



EUROPEAN COMMISSION

Brussels, 17.06.2009  
C(2009)4541 final

**Subject: State aid N 654/2008 – United Kingdom  
Large R&D aid to Bombardier**

Sir,

**1. PROCEDURE**

- (1) The UK authorities notified the measure on 19 December 2008, registered on the same day.
- (2) On 30 of January 2009, the Commission received a complaint from Embraer on the aid in question.
- (3) On 6 February 2009, the Commission requested further information from the UK authorities and forwarded them a non-confidential version of the complaint for comments.
- (4) On 26 February 2009, the UK authorities requested a delay extension to submit their replies and asked for a meeting with the Commission.
- (5) The Commission accepted the delay extension by letter dated 4 March 2009.
- (6) On 18 March 2009, the UK submitted their reply to Commission's request for information, as well as comments on the complaint.
- (7) On the 25 March 2009 a meeting was held between Commission representatives and the UK authorities.
- (8) On 18 May 2009, the UK authorities submitted additional information, registered on the same day.

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## **2. DESCRIPTION OF THE MEASURE**

### **2.1. Legal basis**

- (9) Section 1 of the 1982 Civil Aviation Act, which enables the Secretary of State to exercise a general duty of (inter alia) "organising, carrying out and encouraging measures for the designing, development and production of civil aircraft".

### **2.2. The beneficiary**

- (10) The beneficiary of the measure is Short Brothers, Belfast (hereafter "Shorts") a 100% subsidiary of Bombardier Aerospace chosen to design and develop the composite wing for the C Series project. A description of both Shorts and Bombardier is presented hereafter:

#### **Shorts**

- (11) Shorts was acquired by Bombardier in 1989. Shorts' current expertise lies in the design and manufacturing of fuselage, nacelles system and flight controls. In 2008, it was the largest manufacturing company in Northern Ireland located in Belfast employing circa 5 300 people (including more than 800 design and manufacturing engineers) with an established supply chain in the UK and Europe.
- (12) Shorts is a key contributor to Bombardier Aerospace programmes – around 70% of its output is for Bombardier Aerospace. It has significant design and manufacturing involvement in all five Bombardier aircraft families, representing a total of 11 aircraft programmes (Learjet, Challenger, Global express, regional jets and turboprops). In addition, the company plays an important role in the UK Integrated Wing R&D programme, led by Airbus UK, where it heads up the Wing Structures package, and the UK Environmentally Friendly Engine programme, led by Rolls-Royce, in which Shorts is spearheading the Power Plant Nacelle package. In addition, Shorts has participated in EC Framework Programmes such as ALCAS, SILENCER and TANGO.
- (13) In FY 2008 Shorts made an operating profit of USD 125 million on turnover of USD 947 million. In FY 2007, it made an operating profit of USD 33 million (and a profit after tax of USD 24 million) on turnover of USD 860 million.

#### **Bombardier**

- (14) Bombardier Inc. is a global Aerospace and Transportation company located in Canada traded on the Toronto Stock Exchange. Bombardier has a workforce of 56 000 and manufacturing facilities in 40 countries throughout the Americas, Europe and Asia Pacific. Revenues for the year 2008 amounted to USD 17,5 billion. Market capitalisation on 24<sup>th</sup> of April 2008 amounted to USD 12 billion.
- (15) Bombardier Aerospace (hereafter: Bombardier), subsidiary of Bombardier Inc. is headquartered in Montreal and has a workforce of around 28 000 world-wide and revenues amounting to USD 9,7 billion (31<sup>st</sup> January 2008). It is specialised in the design, manufacture and delivery of products and services for business, regional and amphibious aircraft markets. Bombardier is not currently a large aircraft manufacturer. So far, its main focus has been on regional jets (CR J 700 NextGen,

CRJ 900 NextGen, CRJ 1000 Next Gen), turboprops (Q 400 NexGen) and business jets.

### 2.3. The project

- (16) Bombardier Aerospace is re-launching the CSeries project<sup>1</sup>, in the period 2008-2013, which is about developing a new family of commercial aircraft in the 110-149 seating range.
- (17) Shorts will be charged with the development of the wing for the CSeries aircraft.
- (18) The whole CSeries program will cost EUR 2,2 billion. The costs of the work-package assigned to Shorts amount to EUR 551,7 million.
- (19) The objective of the programme, according to the UK and press-releases of the company itself, is to develop an aircraft which would emit 20% less CO<sub>2</sub> and 50% less NO<sub>x</sub>, fly four times quieter and deliver significant energy savings: 20% fuel-burn advantage due to 15% mass reduction<sup>2</sup> as well as 15% improved cash operating costs in comparison to current in-production aircraft of similar size.
- (20) According to the information provided in the notification by UK authorities, the CSeries is a new aircraft, developed on the basis of latest technological advancements, and not simply the derivative of an existing platform. In its manufacturing both traditional and advanced composite and metallic technology will be applied to deliver the next generation of airframe characterized by:
  - Fourth generation aerodynamics;
  - Increased use of composites and advanced aluminium alloys in structures;
  - The latest system technologies such as fly-by-wire and electric brakes;
  - The composite wing will feature a fourth generation transonic wing.
- (21) The programme covers the development of two new models of aircraft: the CS 100 and CS 300 model (these were previously known as the C110 and C130 models, respectively). Bombardier will offer different versions of each i.e. the standard CS 100 and the extended range CS100ER, as well as standard CS 300, the CS 300 ER and the CS 300 XT. According to the information published by the company, the CS 300 XT is a short range variant of the standard CS 300 that will use the higher thrust version of Pratt&Whitney's GTF to offer improved take-off performance.
- (22) There are separate R&D programmes for each model. The entry into service (EIS) of the CS 100 model is planned for [...] \* 2013. Additional R&D work will be necessary for CS 300 model before its entry into service planned for [...] 2014.

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<sup>1</sup> Bombardier began evaluating the CSeries programme in 2004, with an Entry into Service target date set for 2010. However, due to an insufficient client base the project and the R&D activities had to be postponed. At that time it was notified to the Commission as N 496/05, the notification was subsequently withdrawn.

<sup>2</sup> The estimates made by Bombardier are supported by the technical study of QinetiQ, which finds the reduction targets reasonable. Even if QinetiQ is a bit more prudent on the fuel savings, the impact of the project represents a significant technology shift.

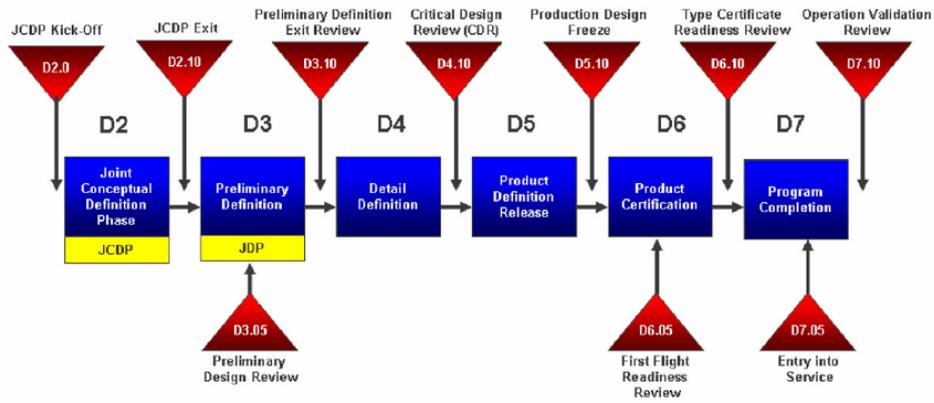
\* Business secret.

- (23) In terms of securing the sales of the aircraft, the Lufthansa supervisory board has approved a proposed order for 30 Bombardier CSeries aircraft. Operating lessor Lease Corporation International (LCI) has emerged as the second firm customer for the Bombardier CSeries aircraft, with a firm purchase agreement for 20 of the type. LCI's deal includes three CS100s and 17 CS300s, making it the first customer for the larger 149-seat version<sup>3</sup>. The deal also includes options on an additional 20 CSeries aircraft.
- (24) As indicated by the UK authorities, the manufacturing of the aircraft will be based on a risk-sharing approach, in line with industry standards, whereby major risk sharing suppliers and/or Bombardier subsidiaries, placed in different geographical locations, will manufacture self-contained sections of the aircrafts (such as wings, centre fuselage, and empennage) to be integrated by Bombardier in a short cycle-time, high-rate final assembly.
- (25) The manufacturing of the CSeries aircraft will be composed of the following work-packages:
- Aircraft wing will be developed by Shorts in Belfast, beneficiary of the aid. As part of the CSeries manufacturing strategy, Shorts will manufacture the Wing Skins, Stringers and Spars;
  - Engine will be developed by Pratt&Whitney in the US;
  - Fuselage and cockpit will be manufactured at a Bombardier facility in Saint Laurent, Montreal;
  - Centre fuselage will be supplied by the Shenyang Aircraft Cooperation, a subsidiary of the state-owned aviation industrial entity China Aviation Industry Corporation (AVIC I);
  - Assembly location is planned to be placed in Mirabel, Montreal.
- (26) In the period during which the Commission had been assessing the notification of aid to Shorts, Bombardier published names of three other main suppliers to be involved in the project:
- Fokker Elmo which will be responsible for the design and production of the entire Wiring and Interconnection System and will provide all the design and production of all Flight Test and Instrumentation wiring required during the certification of the CSeries aircraft. The majority of the design and development effort will take place on-site at Bombardier in Montreal, manufacturing of development and flight test wiring systems will be performed at Fokker Elmo Netherlands, while the serial production is scheduled to be executed at Fokker Elmo China.
  - Alenia Aeronautica will provide the horizontal and vertical stabilisers, fully equipped with hydraulic, electrical and flight control systems, lights and antennas.
  - Goodrich Actuation Systems will be responsible for the design and production of the flap and slat actuation systems.

