



AP/ATM/5  
WP/23  
05/06/03

**International Civil Aviation Organization**

**UNDP/ICAO Regional Project RLA/98/003  
Transition to the CNS/ATM Systems in the CAR and SAM Regions**

**Fifth Meeting/workshop of Air Traffic Management (ATM) Authorities and  
Planners for RVSM, RNAV routes and RNP implementation in the CAR and SAM Regions  
(AP/ATM/5 RVSM-RNAV-RNP)**

(Panama, Panama, 18 to 20 June 2003)

**Agenda Item 4: Review of the matters related to RVSM Implementation in the CAR/SAM  
Regions**

**b) Safety and Airspace Monitoring Working Group (SAM/WG)**

**Development of a comprehensive profile of operators and aircraft types  
expected to use CAR/SAM airspace where the Reduced Vertical Separation Minimum (RVSM)  
is provisionally planned to be applied**

(Prepared by CARSAMMA)

(Presented by Brazil)

**Summary**

This working paper presents the results of analyzing a traffic sample collected during the period 1-30 December 2002 in the CAR/SAM airspace provisionally identified by the ICAO RVSM Implementation Task Force for implementation of the Reduced Vertical Separation Minimum (RVSM). The traffic sample is summarized in terms of observed airspace users, aircraft types and flight levels.

**1. Introduction**

1.1. At its Third Meeting, the ICAO Reduced Vertical Separation Minimum (RVSM) Task Force (RVSM TF) recognized that RVSM would also benefit traffic operating in the CAR/SAM Regions. In light of this recognition, the meeting decided that traffic movement data should be collected for the CAR/SAM Regions in order to provide an initial assessment of the composition of the traffic in this area. Accordingly,

States providing air traffic services in that portion of the CAR/SAM Regions agreed to collect traffic movement data for the month of December 2002.

1.2. As part of its deliberations at RVSM/TF/3, the Task Force reviewed the task list that should be followed to the RVSM implementation. The Task Force recognized that a sample of traffic must be collected to better know the CAR/SAM airspace. Therefore, the Task Force agreed that the traffic sample be presented, even if it is not fully received prior to RVSM/TF/5. As a result, the Task Force commissioned the CAR/SAM Regional Monitoring Agency (CARSAMMA) to conduct the work of data collection and analysis using a complete sample of traffic movements during the period of 1-30 December 2002.

1.3. These traffic samples are necessary to facilitate the readiness and safety assessments for the planned RVSM implementation. The States concerned were noted to be those located in CAR/SAM Regions.

1.4. The Task Force agreed on a one-month period from 1-30 December 2002 for collection of the traffic movement data to account for seasonal increases in traffic movement in the respective FIRs.

1.5. The purpose of this working paper is to present the results of collecting this one month sample.

## 2. Background

2.1 In accordance with the agreement of RVSM/TF/3, ATC units in a number of the implementing FIRs provided traffic samples from the target period.

2.2 Table 1 presents the information requested for an individual traffic movement, or flight, in the sample.

ITEM	EXAMPLE	NECESSARY OR OPTIONAL
Date (either month/day/year or day/month/year format)	5/01/00 or 01/05/00 for 1 May 2000	NECESSARY
Aircraft call sign	MAS704	NECESSARY
Aircraft Type	B734	NECESSARY
Origin Aerodrome	WMKK	NECESSARY
Destination Aerodrome	RPLL	NECESSARY
Entry Fix into RVSM Airspace	MESOK	NECESSARY
Time at Entry Fix	2:25 (or 0225)	NECESSARY
Flight Level at Entry Fix	330	NECESSARY
Exit Fix from RVSM Airspace	NISOR	NECESSARY
Time at Exit Fix	4:01 (or 0401)	NECESSARY
Flight Level at Exit Fix	330	NECESSARY
First Fix Within RVSM Airspace OR First Airway Within RVSM Airspace	MESOK OR G582	NECESSARY
Time at First Fix	02:25 OR 0225	NECESSARY

Flight Level at First Fix	330	NECESSARY
Second Fix Within RVSM Airspace OR Second Airway Within RVSM Airspace	MEVAS OR G577	
Time at Second Fix	02:50 OR 0250	NECESSARY
Flight Level at Second Fix	330	NECESSARY
(Continue with as many Fix/Time/Flight-Level entries as are required to describe the flight's movement within RVSM airspace)		OPTIONAL

Table 1. Information Required for a Flight in Traffic Sample

2.3 The following section presents the results of processing the traffic samples received by CARSAMMA prior to 21 May 2003. These results are presented in terms of summaries of operators, fleet composition and flight level utilization in CAR/SAM airspace, as obtained from the sample.

