to prevent pilot-commanded brake applications during gear retraction. This brake feel during initial application is not improved. There is no change to braking performance.	No	No	B	A	A

MANEUVER OPERATOR DIFFERENCE REQUIREMENTS TABLE						
FROM BASE AIRCRAFT: HA-420 Elite TO RELATED AIRCRAFT: HA-420				COMPLIANCE METHOD		
MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING	CURRENCY
Preflight Inspection	Changes in horizontal tail, elevator. Wingtip triangles installed.	No	No	A	A	A
Cockpit Preparation	**Integrated TOLD and PERF calculation is optional.	No	Yes	B	B	A
Navigation-Approach	Visual approach as a selection in the Garmin 3000 database is not available.	No	Yes	B	A	A
Approach	**Coupled go-around not installed.	No	Yes	B	A	A
All Phases of Flight	**AFCS protection modes, USP, and ESP not installed	No	Yes	B	A	A