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<sup>3</sup> Ref: <http://www.reuters.com/article/pressRelease/idUS109891+30-Mar-2009+MW20090330>

- (27) The development of the wing, assigned to Shorts, will require substantial industrial research and experimental development activities into application of composite materials and new manufacturing technologies to develop a fully composite wing.
- (28) Shorts in the framework of the wing-development work package will be exploiting the highly risky resin transfer infusion, which offers considerable cost reduction opportunities compared to conventional solutions (prepreg) through reduced cost in raw materials and rapid deposition of thick ply packs.
- (29) In technical terms, the UK authorities have indicated to the Commission that the RTI involves injecting resin over the surface of the preform (dry fibre fabric pre-pressed into the mould shape) using low pressure Resin Transfer Moulding (RTM) equipment. In addition to material and lay-up cost reductions the RTI process offers: elimination of prepreg out-life concerns (large prepreg structures typically have to be laid up and cured in 10 days dictating the autoclave cure schedule), potentially better thickness tolerances over the prepreg, utilises existing autoclave composite manufacturing infrastructure and offers potential benefits from recycling of waste dry fibre fabric over prepreg materials.
- (30) Other important features of the work-package of the C Series project carried out by Shorts, as indicated to the Commission in the technical information provided by the UK authorities, is the application of a jigless component assembly process, Flexible Manufacturing System (FMS), and Factory modelling and simulation marked by a higher level of automation.
- (31) In terms of the organization of the work-package assigned to Shorts the wing will be developed in three stages, being the i) test programme, ii) full scale composite wing demonstrator and iii) composite wing design and development programme. Each one of the stages is briefly described below:
- Test Programme - Given the novel material systems being used, a significant level of development and testing is required in order for the process to be developed for use in primary structural components such as wings.
  - Full Scale Composite Wing Demonstrator - The demonstrator will act as a proof of concept around the technological advances of using RTI technology, in the development of composite manufacturing processes for large primary aerospace structures.
  - Composite Wing Design and Development - The wing development will cover all aspects of design and manufacturing engineering through the Bombardier Engineering System (BES) development phases.
- (32) The realization of the stages will be based on the Bombardier Engineering System (later on referred to as BES) product development process covering all aspects of design and manufacturing engineering, which are described in detail below :



- (33) Based on information provided by the UK authorities, the Commission considers both Joint Concept Development Phase (D2) and Joint Development Phase (D3) as composed of industrial research activities. The phases from Detail Design Phase (D4) up until and including Product Certification (D6), have been recognized as experimental development.
- (34) A description of the BES phases has been provided below on the basis of information transmitted to the Commission with the notification.

**Joint Concept Development Phase (D2)**

- (35) During the joint concept development phase of the wing (JCDP) various feasibility studies and preliminary Trade Studies will be conducted. These studies will research and compare alternative designs and manufacturing processes.

**Joint Development Phase (D3)**

- (36) During the joint development phase of the Wing (JDP) further development of initial concepts will be generated. In this phase new design features specific to the composite wing will be proven using a combination of analytical and physical testing.
- (37) The research and development activities carried out during the Test and Full Scale Composite Wing Demonstrator programme of the wing development work-package will all be covered by the Joint Concept Development Phase (D2) and the Joint Development Phase (D3).

**Detail Design Phase (D4)**

- (38) Detail definition phase (DDP) ensures that design for manufacture and assembly is realized. During the detail definition phase of the Wing all concepts will be finalized.

**Product Definition Release (D5)**

- (39) This phase formally completes the baseline issue of the detailed Engineering Data Set to manufacturing. This allows for the completion of the tool design and first article assembly. The other significant activity that takes place is the completion of the test rigs so that component and sub-system testing can commence. The end of phase milestone is the Production Design Freeze (PDF).

## **Certification Phase (D6)**

- (40) The longest phase of the program is when Complete Integrated Aircraft Systems Test Area (CIASTA) testing starts, flight test aircraft are assembled and flight testing and validation activities take place. The end of phase milestone is the Type Certificate Readiness Review, which ensures that the design complies with airworthiness standards and demonstrates compliance to their contractual obligations in readiness for Entry Into Service (EIS).
- (41) Research and development activities carried out during the Composite wing design and development stage will include all the phases of the BES product development process covering Joint Concept Development Phase (D2) up to Certification Phase (D6).
- (42) The UK authorities have confirmed that the eligible costs for the Bombardier CSeries programme are those up to the certification dates of the CS100 and CS300 aircraft variants only and cover R&D activities necessary to successfully complete the certification process. Furthermore, the UK authorities have affirmed that all post certification costs have been excluded from costs eligibility calculations.

### **2.4. The R&D categories and the eligible costs**

#### *The R&D categories*

- (43) Shorts is responsible for the complete development of the composite wings for the CSeries family of aircraft.
- (44) This work package of the CSeries project is composed of industrial research and experimental development activities, representing respectively [...] % (GBP [...] million) and [...] % (GBP [...] million) of the eligible costs of the project amounting to GBP 333,35 million.

<b>Type of activity</b>	<b>Eligible costs (Million £)</b>	<b>Aid amount (Million £)</b>	<b>Aid intensity</b>	<b>Maximum aid intensity allowed</b>
<b>Industrial research</b>	[...]	[...]	[...]%	60%
<b>Experimental development</b>	[...]	[...]	[...]%	40%
<b>Total</b>	333,35	113,37	34,01%	

- (45) In the following recitals of the decision the Commission will briefly describe the character of industrial research and experimental development activities taking place in the framework of the wing development work-package. In the next step it will focus on the research activities taking place in the individual stages of the wing development programme, as described in recital (31) of the decision classifying them accordingly to industrial research or experimental development activities.

### Character of industrial research activities

- (46) As already indicated, the industrial research activities will apply to joint conceptual definition (D2) and joint definition (D3) of the BES product development process.
- (47) The industrial research activities will mainly consist of: the analysis of potential technologies to be applied in the framework of the work-package, definition of the systems architecture and functionality, research into new materials, the assessment of new innovative manufacturing processes and tooling concepts and the development of structural concepts that would be validated by tests.
- (48) As part of the industrial research activities, the RTI process will be tested for use in primary structural components, and validated for its robustness and capability in manufacturing components that will meet the design requirements of the C Series aircraft.
- (49) Also, manufacturing process development testing will be carried out to investigate the effects of variation within the manufacturing process, to determine which variables will need to be controlled in order to deliver a composite material that meets the engineering requirements and that is weight competitive when compared to the conventional prepreg baseline.
- (50) Structural development test will also be required and will involve manufacturing and testing of a large number of specimens over a wide thickness range. It is at this stage that structural concepts will be developed that are matched to the RTI process capability. Furthermore, tests on components will be carried out characterized by increasing complexity ranging from sub components level to that of a full scale demonstrator wing box.

### Character of experimental development activities

- (51) Experimental development activities will be carried out in the detail design phase (D4) up to certification phase (D6) of the BES product development process.
- (52) They will concern developing in detail the preliminary design definition, obtained at the end of joint concept development and development phase. As a result production drawings and confirmation of the preliminary designs of tools and first article assembly (these include the assembly and installation drawings, master specialization list, design change proposals, test plans and qualification assessment notice) should be achieved.
- (53) Moreover, experimental development activities will include all activities required to certify the product and demonstrate compliance with airworthiness standards. A review of the first aircraft's readiness to begin flight testing will also be included.

### Activities carried out in the stages of the wing development programme

- (54) The research and development work will be undertaken in three phases, as indicated in recital (31) of the decision. The classification of the wing design and development programme is based on the concept that the Joint Conceptual Definition Phase (D2) and the Joint Definition Phase (D3) have been classified as Industrial Research. Detail Design (D4) through to Certification (D6) have been classified as Experimental

Development, as these phases will take the output from the earlier phases to create the design and production plans for the manufacture of the first articles. However, it is recognised that the feedback from these phases may also generate Industrial Research to resolve identified issues.