### 3. Discussion

3.1 Traffic movement data for operations in CAR/SAM airspace were received by CARSAMMA prior to 21 May 2003 from the following States/Organizations: Argentina, Bolivia, Brazil, Colombia, Dominican Republic, Mexico, Chile, COCESNA, Cuba, Guyana, French Guyana, Paraguay, Peru, Suriname, Uruguay. Some data, due to the format or lack of information could not be treated. This analysis will need to be updated as more traffic movement data are received.

3.2 The total number of flights observed in the traffic samples is 88.255.

3.3 Figure 1 shows the top 19 operators, in terms of total operations, as observed in the traffic sample. These operators account for roughly 70% percent of the operations observed in the sample. The top 10, representing over 59 percent of total operations in the data sample, are VARIG(VRG), TAM(TAM),GOL(GLO), American Airlines(AAL), VASP(VSP), Aerolíneas Argentinas (ARG), Rio Sul (RSL), Línea Aérea Nacional de Chile (LAN), LAN Express (LXP) and Companhia Panamericana de Aviação(CMP). Analysis of the FIR samples shows that commercial operators conducted 94 percent of operations, with international general aviation operators and state operators responsible for 5.2 and 0.6 percent of operations, respectively.

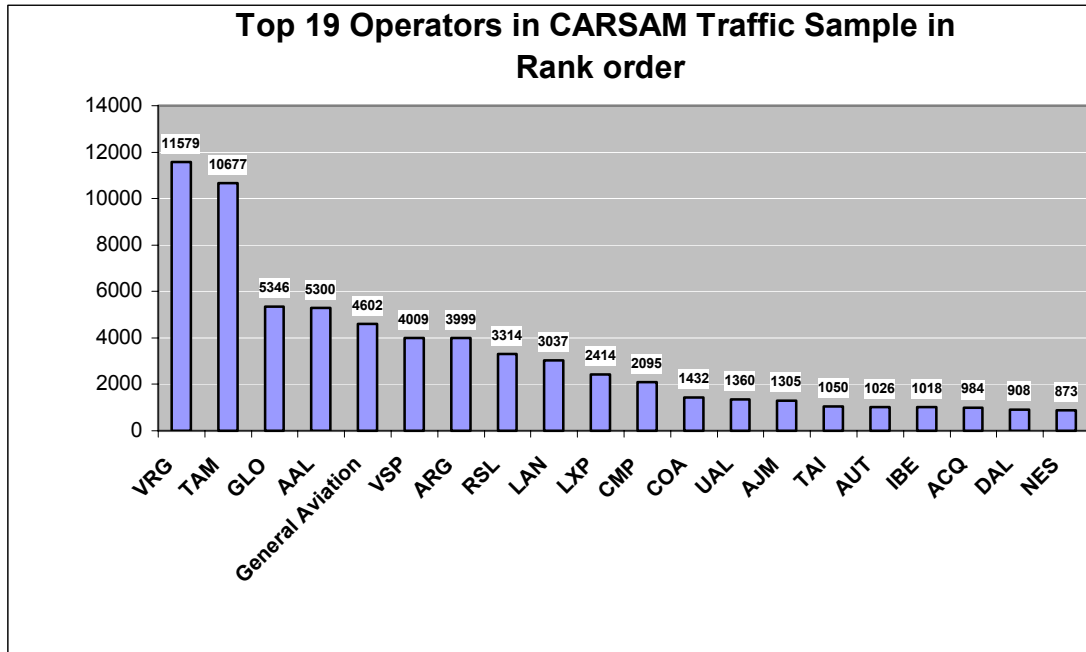


Figure 1. Top 19 Operators Observed in CARSAM Airspace Traffic Sample Presented in Rank Order

3.4 The distribution of the top 15 aircraft types is shown in Figure 2. The top 15 aircraft types account for roughly 77% percent of the operations in the traffic sample. The top five aircraft types representing over 50% percent of the operations in the combined FIR samples are: B737, A320, B732, B733, and B763. Complete details of operations by aircraft type as observed in the sample are shown in Appendix A.

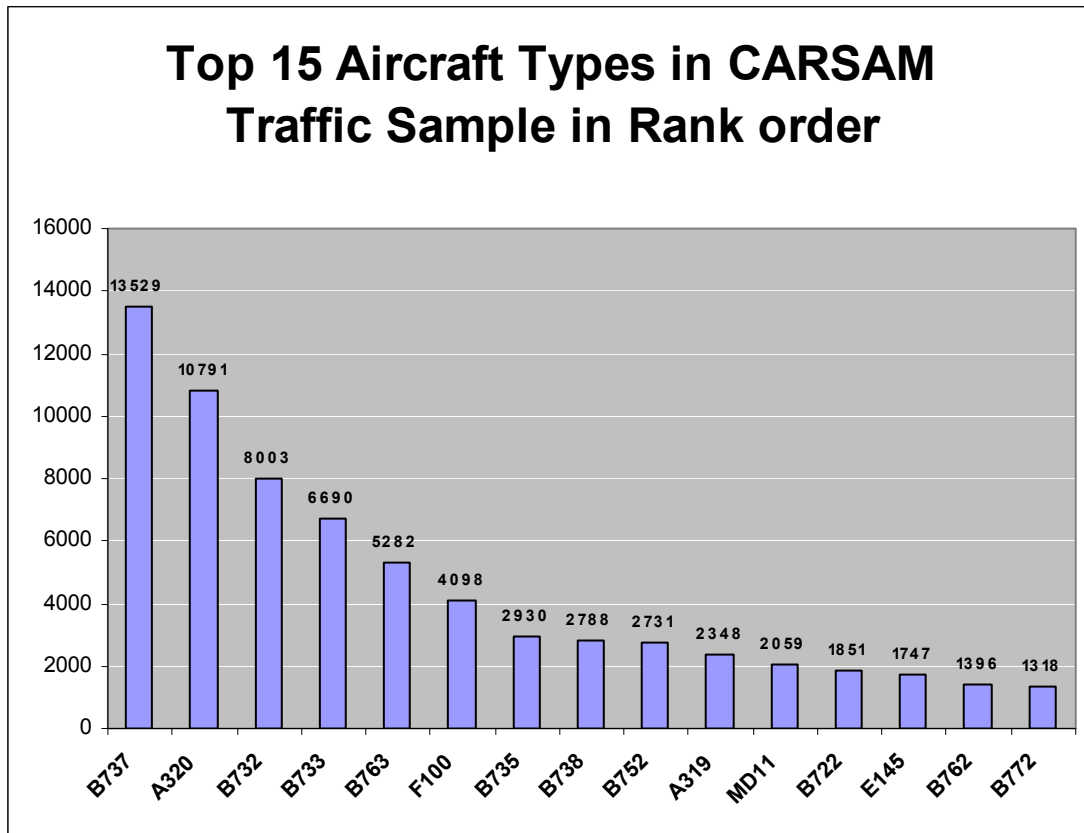


Figure 2. Top 15 Aircraft Types Observed in CARSAM Airspace Sample Presented in Rank Order

3.5 Approximately 45% percent of the flights in the FIR traffic samples contained flight level information. Figure 3 shows the flight level utilization for those flights with flight level data. Aircraft operating at flight levels below FL 290 and above FL 410 were eliminated from the analysis.