- (55) The test programme has been classified, by the UK authorities, as Industrial Research as it is critical investigation undertaken in order to acquire new knowledge and skills for the development of a new manufacturing process. It covers Joint Conceptual definition and joint definition phases of the BES product development process.
- (56) During the test programme all the issues involved in designing, manufacturing and supporting the composite wing through its lifecycle will be identified. Two different material systems will be used for the spars and skins and a building block approach will be adopted. This approach, of which a diagram was presented by UK authorities in their notification, will involve design allowables, structural details and sub-component tests required to develop the material which will support the design of the composite components within the wing.
- (57) During the demonstrator programme, a full scale composite wing demonstrator will be used consisting of a full-scale,  $\frac{3}{4}$  span wing with composite upper and lower skins (with integral stiffening blades/stringers), composite front, rear (inner and outer) and auxiliary spars and machined aluminium ribs, all assembled to form a wing 'box'. It will enable the validation of the RTI manufacturing process and the tool designs that will be required to support large-scale wing skins. It will also allow the manufacturing teams to validate the lay-up processes using different composite fabrics around very challenging geometrical features, proving drapeability, skin thickness/stack-ups and potential variation during fabrication. The objective will be to optimise the wing weight and ensure that the design is producible without material "creases" which are deviations within the structure.
- (58) The demonstrators programme taking account of the nature of research activities it requires has also been classified by the UK authorities as Industrial Research as it is critical investigation undertaken in order to acquire new knowledge and skills for the development of a new manufacturing process. It covers Joint Conceptual definition and joint definition phases of the BES product development process.
- (59) The wing design and development programme will mostly consist of experimental development activities (approx. [...]%). All the product development phases of the BES process as described in recital (41) of the decision will be applicable.
- (60) This stage of the wing development programme is composed of design engineering and manufacturing/tooling engineering.
- (61) Manufacturing and tooling engineering will require the application of many new build concepts, processes and tooling techniques covering the following areas:
  - material cutting, stringer production and skin production;
  - autoclave cure, wing trim, non-destructive testing (NDT);
  - leak test and final equipping line.

- (62) This stage of the wing development activities will pose significant challenges, which will concern developing design features that provide an optimised structure while incorporating the integration of mechanical, fluid, pneumatic and electrical systems.

Eligible costs

- (63) Shorts has utilised a “bottom up” cost estimation model to capture all costs required to develop the wing. The cost estimates have been developed in line with the individual stages of BES as outlined in point 2.3 of the decision.
- (64) Total costs of the project amount to EUR 2,2 billions<sup>4</sup> (USD 3,2 billion or GBP 2,07 billion). The work package assigned to Shorts amounts to EUR 551,7 million (GBP 520,5 million) and constitutes approximately 25% of the total value of the project. Bombardier will itself contribute GBP [350-450]\* million and the UK authorities intend to grant GBP 134,37 million (GBP 113,37 million for R&D activities and GBP 21 million for regional development)<sup>5</sup> for the development of the wing, assigned to Shorts.
- (65) The eligible costs of the research activities carried out by Shorts and linked to the development of the wing for the CSeries aircraft amount to GBP 333,35 million, against GBP 520,5 million to the overall value for the work-package assigned to Shorts.

The breakdown of these costs covering the life of the programme has been shown in the table below:

<b>Bombardier Financial Year 1 Feb to 31 Jan</b>	<b>2008/09</b>	<b>2009/10</b>	<b>2010/11</b>	<b>2011/12</b>	<b>2012/13</b>	<b>2013/14</b>	<b>2014/15</b>	<b>2015/16</b>	<b>Total</b>
<b>Personnel Costs</b>	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
<b>Costs of instruments and Equipment</b>	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
<b>Costs for Contractual Research</b>	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
<b>Additional Overheads</b>	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
<b>Total</b>	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	<b>333,35</b>

- (66) The eligible costs of the research activities have also been demonstrated in a breakdown including the BES phases:

<sup>4</sup> The exchange rate assumed is 1 GBP = 1,06 EUR; 1 EUR = 1,43 USD as at 18.12.2008.

\* Business secret. Range value.

<sup>5</sup> See recital 76.

	<b>Joint Conceptual Definition</b>	<b>Joint Definition</b>	<b>Detail Design</b>	<b>Product Definition Release</b>	<b>Certification</b>	<b>Total</b>
<b>Personnel costs</b>	[...]	[...]	[...]	[...]	[...]	[...]
<b>Costs of Instruments and Equipment</b>	[...]	[...]	[...]	[...]	[...]	[...]
<b>Costs for contractual research</b>	[...]	[...]	[...]	[...]	[...]	[...]
<b>Additional Overheads</b>	[...]	[...]	[...]	[...]	[...]	[...]
	[...]	[...]	[...]	[...]	[...]	333,35

## 2.5. The aid instrument

- (67) The UK is providing a repayable advance to Shorts amounting to GBP 113,37 million.
- (68) The aid will be disbursed over [...] in quarterly instalments starting in 2009/10 and ending in [...] against company's expenditure on eligible costs. The UK government has agreed to an annual cap of GBP [...] million a year [...]. Furthermore, the UK government in the agreement with Bombardier has secured itself conditions that [...] the investment of the government.
- (69) After the original notification, the UK has reduced the eligible costs by GBP [...] million (down to the current GBP 333,35 million), because Shorts has identified that an element of the tooling to be used in the R&D phase of the CSeries programme will have a useful life that extends beyond this phase. Therefore, the investment in this tooling has been removed from the eligible costs. As a result of this, the amount of the repayable advance has been reduced by GBP [...] million, from GBP [...] million to GBP 113,37 million.
- (70) In total, the reimbursable advance will not exceed 34,01 % of eligible costs of Shorts.
- (71) The conditions for the reimbursement of the repayable advance depend on the successful outcome of the R&D project. The successful outcome of the project will be that Bombardier delivers an optimised, novel and innovative manufacturing process that will support the CSeries business plan of offering an optimised aircraft in the 110 to 130 seat segment to the expectation of its customers. The repayable advance will be reimbursed to the UK government in the form of a fixed levy linked to the aircraft sales.
- (72) The UK government assessed, against market assessments<sup>6</sup>, a [...] sales profile for the CSeries aircrafts in the time period 2013-2030. On its sales forecasts the UK

<sup>6</sup> Letter of Intent by the UK Government. The UK Department of Business, Enterprise and Regulatory Reform and KPMG Report: Assessment of the Application for Launch Investment of BBD CSeries, pages 71 – 74 (hereafter: "BERR/KPMG Report").

government is assuming a [...]% [...] return on its investment. The [...] rate of return was benchmarked taking into account [...].<sup>7</sup>

- (73) Shorts will start making repayments to the UK government on the sale of the [...] aircraft and continue until the [...] aircraft is sold.
- (74) Bombardier has targeted higher sales, at [...] planes, than those foreseen by the UK authorities. In a case where Bombardier manages to reach its targeted sales figure of [...] planes, the UK authorities in the construction of the repayable advance have incorporated a royalty payment for every aircraft sold above the [...] unit. The UK authorities would thus be able to benefit from extra payments in case of success of the project exceeding forecasts until the sale of the [...] aircraft.
- (75) The aid can not be cumulated with other public aid in respect to the same eligible costs.
- (76) In addition, the UK intends to provide regional development aid amounting to GBP 21 million in order to support the same project. The regional aid is granted within an existing block exempted aid scheme XR 11/2007 - Selective Financial Assistance SFA for Northern Ireland and is not subject to this decision.

## **2.6. Duration of the programme**

- (77) The CSeries Development Programme will be implemented within six years 2009-2015. The investment will be disbursed over [...] financial years, from 2009/10 to [...] in quarterly instalments.
- (78) The duration of the investment, however, is flexible since the UK government will receive repayments based upon aircraft sales. The UK starts to receive repayments on the sale of the [...] aircraft, [...]. On the sale of the [...] aircraft the government will have achieved its target rate of return of [...]% [...], provided that sales have been according to the forecast profile. It is forecast by the government that the [...] aircraft will be sold in [...].<sup>8</sup>

## **2.7. The complaint**

- (79) The Commission received a complaint concerning the aid measure in question. The complaint was submitted on behalf of Embraer – Empresa Brasileira de Aeronáutica S.A., Embraer Aviation Europe and OGMA – Indústria Aeronáutica de Portugal S.A., its Portuguese subsidiary.
- (80) Embraer is one of the four main manufacturers of jets, its models directly compete with the CSeries (at the lower range).
- (81) The complaint focused mainly of the following issues:
  - doubts on the innovative character of the R&D activities and contends that aid is granted to the activities which should be considered too close to the market;

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<sup>7</sup> Bombardier's cost of equity is estimated to be at [...]% and [...]%

<sup>8</sup> CSeries Forecast Review by Dept. of Business, Enterprise and Regulatory Reform.

- doubts on the incentive effect of the aid due to the allegation that the project was launched already in 2005;
- doubts on the validity of the market failure argument since the complainant was allegedly capable to obtain external financing for its projects through an IPO<sup>9</sup>;
- doubts on the appropriate amount of aid compared to the amount of eligible costs and thus doubts on the amount and conditions of the repayable advance which might not reflect market terms;
- the complainant proposes to include the market for wings for aircrafts in the Commission's analysis of the distortive effects of aid and claims that its subsidiary would be a possible partner for this work.

(82) The concerns of the complainant are addressed in the assessment part of this decision.