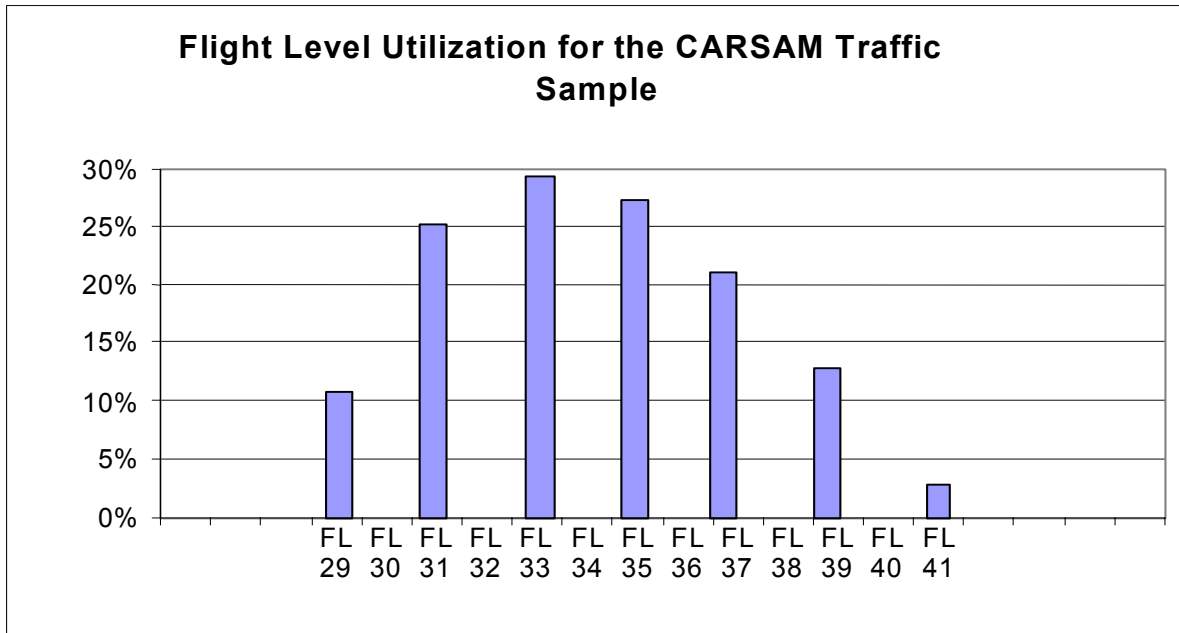


Figure 3. Flight Level Utilization in CARSAM Airspace Sample

#### 4. Conclusions and Recommendations

4.1 This working paper has presented the results of analyzing traffic samples from CARSAM airspace where the RVSM is planned for implementation. The data were collected during the period 1-30 December 2002. Traffic samples included in this analysis are those received by CARSAMMA prior to 21 May 2003.

4.2 Analysis of the samples indicates that roughly 94 percent of operations were conducted by commercial operators, with international general aviation aircraft and state operators accounting for roughly 5.8 percent of the operations.

4.3 19 commercial operators accounted for roughly 70 percent of total operations in the traffic sample, with the top ten of these operators responsible for slightly more than 59 percent.

4.4 15 aircraft types accounted for roughly 77 percent of total operations in the traffic sample, with the top five aircraft types accounting for over 50 percent of the operations in the sample.

4.5 The Task Force is invited to review the results of the traffic movement data collection as presented in the body of the text and the appendices.

4.6 After completing its examination, the Task Force is further invited to note that additional traffic samples are expected to be received. This analysis should be updated as additional traffic samples are collected.

4.7 Some samples reached CARSAMMA in a different format than the one agreed upon. States are requested to send the data, in the next sample to be collected, in a date to be determined, in just one excel file containing all the data requested, including the name of the FIR where the data was collected so as to facilitate the identification.



**Appendix A**

Aircraft Type Distribution for the CARSAM Airspace Traffic Sample (Over 99% of Aircraft Type/Groups Shown)

<b>TYPE</b>	<b>TOTAL</b>
<b>B737</b>	<b>13529</b>
<b>A320</b>	<b>10791</b>
<b>B732</b>	<b>8003</b>
<b>B733</b>	<b>6690</b>
<b>B763</b>	<b>5282</b>
<b>F100</b>	<b>4098</b>
<b>B735</b>	<b>2930</b>
<b>B738</b>	<b>2788</b>
<b>B752</b>	<b>2731</b>
<b>A319</b>	<b>2348</b>
<b>MD11</b>	<b>2059</b>
<b>B722</b>	<b>1851</b>
<b>E145</b>	<b>1747</b>
<b>B762</b>	<b>1396</b>
<b>B772</b>	<b>1318</b>
<b>MD80</b>	<b>1210</b>
<b>B767</b>	<b>1150</b>
<b>DC10</b>	<b>1078</b>
<b>A330</b>	<b>928</b>
<b>DC9</b>	<b>836</b>
<b>B742</b>	<b>783</b>
<b>B721</b>	<b>726</b>
<b>A343</b>	<b>726</b>
<b>B727</b>	<b>601</b>
<b>A340</b>	<b>568</b>
<b>LJ35</b>	<b>521</b>
<b>DC86</b>	<b>503</b>
<b>B747</b>	<b>464</b>
<b>A306</b>	<b>461</b>

<b>B757</b>	<b>461</b>
<b>A310</b>	<b>444</b>
<b>MD88</b>	<b>421</b>
<b>A321</b>	<b>418</b>
<b>C560</b>	<b>408</b>
<b>B744</b>	<b>351</b>
<b>C550</b>	<b>332</b>
<b>B777</b>	<b>313</b>
<b>C525</b>	<b>281</b>
<b>H25B</b>	<b>263</b>
<b>B73S</b>	<b>255</b>
<b>B707</b>	<b>240</b>
<b>A30B</b>	<b>235</b>
<b>CL60</b>	<b>204</b>
<b>DC8</b>	<b>201</b>
<b>DC87</b>	<b>196</b>
<b>BE40</b>	<b>191</b>
<b>A332</b>	<b>189</b>
<b>C650</b>	<b>174</b>
<b>A342</b>	<b>171</b>
<b>B734</b>	<b>164</b>
<b>C56X</b>	<b>159</b>
<b>LJ25</b>	<b>157</b>
<b>H25A</b>	<b>149</b>
<b>A322</b>	<b>139</b>
<b>B743</b>	<b>138</b>
<b>L101</b>	<b>133</b>
<b>MD83</b>	<b>129</b>
<b>IL62</b>	<b>129</b>
<b>C500</b>	<b>128</b>
<b>LJ60</b>	<b>127</b>
<b>FK28</b>	<b>126</b>
<b>F900</b>	<b>123</b>
<b>GLF4</b>	<b>119</b>
<b>B764</b>	<b>114</b>
<b>LJ55</b>	<b>109</b>

<b>LJ31</b>	<b>99</b>
<b>C750</b>	<b>85</b>
<b>MD82</b>	<b>75</b>
<b>B703</b>	<b>73</b>
<b>GLF5</b>	<b>67</b>
<b>BE20</b>	<b>66</b>
<b>GLF2</b>	<b>63</b>
<b>F2TH</b>	<b>62</b>
<b>M326</b>	<b>57</b>
<b>B350</b>	<b>57</b>
<b>A300</b>	<b>57</b>
<b>ASTR</b>	<b>56</b>
<b>B72Q</b>	<b>48</b>
<b>HS25</b>	<b>47</b>
<b>B73C</b>	<b>44</b>
<b>EA32</b>	<b>41</b>
<b>BJ40</b>	<b>39</b>
<b>MD81</b>	<b>37</b>
<b>B73B</b>	<b>36</b>
<b>FA50</b>	<b>34</b>
<b>LJ45</b>	<b>33</b>
<b>WW24</b>	<b>33</b>
<b>FA20</b>	<b>32</b>
<b>LR35</b>	<b>32</b>
<b>PRM1</b>	<b>32</b>
<b>C17</b>	<b>31</b>
<b>AT26</b>	<b>31</b>
<b>E135</b>	<b>31</b>
<b>SBR1</b>	<b>29</b>
<b>FA90</b>	<b>28</b>
<b>AJ25</b>	<b>26</b>
<b>G4</b>	<b>26</b>
<b>BE30</b>	<b>25</b>
<b>YK42</b>	<b>24</b>
<b>FA10</b>	<b>24</b>
<b>LJ24</b>	<b>24</b>

<b>GALX</b>	<b>23</b>
<b>L29B</b>	<b>22</b>
<b>DC93</b>	<b>21</b>
<b>B73A</b>	<b>18</b>
<b>GLF3</b>	<b>18</b>
<b>B731</b>	<b>16</b>
<b>EA30</b>	<b>15</b>
<b>G5</b>	<b>15</b>
<b>LR25</b>	<b>15</b>
<b>L29A</b>	<b>14</b>
<b>DC85</b>	<b>14</b>
<b>BE35</b>	<b>14</b>
<b>MU30</b>	<b>12</b>
<b>GLEX</b>	<b>12</b>
<b>C441</b>	<b>12</b>
<b>N265</b>	<b>12</b>
<b>L1011</b>	<b>11</b>
<b>EA34</b>	<b>11</b>
<b>B736</b>	<b>10</b>
<b>C501</b>	<b>10</b>
<b>F5E</b>	<b>9</b>
<b>B720</b>	<b>9</b>
<b>C551</b>	<b>9</b>
<b>L329</b>	<b>8</b>
<b>C141</b>	<b>8</b>
<b>DA90</b>	<b>8</b>
<b>H25C</b>	<b>7</b>
<b>IL96</b>	<b>7</b>
<b>A333</b>	<b>7</b>
<b>DA20</b>	<b>6</b>
<b>C17A</b>	<b>6</b>
<b>WW25</b>	<b>6</b>
<b>IL76</b>	<b>6</b>
<b>E170</b>	<b>6</b>
<b>ZZZZ</b>	<b>6</b>
<b>HJ25</b>	<b>6</b>