### **3. ASSESSMENT**

#### **3.1. Existence of aid**

(83) The notified measure concerns repayable advances granted by the UK to Shorts. The resources involved are State resources, as they will be provided directly by the UK Government. The measure is selective as it favours explicitly only one undertaking, Shorts. Since Shorts is a large enterprise involved in trade with other Member States, a financial advantage favouring it compared to its competitors distorts or threatens to distort competition and affects trade between the Member States.

(84) The granted advantage gives the beneficiary an access to resources on terms which the market may not necessarily provide taking into account the profile of the company and the size of the project in relation to Bombardiers and Shorts' experience and turnover. Therefore, despite the fact that the paid interest rate on the repayable advances is [...] higher than the reference rate, the Commission considers that the repayable advances in this case provides an advantage to the beneficiary.

(85) Therefore the measure constitutes State aid according to article 87 (1) of the EC Treaty.

#### **3.2. Legality of aid**

(86) The UK intends to implement the measure only after the authorisation by the Commission and, therefore, the UK fulfils the obligations imposed by Article 88(3) of the EC Treaty.

#### **3.3. Scope of the decision**

(87) Concerning the identification of the beneficiaries, the Commission notices that the aided project is implemented by Shorts in Northern Ireland. The aid measure should therefore be assessed on both the Community level since Shorts is a European company and the global level as it is owned entirely by Bombardier. The economic

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<sup>9</sup> Initial public offering

analysis shows that Shorts' operations are financed from its own cash flow and profits (i.e. retained earnings), by inter-company loan financing and, to a limited extent, by external financing. In terms of its R&D expenditure in recent years, typically around [...] % has been sourced internally and around [...] % externally. Given the size of the project, Shorts would necessarily need to recur to intra-company financing. Moreover, the decision to undertake the project in Belfast rather than other locations was taken at Bombardier's level. The strategic decision on the allocation of working packages was taken by Bombardier.

- (88) It is therefore appropriate to conduct a detailed assessment of the compatibility of the aid considering both, the level of Shorts and of Bombardier.
- (89) The regional aid referred to in recital (76) above is excluded from the scope of this decision.

### 3.4. Compatibility

- (90) Given the nature of the aid, concerning industrial research and experimental development activities, the Commission has assessed the measure on the basis of Article 87(3)(c) of the EC Treaty, especially with regard to the Community Framework for State aid for R&D&I<sup>10</sup> (hereafter the R&D&I Framework). The assessment conducted under the R&D&I Framework is in line with the decisional practice applied to the aeronautic sector which the Commission demonstrated in a number of cases<sup>11</sup>.

#### 3.4.1. Market failure

- (91) According to the R&D&I Framework<sup>12</sup>, market failures may prevent the market from reaching the optimal output, and State aid may be necessary to increase R&D&I in the economy only to the extent that the market, on its own, fails to deliver an optimal outcome. Depending on the specific market failure addressed, the Commission takes into consideration the following elements: knowledge spill-overs, imperfect and asymmetric information and coordination failure. For State aid targeting R&D&I projects or activities located in assisted areas, the Commission takes also into account the specific problems related to these areas. In this case, the Commission found that the relevant elements are: knowledge spill-overs, imperfect and asymmetric information and the location in an assisted area.

##### 3.4.1.1. Knowledge spill-overs

- (92) R&D&I often generates benefits for the society in the form of knowledge spill-overs, namely with reference to the level of information dissemination foreseen, the specificity of the knowledge created and the availability of IPR protection. In particular, the spill-overs are high from R&D implemented in the aerospace industry. The knowledge spill-overs were widely substantiated for the UK economy and its implications to the productivity of the aeronautic sector at large in an Oxford

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<sup>10</sup> OJ C 323, 30.12.2006, p. 1.

<sup>11</sup> E.g. Case N 447/2007 *Turbomeca (Safran Group)* (18.1.2008). Case N 647/2007 *PAMELAT project of Latécoère, France* (16 July 2008). Case N 195/2007 *Rolls Royce Germany Ltd.* (11.3.2008).

<sup>12</sup> See points 1.3.2 and 7.3.1 of the R&D&I Framework.

Economic Forecasting study<sup>13</sup>. Furthermore, the UK authorities provided information substantiated by the BERR/KPMG report (referred to above in the decision) on how the organization of the wing development work-package between Shorts and its suppliers will create knowledge spill-overs within the EU aircraft manufacturing value chain, the aerospace industry as well as the wider economy. The points raised by the UK authorities are elaborated in detail below.

- (93) The Commission notes that in the framework of the CSeries programme a number of European companies are competing to be awarded design and manufacturing packages for the CSeries wing programme. The selected companies participate directly in the R&D programme<sup>14</sup>. There are also other major suppliers to other parts of the CSeries programme, some of whom will also need to integrate their products with a composite (as opposed to a metal) wing<sup>15</sup> thereby creating further spill-overs.
- (94) Shorts will have to disclose certain aspects of its technology (on normal commercial terms) to suppliers and/or sub-contractors as they will need to understand the composite manufacturing processes developed by Shorts for the CSeries wing. The companies benefiting from this knowledge diffusion will include suppliers of raw materials, equipment for manufacturing composite structures, manufacturers of composite components and assemblies, suppliers of other materials and equipment that will be integrated with composite assemblies. Shorts will also provide its supply chain with technical, logistics and programme management support.
- (95) Furthermore, the UK authorities indicated that during the Joint Conceptual and Definition phases many suppliers will be an integral part of Shorts' Integrated Product Development Teams. Suppliers' employees will be based at Shorts' Belfast facility and work within Shorts' integrated design groups. This will have many benefits for the participating suppliers, as, *inter alia*, it will lead to increased knowledge and learning in relation to design, manufacturing, tooling, materials and processes and it will enhance systems exposure, including computerised systems for R&D, materials procurement, testing and production processes.
- (96) The UK authorities have informed the Commission that Shorts will need to disseminate its newly-acquired knowledge to successfully exploit the CSeries programme. Also Shorts' is a company which has a history of sharing (whether under licence or otherwise) its technological knowledge with others, in particular suppliers and co-participants in R&D projects. Third parties will therefore have the opportunity to improve their own products and processes, not only in respect of their involvement in the CSeries programme, but also on subsequent projects and programmes
- (97) Furthermore, the UK authorities indicated to the Commission, that Shorts for the wing development programme in Belfast, will need to involve other parties (subcontractors, academic institutions) in the R&D efforts and will disclose aspects of the technological results to partners and suppliers, on normal commercial terms.
- (98) Shorts participated and will continue to participate, in many academic and/or industry-wide research programmes (including programmes funded by the European

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<sup>13</sup> Assessing the Economic Impact of Aerospace Research & Development, provided to the Commission by the UK authorities.

<sup>14</sup> These companies include [...], Sonaca (Belgium; fixed leading assembly), [...]

<sup>15</sup> For example Liebherr Aerospace, which will supply the landing gear.

Community and/or the United Kingdom authorities). Within the framework of these programmes sharing and dissemination of technical knowledge with the contracted partners has always taken place. In many cases, open public events have also benefited from the technology developed by Shorts and it is the expectation that this will be the case also for knowledge generated through the CSeries programme.

- (99) Shorts also participated in the Society of British Aerospace Companies Supply Chain for the 21<sup>st</sup> Century (SBAC SC21) programme. It also exchanges technical, logistical and programme management support and advice. Shorts is also a member of the Centre of Excellence for Integrated Aircraft Technology at the Queen's University Belfast and collaborates with many other leading universities throughout the United Kingdom and Europe.
- (100) There are specific areas in which the science base is expected to benefit from the CSeries wing programme, including the validation of basic technology for carbon fibre and resin systems, potential for identification of areas for future research and the validation of basic research using virtual tools developed for the programme.

*Issues raised by the complainant*

- (101) As for the arguments submitted by the complainant, it confirms that the aeronautic sector is very knowledge-intensive. However, it claims that only the pre-competitive research has significant spill-over effects, since the development of a new technology in the aeronautic sector finds its use in other sectors and since on the field of research the manufacturers interact closely with universities and researchers. However, at the development stage of a product, a spill-over is excluded due to the extensive intellectual property protection. A transfer of knowledge is possible only by a licence protecting the rights of the licensor.

*Conclusion on the spill-over effect*

- (102) The Commission, having assessed all the information submitted, considers the following:
- (103) It is true that Shorts will protect the results of its R&D efforts (which will require very extensive investment by the company), where this is legally possible. This does not, however, mean that Shorts will not share the results of its R&D with others, as it will have every incentive and need to share them. This is based both on the need to do so in order to exploit successfully the CSeries programme (given the need to rely on other partners and suppliers to manufacture the complete wing package) and Shorts' history of sharing (whether under licence or otherwise) its technological knowledge with others, in particular suppliers and co-participants in R&D projects.
- (104) Therefore, Shorts will disseminate both to its suppliers and to the subcontractors part of the know-how related to the project, in order to allow broadening the knowledge on these innovative technologies.
- (105) Moreover, besides the necessary limited numbers of suppliers and sub-contractor, the participation of Shorts in numerous national and international programmes will further enhance the dissemination of the certain outcome of the research. Shorts also works closely together with Airbus UK and other partners in the project ALCAS and is

heavily involved in the Platform 1 - Airliner Wing. The participation of Shorts in the Next Generation Composite Wing (NGCW)<sup>16</sup> programme together with 17 UK companies and Research Centres will also ensure a broad dissemination of results.