<b>EA31</b>	<b>6</b>
<b>F70</b>	<b>6</b>
<b>F5</b>	<b>6</b>
<b>CL64</b>	<b>5</b>
<b>R99B</b>	<b>5</b>
<b>R99A</b>	<b>5</b>
<b>DA50</b>	<b>5</b>
<b>G2</b>	<b>5</b>
<b>LR55</b>	<b>5</b>
<b>B774</b>	<b>5</b>
<b>E140</b>	<b>5</b>
<b>C5</b>	<b>4</b>
<b>PAY3</b>	<b>4</b>
<b>SBR2</b>	<b>4</b>
<b>R35A</b>	<b>4</b>
<b>A124</b>	<b>4</b>
<b>LR36</b>	<b>4</b>
<b>LR24</b>	<b>4</b>
<b>LR31</b>	<b>3</b>
<b>E120</b>	<b>3</b>
<b>G3</b>	<b>3</b>
<b>HS80</b>	<b>3</b>
<b>G100</b>	<b>3</b>
<b>MU3</b>	<b>3</b>
<b>E25A</b>	<b>3</b>
<b>B753</b>	<b>3</b>
<b>C600</b>	<b>3</b>
<b>H525</b>	<b>2</b>
<b>B200</b>	<b>2</b>
<b>GLFS</b>	<b>2</b>
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<b>B340</b>	<b>2</b>
<b>C135</b>	<b>2</b>
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<b>B773</b>	<b>2</b>
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<b>F50</b>	<b>2</b>
<b>VU93</b>	<b>2</b>
<b>AE32</b>	<b>2</b>
<b>LR45</b>	<b>2</b>
<b>AC90</b>	<b>2</b>
<b>F103</b>	<b>2</b>
<b>C260</b>	<b>2</b>
<b>R35</b>	<b>2</b>
<b>F20</b>	<b>2</b>
<b>G2GL</b>	<b>2</b>
<b>VU35</b>	<b>2</b>
<b>MB88</b>	<b>1</b>
<b>SW3</b>	<b>1</b>
<b>SW4</b>	<b>1</b>
<b>MI3</b>	<b>1</b>
<b>MD86</b>	<b>1</b>
<b>N742</b>	<b>1</b>
<b>YK40</b>	<b>1</b>
<b>A25B</b>	<b>1</b>
<b>B728</b>	<b>1</b>
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<b>AF1</b>	<b>1</b>
<b>PA50</b>	<b>1</b>
<b>SBR</b>	<b>1</b>
<b>AC21</b>	<b>1</b>
<b>SBRI</b>	<b>1</b>
<b>PA42</b>	<b>1</b>

<b>PA10</b>	<b>1</b>
<b>PAYE</b>	<b>1</b>
<b>RA</b>	<b>1</b>
<b>AC6L</b>	<b>1</b>
<b>A323</b>	<b>1</b>
<b>AC69</b>	<b>1</b>
<b>F5EL</b>	<b>1</b>
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<b>GFL4</b>	<b>1</b>
<b>C171</b>	<b>1</b>
<b>C245</b>	<b>1</b>
<b>C402</b>	<b>1</b>
<b>FA33</b>	<b>1</b>
<b>C505</b>	<b>1</b>
<b>C51</b>	<b>1</b>
<b>B761</b>	<b>1</b>
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<b>BE9L</b>	<b>1</b>
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<b>EA33</b>	<b>1</b>
<b>A1</b>	<b>1</b>
<b>FA24</b>	<b>1</b>
<b>H25</b>	<b>1</b>
<b>LR26</b>	<b>1</b>
<b>LJ56</b>	<b>1</b>
<b>LJ51</b>	<b>1</b>
<b>B73Q</b>	<b>1</b>
<b>K137</b>	<b>1</b>
<b>B751</b>	<b>1</b>
<b>IA63</b>	<b>1</b>

<b>TYPE</b>	<b>TOTAL</b>
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<b>B765</b>	<b>1</b>
<b>GH</b>	<b>1</b>
<b>H500</b>	<b>1</b>
<b>BFMJ</b>	<b>1</b>
<b>GULF</b>	<b>1</b>
<b>GLX</b>	<b>1</b>
<b>BE350</b>	<b>1</b>
<b>GLFR</b>	<b>1</b>
<b>BE50</b>	<b>1</b>
<b>BE55</b>	<b>1</b>
<b>BE80</b>	<b>1</b>
<b>BE90</b>	<b>1</b>
<b>LR31A</b>	<b>1</b>
<b>B76Q</b>	<b>1</b>