- (106) Finally, the possibility to use the advancement of this new technology in other fields that will not be exploited by Shorts is also a positive element, allowing other industries to benefit from these technologies.
- (107) The Commission therefore concludes that the programme CSeries will entail significant knowledge spill-overs to the benefit of a number of undertakings and eventually to the EU as a whole. Furthermore, the UK authorities have shown that the CSeries programme will likely increase this level of engagement and the dissemination of technical knowledge, compared to the activity levels previously seen, via the academic and national/EU programmes channel. It is also very likely that some of the results of the R&D will have industrial application outside of the aerospace sector, in other complex manufacturing industries, where Shorts would clearly have an incentive to licence its technology.

#### 3.4.1.2. Imperfect and asymmetric information.

- (108) The main market failure invoked by the UK is the asymmetric information. The UK claims that the market would not provide all the requested financial resources, nor could Bombardier or Shorts alone afford to self-finance the entire project taking account of its capital intensive nature and the technical, as well as commercial risks involved.
- (109) The UK has therefore presented extensive information on the difficulties for Bombardier and Shorts to obtain financing on the market and the use of own resources to fund the large investment. The Commission has assessed the extent of the market failure the company is facing on the basis of the provided detailed and sensitive information relating to among others [...].<sup>17</sup>
- (110) In terms of asymmetric information assessment, the Commission would like to indicate that, on the basis of its previous decision practice, it has to be assessed with specific reference to the company's ability to obtain financing on the market and its need to do so. These variables are also affected by the very nature of the project underlying the request for funding. Projects targeting the development of new products, with high upfront investments and long delays for the return on capital will encounter more difficulties to obtain financing on the market on the basis of the higher risks that are involved in their successful completion.
- (111) The Commission notes that it is therefore the characteristics of both the project and the company which need to be considered when assessing the asymmetry of information.
- (112) On the basis of its past decisional practice, the Commission further notes that when assessing the market failure in the form of asymmetries of information it needs to take

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<sup>16</sup> The UK's Technology Strategy Board launched the "Next Generation Composite Wing" programme with total value GBP 103 million and 3 years duration.

<sup>17</sup> Primary Distribution Report by Bombardier of December 2008.

into account the fact that risks related to the aircrafts sector are both of a general and specific nature, the latter relating to the type of projects carried out<sup>18</sup>.

- (113) The UK authorities indicated that the inherent risks of commercial aircraft programmes assumed by aircraft manufacturers are numerous and very significant. They include: extensive research and development requirements requiring significant up-front investments, general risks (such as higher costs and delays) associated with the introduction of new technologies and materials and their certification. Furthermore, competition and market access, including downward price pressure from amortised legacy aircraft programmes and national purchasing preferences, as well as aircraft market cyclicalities, make it a particularly competitive and tough environment for new innovative products.
- (114) Another important feature of the sector that introduces significant risks to the aircraft development projects is that in case of late delivery there are significant penalties and/or liquidated damages. The product liability, warranty claims and aircraft performance guarantees are often important factors of risk. Exposure to foreign currency fluctuations, (which is in US dollars, even though costs will be incurred in multiple currencies) also impact the profitability forecasts. Lastly, it must be stressed also that there is a highly regulated environment and associated risks of changes in regulations are heavy for aircrafts companies.
- (115) Consequently, the Commission when assessing the extent of the market failure faced by Bombardier and Shorts took account of the specific characteristics of projects carried out in the aerospace industry and specific features of the CSeries aircraft development programme. It looked in detail into information provided by the UK authorities and the company, provided to the Commission to substantiate the claim that Bombardier and Shorts faced numerous constraints in terms of financing the project.
- (116) The UK authorities have emphasised the fact that already the overall size and risk of the CSeries project puts financial and commercial constraints on Bombardier's ability to fund the entire project itself. With CSeries total costs amounting to USD 3,2 billion, the project is the most expensive programme ever carried out by the company and represents a significant share of company's capitalization. The CSeries programme is marked by high risks to potential investors, as it concerns a completely new aircraft development programme which is not simply the derivative of an existing platform. Furthermore, the UK authorities have stressed that Bombardier has never before undertaken a complex project of this size, and the project involves the development, implementation and integration of many new technologies, including a new engine (being developed by Pratt & Whitney), the use of a composite wing and the use of advanced aluminium alloys for the construction of the fuselage.
- (117) Furthermore, the UK authorities have indicated that this is the largest project undertaken by the company. In relation to earlier programmes of the company the highest development costs incurred amounted to USD [500-700]\* million. In terms of self-financing capability in the case of earlier projects, Bombardier was able to secure

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<sup>18</sup> Whereas the specific characteristics of the project are assessed in the section on incentive effect, the more generic risks faced by the industry are presented under this section.

\* Business secret. Range value.

USD [...] million from its own funds for the CRJ 1000 aircraft (a derivative of the CRJ 900).

- (118) Taking account of the size of the project, its innovative features and associated risks Bombardier has claimed that it was not capable of financing the project itself and had to look for funds from industrial risk-sharing partners such as suppliers of assemblies (e.g. engines, fuselage sections and landing gear) and financial investors.
- (119) Furthermore, as indicated in the BERR/KPMG report, recent volatility in the credit markets made external financing of the project even more difficult. It was indicated that the situation on the financial markets has affected sources of corporate financing with the bond markets having been open on acceptable terms only for the very strong credits and bank market conditions having been impacted by an unwillingness by lenders to take significant market risk.
- (120) In the following section the Commission will elaborate on the financial constraint faced by Bombardier and Shorts in the framework of the CSeries programme. The information is presented on the basis of notification documents transmitted by the UK authorities and presentation made during the meeting between the UK and the Commission.
- (121) Initially, the UK authorities provided information showing that Bombardier would invest approximately USD [...] (approximately [...]% of the total capital investment costs) into the CSeries programme. However, the company had assumed that [...]. The UK authorities indicated to the Commission that funding possibilities were further made more difficult with the overall credit constraints faced by the financial markets. Therefore, it is likely that [...]. This will take Bombardier's total investment to USD [...] ([...]% of total costs). The company stressed that [...]. Negotiations with other parties/partners to finance the investment are underway.
- (122) The Commission notes that Industrial risk-sharing partners, and providers of non-recourse financing at the end of arm's length negotiations were able to contribute maximum, in total, a further USD [...] million (approximately [one third]\*). The UK authorities, indicated that this was the maximum exposure that could be assumed by the risk-sharing partners taking account of the financial risks involved in the project and credit constraints faced by the partners in the financial markets. However, there remained a funding shortfall of USD [...] million ([approximately one third]\*), which Bombardier had to obtain from other sources.

Bombardier	Other partners	Missing	Total
<i>In M \$</i>			
[...]	[...]	[...]	3200
[approximately one third]*	[approximately one third]*	[approximately one third]*	100%

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\* Business secret. Range value.

- (123) The UK authorities have stressed the fact that, as the developer of the CSeries and the manufacturer of the final aircraft, Bombardier carries the heaviest investment risk and bears most the project risk of the programme. Should the project fail it will have to incur the financial losses by itself and not be able to recover the heavy upfront capital investment generating negative cash flows for many years for the company. Financial partners (potential and existent) recognize the risk involved in the project, which are further reinforced by the fact that Bombardier has secured a limited amount of sales of the CSeries aircrafts.
- (124) Consequently taking account of the project's specificities, external financing proved to be very difficult to obtain for Bombardier.
- (125) In terms of project-financing, the UK authorities informed the Commission that [...] did not make it suitable for this type of financing. The Commission acknowledged that the [...]. Furthermore private equity [...].
- (126) Debt financing option was not a credible solution as well. The Commission would like to note that although Bombardier has experienced improved cash position<sup>19</sup>, its credit rating remains the lowest among its peers, rated at a sub-investment grade of BB+, or equivalent, by all three credit rating agencies (sub-investment credit rating BB+ or Ba2)<sup>20</sup>. The UK authorities have emphasised that Bombardier's credit rating was below investment grade even before the start of the recent financial crisis. Bombardier's management is striving to improve the rating, for which they need to reduce debt exposure (they have redeemed USD 1 billion notes in January 2008). They aim at obtaining investment rating at the latest by FY [...].
- (127) The UK authorities have also informed the Commission that Bombardier looked for additional funds, by contacting [...] banks. [...]. The participation of banks was sought only for [...] <sup>21</sup>.
- (128) The UK authorities have also emphasised that Bombardier could not resort to Shorts for external financing.
- (129) Shorts, a 100% subsidiary of Bombardier, of which operations are financed from its own cash flow and profits (i.e. retained earnings), by inter-company loan financing (around [...]%) and, to a limited extent, by external financing (around [...]%) faced limited possibilities in terms of getting external financing sources of the project.
- (130) Shorts had been seeking third-party financing for the construction of new buildings in Belfast that will house the manufacturing and assembly lines for the new composite wings for the CSeries. Its proposals (such as sale and lease-back or property leasing) have drawn little interest from financial institutions, even though Bombardier would have provided a direct parent company guarantee<sup>22</sup>.
- (131) The Commission concludes that faced with significant internal - funding constraints Bombardier had to resort to possibilities for co-investment and partnering in the CSeries programme with other financial institutions and industry participants such as

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<sup>19</sup> On the basis of the information provided, Bombardier's cash position [...].

<sup>20</sup> UK authorities have provided the Commission with Bombardier Inc. credit ratings of S&P, Fitch and Moody's

<sup>21</sup> [...].

<sup>22</sup> [...].

venture, private capital funds. However, with the adverse financial market conditions and [...] inherent risks of the project, [...]. The Commission notes that the UK provided evidence on the fact that banks have declined to participate, [...].

- (132) Furthermore, financing the new project through debt financing was not really a possible option for the company faced with a sub-investment rating grade.
- (133) Finally, the Commission on the basis of received information both from the UK and the company can conclude that the obtained financing of the project is the outcome of a process by which Bombardier and its industrial partners identified the maximum contributions they could make for the project on the basis of the financial exposure they could bear and the financial resources they could get from the financial markets.
- (134) The Commission, on the basis of the constraints faced by Bombardier and Shorts in getting external financing for the project sees it as a strong indication of a market failure being the result of asymmetry of information between potential investors and the project owners (where the financial investors struggle to price risks in a way that reflects true opportunity costs and risks), credit market imperfections as well as specific risks linked to the features of the project.
- (135) Consequently, the Commission finds that given the inability of the financial markets and industrial partners to make available financing to Bombardier and Shorts, and taking account of the company's internal constraints, public funding is necessary to make the project possible.

*Issues raised by the complainant*

- (136) On the other hand, one of the main arguments of the complainant is the absence of such market failure, in particular regarding the market funding of the project. Embraer claims the following:
- (137) First, there is no significant technical risk in respect to the development of the composite wing since Bombardier has previous experiences with development of composite structures including wings and that it worked on it within various programs it was involved in including the cooperation with the Centre of Excellence of Integrated Aircraft Technology. Moreover, the aircraft sector generally recognizes the necessity of investments into R&D&I in order to increase the fuel-efficiency of the aircrafts and thus the market is capable of providing sufficient funding for this project.
- (138) Second, Embraer claims that it succeeded in gaining resources to launch its own commercial jet without any state support - the project of the 170/190 family with incremental improvements of aerodynamics and increased fuel efficiency. At first the necessary funds were raised through an initial public offering of stock at the New York Stock Exchange, then Embraer allocated finances from its cash generation and finally from risk sharing partners.
- (139) Third, Bombardier as one of the largest aircraft manufacturers worldwide, disposes of capacities sufficient for the completion of the composite wing for the CSeries including outstanding long-lasting experience in the area of composites structures and skilled work force. In fact, the complainant admits the existence of a market failure in the sector, but it applies mainly to small and medium-sized undertakings, new market

entrants and firms expanding in new geographic territories. Since Shorts is entirely owned by Bombardier, it has access to its resources in terms of both, personnel and finance.

#### *Conclusions on the asymmetry of information*

- (140) The repayable advance relates specifically to the R&D programme for the CSeries *composite wing*. This is a very substantial and technically complex programme, at the cutting edge of composites technology. The development of these composite materials and their associated manufacturing technologies has not yet been resolved, neither from the big airframe makers nor from any regional jet manufacturer. Shorts does not possess the necessary technology to develop and manufacture the CSeries wing.
- (141) The Commission also notices that the technical risks associated with the CSeries programme are extremely high, as it concerns the development of a new aircraft and not a simple derivative of an existing one. The CSeries is a “mainline” aircraft with very different characteristics and parameters to regional aircrafts, which have been so far the area where Bombardier has exclusively worked. A thorough evaluation of the technical risks related to the CSeries is carried out in section 3.4.3.5.
- (142) It is therefore the nature of the project, its financial implications and the proven reluctance of the financial market to support such project that has led Bombardier to resort to state aid to partly finance it. By way of comparison, Bombardier was able to fund almost entirely the development work for its new CRJ 1000 aircraft, which is a derivative of the CRJ 900 and has total project investment requirements of approximately USD [...] million. The Commission also takes note that based on Bombardier’s market capitalisation at the time of the CSeries programme launch decision (11 July 2008), the investment would have represented [...] % of its market capitalisation at launch.
- (143) The Commission, having fully analysed the information provided by the UK, by the complainant and any other element in its possession, has come to the conclusion that the beneficiary could not have financed the project alone without State aid, given the responses of the financial market to these types of risky projects, with significant long-term return perspective and high initial investments.

#### 3.4.1.3. Location in a disadvantaged area

- (144) In its assessment of the market failure, the Commission will also consider the following elements: (i) disadvantages caused by the peripherality and other regional specificities, (ii) specific local economic data, social and/or historic reasons for a low level of R&D&I activity in comparison with the relevant average data and/or situation at national and/or Community level as appropriate; and (iii) any other relevant indicator showing an increased degree of market failure.
- (145) According to the information provided by the UK, Northern Ireland’s Gross Value Added (GVA) per head relative to the UK average narrowed during the early to mid-1990s but, since 2000, the gap has remained at roughly 20 per cent. Relative to the UK as a whole, Northern Ireland sits near the bottom of the 12 UK regions. Invest Northern Ireland’s Corporate Plan 2008-2011 highlights that at 0,55% of GVA,

Northern Ireland spends less on R&D than the UK as a whole, at 1,24% and is well adrift of the EU target of 3%.

- (146) In recent years, Northern Ireland's relatively strong economic performance has masked a number of underlying structural weaknesses within its regional economy. These include an underdeveloped private sector, which is mainly composed of micro-firms and lacks scale; low productivity per head compared with the UK average; low innovation and R&D expenditure; the highest rate of economic inactivity in the UK; proportionately high long-term unemployment; and low levels of business formation. In order to cope with these structural problems, a managed transition of over a 10 to 15 year time will be needed. This transition has to take place within an increasingly competitive global arena where technology and new participants have removed many market boundaries.
- (147) Concerning R&D activities, growth in business expenditure on R&D in Northern Ireland is coming from small and medium sized enterprises (SMEs): companies with 250 or more employees accounted for 47% of Business R&D expenditure in 2006 although they represented only 11% of the R&D performing companies<sup>23</sup>.
- (148) In terms of unemployment in Northern Ireland, although it continues to fall in line with the rest of the UK, there is a significant proportion of long-term unemployed, well above the UK average. In Belfast, employment within the manufacturing sector has shrunk by 76% over the last 30 years. This compares with 42 % within Northern Ireland over the same period. This is reflective of the high dependence within Belfast upon traditional industries like textiles and engineering. Also, in comparison to other regions in the UK, higher proportion of the working population is employed in public services impacting the nature of the labour market. It has also been estimated that over one third of Northern Ireland's lower productivity compared to the UK, is due to the lower employment rate and the higher economic inactivity rate.
- (149) The manufacturing sector, in particular the aerospace industry, has a key role to play in an attempt to move Northern Ireland to a high value added, externally focused economy driven by innovation and highly-skilled workforce. It also remains extremely significant to the Northern Ireland's economy in terms of what it can offer through investments into research and development, as well as employment opportunities.
- (150) The aerospace industry in Northern Ireland accounts for approximately 30% of the overall share of the manufacturing output. It encompasses 40 companies with a combined turnover of circa GBP 750 million and employs 8 000 people (out of 89 000 manufacturing jobs in Northern Ireland). Shorts is a key player within the sector employing 5 300 people.
- (151) The manufacturing sector invested GBP 93,7 million on research and development in 2006 (6% decrease on 2005) employing over 1 630 personnel undertaking research and development jobs. Amongst business expenditure on research and development, manufacturing was responsible for 60, 3% of research and development investment

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<sup>23</sup> Report by Northern Ireland's Department of Enterprise Trade & Investment (DETI), "Research & Development Report (2007)".

compared to 39,7 % in service sector. Companies involved in engineering and allied industries accounted for over 58,3% of this expenditure.

- (152) However, the manufacturing sector faces the problem of managing the shift from declining traditional manufacturing industries to a more knowledge-intensive manufacturing sector. In addition, the increasing cost-based competition from new EU member states and Far East economies puts pressure on the sector to place a focus on productivity, innovation and external markets. The UK authorities claim on the basis of substantiated information transmitted to the Commission that with the C Series wing development work-package assigned to Shorts significant benefits to the economy could be achieved helping to bring Northern Ireland in equality with other UK region.
- (153) Shorts engagement in design development phase of C Series programme and the execution of the wing development and manufacturing work-package will significantly strengthen the technology and work force skill base of the UK aerospace industry and lead to increased investment in technology and innovation, greater collaboration and supply chain development impacting directly the Northern Ireland region.

#### Issues raised by the complainant

- (154) According to the complainant, the argument of peripherality of the assisted area Northern Ireland used in favour of Shorts is rebutted by the fact that Shorts is entirely owned by Bombardier. And since Bombardier is a large aircraft manufacturer experienced in the area of composites structures which disposes of skilled work force and sufficient funding, Shorts has access to its resources in terms of both, personnel and finance and therefore is not handicapped by disadvantages of a company located in an assisted area.

#### *Conclusion on the project localization*

- (155) On the basis of information submitted, the Commission concludes that there is an additional level of market failure due to the location of the R&D activities. With reference to Commission's previous practice<sup>24</sup> taking into account the specific situation in the assisted area where the project is carried out, the additional level of market failure demonstrates that the positive effects of the aid are particularly important.
- (156) In addition, assessing the market failure on both the local level of a company in an assisted area and Bombardier as a whole, the insufficiency of the available funding for the C Series project implementation is evident.
- (157) The Commission also acknowledges that the location of the EU state financed part of the project further exacerbates market failure, given the problems related to the peripherality of the location.

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<sup>24</sup> E.g. Commission decision in N 195/2007 *Individual R&D Aid to Rolls-Royce Germany – BR725 Project* (11.3.2008), OJ C118, 15.5.2008, p.1.

### 3.4.2. *Appropriate Instrument*

- (158) State aid for R&D&I can be authorised under Article 87(3)(c) of the EC Treaty when it is necessary to achieve an objective of common interest, as an exception to the general prohibition of State aid. An important element in the balancing test is whether and to what extent State aid for R&D&I can be considered an appropriate instrument to increase R&D&I activities, given that other less distortive instruments may achieve the same results.
- (159) The UK has considered different alternatives for the choice of the support instrument. In the UK, large development programmes of this type are often funded by a repayable advance since it is considered to be the most appropriate instrument taking into account the high level of funding required, the long timescale and complexity of the project, and the high level of commercial and technical risks involved<sup>25</sup>.
- (160) The UK considered other options, such as tax credits and the acquisition of preferred shares in the company. However, tax credits are a general measure to stimulate private sector investment in research and development by reducing business' corporation tax liability. In this specific case, this instrument would not have met the high cash upfront investments needed. A UK government purchase of preference shares in the company is not in line with normal UK government policy. The Commission considers that in this case the repayable advance is an appropriate instrument and at the same time less distortive than other more direct support options.

### 3.4.3. *Incentive effect and necessity of aid*

- (161) Analysing the incentive effect of the aid measure is the most important condition in analysing State aid for R&D&I. Identifying the incentive effect translates into assessing whether the planned aid will induce undertakings to pursue R&D&I which they would not otherwise have pursued.
- (162) In its analysis, the Commission will, in addition to the indicators mentioned in Chapter 6, take into consideration the following elements: specification of intended change, counterfactual analysis, level of profitability, amount of investment and time path of cash flows, the level of risk involved in the research project and continuous evaluation. For State aid targeting R&D&I projects or activities located in assisted areas, the Commission will take into account disadvantages caused by the peripherality and other regional specificities, which negatively impact on the level of risk in the research project.
- (163) The Commission notes that Shorts did not commence the R&D project for the composite wing before making its applications to BERR and Invest Northern Ireland (on 18 January 2008). Work commenced in February 2008 and therefore, the incentive effect can not be excluded, in accordance with chapter 6 of the R&D&I Framework.

#### 3.4.3.1. Specification of intended changes:

- (164) The Commission took note of the information provided by the UK on the changes driven by the project. In the transmitted documentation it was, firstly, emphasised that

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<sup>25</sup> BERR/KPMG Report.

due to the aid the wing development package as such will be allocated to Shorts in Belfast. Secondly, the UK authorities have stressed the fact that as a consequence of the work package allocation to Shorts, the company will increase the number of employees assigned to R&D&I activities by an average of [150-250]\* over the first six years of the project, as demonstrated in the following table:

Headcount projections at Short Brothers Belfast FY09 to FY14							
R&D Employment with CSeries							
	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	Average
Employment	[...]	[...]	[...]	[...]	[...]	[...]	[...]
R&D Employment without CSeries							
	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	Average
Employment	[...]	[...]	[...]	[...]	[...]	[...]	[...]

- (165) Furthermore, as a result of activities implemented within the framework of the wing development work-package, Shorts will increase the company's R&D by over [...], as shown in the table below:

R&D Expenditures as Percentage of Turnover							
	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	Total
% with CSeries	[...]	[...]	[...]	[...]	[...]	[...]	[...]
% without CSeries	[...]	[...]	[...]	[...]	[...]	[...]	[...]

- (166) In addition, the UK authorities and Bombardier stressed the fact that with the involvement in the CSeries programme Shorts' can develop to a centre of excellence for the design and development of composite primary structures. This is possible as in the wing development work-package, Shorts will develop state-of-the-art technologies and innovative manufacturing processes to be applied to the design and development of a fully composite wing. The design of the wing will incorporate new manufacturing techniques including RTM (Resin Transfer Moulding) and RTI (Resin Transfer Infusion). In fact also the company stressed that with the project and significant investments into novel composite manufacturing processes a new opportunity exists for new strategic direction in Composite wing capability development.

*Conclusion on the impact of the project on the R&D efforts implemented within the project*

- (167) The Commission notes that, taking account of the above arguments, the CSeries programme will result in a long-term benefits to the European aerospace industry providing cutting edge R&D&I opportunities in Europe and advancing the European

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\* Business secret. Range value.

technology base. The Commission further asserts that the technological knowledge base, as confirmed by UK authorities in their notification information, can be applied to other future aircraft programmes.

- (168) The Commission therefore finds that the aid, by making it possible to carry out the project, will have a clear incentive effect in increasing the scope and the amount of the research undertaken.

#### 3.4.3.2. Counterfactual analysis

- (169) The Commission has assessed the difficulties of Bombardier and Shorts to obtain the full financing of the project and concluded, in the section on market failure that Bombardier and Shorts would not have the financial resources neither alone nor with the help of industrial partners only to undertake the project. The UK has provided internal documents showing the difficulties in finding additional risk-sharing partners<sup>26</sup>. In addition, a report confirmed that it is "extremely rare for aviation projects such as the C Series to be financed by project finance"<sup>27</sup>.
- (170) Bombardier considered different options and scenarios for carrying out the project, including possible alternative ways of financing and locating it.<sup>28</sup> However, it is clear from the documents produced that Bombardier, without public funding of this project would have had to abandon it.
- (171) The Commission has also considered the possibility of a reduced version of the project, which might have been affordable by the company. However, Bombardier had experience with the previous C Series project in 2005, when the limited innovative features and scope of the project ultimately did not meet the requirements of its future clients. Therefore, it is credible that a reduced version of the C Series would not be a viable option.
- (172) At European level, if the UK Government would not grant the aid, Bombardier would have looked for alternative government risk-sharing arrangements. The choice of location for all work packages was driven by both technical considerations and financial considerations (i.e. maximising the returns of the overall programme)<sup>29</sup>.
- (173) Without the aid, Shorts would not be able to cover the full costs of the project attributed to it. The UK authorities have shown evidence of the fact that Shorts does not have the financial resources to undertake the project alone and that the project is of a much larger scope than the normal kind of projects undertaken by the company.
- (174) The Commission therefore considers that the counterfactual scenario without any aid will be the abandonment of the project.

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<sup>26</sup> Partnering discussion document.

<sup>27</sup> BERR/ KPMG Report.

<sup>28</sup> On project location: Presentation [...] by the Finance and Risk Management Committee, Bombardier, 3.7.2008., [...]. Article in the Kansas City Star on the possible allocation of the project in Kansas City. Bombardier Press Release, 29 May 2008. [Business secret. Internal Bombardier document].

Self-financing constraints: Presentation of C Series Cash Flows: Without Financing for the Final Assembly Line (FAL). New Commercial Aircraft Program: C Series Presentation to KPMG by Bombardier, 19 February 2008

<sup>29</sup> The fact that Bombardier owns the Shorts plant in Belfast was not, in itself, a decisive factor in awarding the wing work programme to Shorts. Shorts' location, in fact, did not provide a natural currency hedge.

### 3.4.3.3. Level of profitability

(175) Based on the information provided by the UK government<sup>30</sup>, the CSeries project has the following financial data assuming that the [...] aircraft are sold<sup>31</sup>.

<b>Project IRR (%)</b>	<b>Break even</b>	<b>Cumulative project cash flows (US \$m)</b>
[...]	[...]	[...]

(176) In particular, from these data, the IRR<sup>32</sup> might look favourable. However, it fails to adequately address [...]. Also, the CSeries programme's funding structure has the effect of improving the IRR [...], by [...]. Without this structure, an additional [...].

(177) Furthermore, the UK has demonstrated that the IRR in this case is highly sensitive to variation of costs. As an example a [...] % cost increase would reduce the IRR by [...] % and the break even point will be reached in [...]. A delay of entry into service [...]. The reason for that is that Bombardier is largely [...] and it expects an aggressive price-policy from its competitors, [...]. [...].

(178) Given the technologic novelty and the risks associated to this project, [...] and that it is realistic to argue that the final IRR might be considerably lower.

(179) It should be stressed that the request for public support has not been made on the basis of programme profitability, but on the basis of investment risk sharing and cash flow. This is shown, namely, by the impact of the aid on the EBIT of Bombardier<sup>33</sup>. With support from public authorities, the project is reaching an EBIT of [...] %<sup>34</sup>. This is considered an acceptable margin by the company, given the risks of the project. However, without the public support, the project would be able to reach an EBIT of [...] % (or a total of USD [...] billion). This is due to the impact of repayable advances on the EBIT. The aid, therefore, has a limited (even slightly negative) impact on the profitability of the project.

(180) Furthermore, with the CSeries, Bombardier will only begin to achieve a satisfactorily level of EBIT in [...], [...] years after entry into service of the CS100 and [...] years after the launch decision (and after [...] deliveries).

(181) The return of the project will therefore be volatile and depend on a number of external factors. This, linked with the fact that the project will achieve a satisfactory level of EBIT [...] from the launch decision, explains the role of the aid on the investment decision.

<sup>30</sup> Letter of intent of the UK government, p. 14. Study of BERR/KPMG p. 45, 55-56, 71-73.

<sup>31</sup> The [...] was calculated at [...] %.

<sup>32</sup> Internal rate of return.

<sup>33</sup> Earnings before interests and taxes.

<sup>34</sup> Publicly available information of commercial aircraft competitors indicates that margins of between 10 - 12% are satisfactory levels of EBIT margin.

#### 3.4.3.4.Amount of investment and time path of cash flows

- (182) The CSeries programme requires substantial up-front capital investments in R&D, buildings and new plant and machinery. The total investment requirement is USD 3,2 billion (EUR 2,2 billion)<sup>35</sup>. The total investment cost in Northern Ireland is GBP 520,5 million (EUR 551,7 million)<sup>36</sup>. Bombardier has never before undertaken a complex project of this size. As a comparison, the other Q series and CRJ family of Bombardier had development costs [less than USD 1 billion]\*. This investment must be made even though no aircraft will be delivered for at least [...] years (under the current business plan) and the [...] contribution to cash flow is [...] customer advances relating to aircraft yet to be constructed and delivered.
- (183) The project will, in each of its early years, until FY [...], have significant annual negative cash flow and on a cumulative basis will not be cash flow positive until year [...] after [...] deliveries have been made<sup>37</sup>. The cumulative negative cash flow will be approximately USD [...] million by the time of the projected first delivery of the CSeries model CS100 (previously known as the C110 model of the CSeries aircraft) in year 6 of the project.
- (184) Only in Shorts, the development costs amount to GBP 520,52 million. The overall cash-flow is expected to be negative until the year [...]. The Commission acknowledges that this is [...], in which the company will be significantly financially exposed.

#### 3.4.3.5.The level of risks involved:

- (185) Concerning the CSeries, on the basis of the information provided there are two main types of identified risks: technical, market and financial risks.
- i) Technical Risk** is linked to the successful design and development of the wing.
- (186) As the CSeries is a project targeting the development of a new aircraft and not simply the derivative of an existing platform detailed information have been provided by the UK authorities, on the request of the Commission, to substantiate the innovative aspects of the project and the associated with its development high technical risks. The Commission received internal documents from the company itself, as well as external technical studies prepared on the request of UK authorities. On its hand, the Commission made use in its assessment of these documents but in particular the QinetiQ study.
- (187) The study emphasised the high degree of risks arising from the applied technologies in the CSeries programme. Following features of the project were considered to generate most of the technical risks:
- (188) The aircraft will be manufactured through the application of both traditional and advanced composite and metallic technology to deliver the next generation of airframe. The approach taken to develop the composite wing is a stepping change in

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<sup>35</sup> As at 18 December 2008 exchange rate of 1 € = 1.43 USD.

<sup>36</sup> As at 18 December 2008 exchange rate of 1 £ = 1.06 €.

\* Business secret. Range value.

<sup>37</sup> [...]

convention in that it addresses many of the manufacturing issues (tooling and material cost and production rate) normally associated with pre-preg wing technology by adopting a new patented manufacturing process.

- (189) The RTI process applied to develop and manufacture the full-scale composite wing (as opposed to a metal wing with composite components) for a large aircraft such as the CSeries does not exist yet and will need to be tested and adapted in the framework of the works carried out by Shorts.
- (190) The RTI process (to be used on the wing spar and covers) builds on the advantages of Resin Transfer Moulding (RTM) and the Resin Infusion under Flexible Tooling (RIFT) process but utilises an autoclave cure process to assist consolidation. Bombardier has found this improves the quality of the product by minimising defects. The process has been used successfully to manufacture a short length of composite spar under the European Collaborative Programme 'TANGO'. This programme demonstrated the manufacturability of the process although it has not been established if mechanical data comparisons to a conventional pre-preg spar have been completed.
- (191) The UK authorities have emphasised that significant risks are involved as the novel manufacturing process RTI, composite material and certification philosophy are being introduced simultaneously.
- (192) Moreover the development of the wing in line with project specifications is critical for the success of the whole programme as the ambitious fuel efficiency targets, set by Bombardier, are mainly based on the composite wing and the P&W geared turbofan engine.
- (193) Taking account of the above and having assessed information provided by the UK authorities the Commission concludes that the proposed composite wing R&D is considered beyond the present state-of-the-art at industrial level, involves new application of materials and manufacturing processes exposing the project to significant technical risks.

## **ii) Market Risk**

- (194) CSeries are not regional aircrafts, they are commercial aircrafts (100-149 range). The UK authorities have presented detailed information on the market structure substantiated by the BERR/KPMG report indicating that Bombardier with the CSeries is entering a difficult market segment, offering growth opportunities, as currently the market is served by shrunk versions of larger or extended versions of smaller aircraft. However, the presence of very large competitors (Airbus, Boeing and Embraer) with an established buyer base also has to be taken account of.
- (195) Moreover the UK authorities have emphasised to the Commission the fact that the launch of CSeries will cause a strong reaction from competitors [...]. Bombardier with its new model is entering a market dominated by two large incumbents i.e. Boeing and Airbus, which benefit from size and diversified product portfolio advantages, which in the end secures them a stable client base. It is likely they will react to the new competition from Bombardier [...]. The competitive environment could be [...]. Therefore, the market prospects ultimately will depend on the reaction of two dominant players i.e. Airbus and Boeing.

- (196) The Commission assessed the submitted facts and confirms the existence of such important risks linked to the project.

#### 3.4.3.6. Continuous evaluation

- (197) The CSeries project is subject to continuous evaluation based on well specified milestones. The repayable advance will be paid in instalments, which will correspond to the progress of the project, and following the submission by Shorts of appropriate financial and reporting information detailing eligible cost expenditure. The UK government will also hold regular project review meetings to discuss both technical progress on the Belfast work and the overall progress on the CSeries project as a whole. The UK government also requires that before each draw down of funding by Shorts it needs to confirm that [...].

#### *Issues raised by the complainant*

- (198) The complainant argues the rational of granting the R&D aid to the projects. He claims that the aid measure does not provide any incentive effect to the company since the project was already at least partially implemented in the past (the industrial research part might be concluded). The work on the CSeries commenced as early as in 2005, when the UK launched the first project.
- (199) According to the complainant Bombardier has been working on the development of a new aircraft for the 100-149 seats market already since 1999 and the concept definition phase started in 2004. In 2005 Bombardier launched the R&D project for development of the composite wings, nacelle and empennage for the CSeries family aircraft which after obtaining the aid from the UK government amounting to GBP 180 (EUR 198) million<sup>38</sup> was supposed to take place in Northern Ireland. Still in 2005 the new C-Series jet was introduced to customers.
- (200) Despite the fact the project was later abandoned, according to the complainant significant research was already conducted, partially also due to Shorts participation in EU framework programmes targeted on development of market structure. Nevertheless, the new project is according to the complainant reduced in scope since the previous one included nacelle and empennage.
- (201) Moreover, the idea of composite wings is not innovative, since all aircraft manufacturers currently work in this area.

#### *Conclusion on incentive effect*

- (202) The Commission considers that the information provided by the UK provides sufficient evidence on the innovative character of the CSeries, compared to the 2005 project on the composite structures. The Commission notes that the project is very different from the one developed in 2005 by Bombardier. Key changes compared to the 2005 CSeries application include the engine (with the selection of the Pratt & Whitney Geared Turbofan, which is a key enabler to the aircraft) and the use of significantly more composites and more advanced composites processes than before. The R&D work for the composite wing for the CSeries is an entirely new programme:

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<sup>38</sup> R&D and regional aid, notified under N 496/2005. Embraer submitted a complaint against the aid. In 2006 the notification was withdrawn.

the original design for the CSeries involved a *metal* wing, manufactured primarily of aluminium. Bombardier made the decision to switch to a *composite* wing in April 2007, well after the 2006 decision to suspend the original CSeries programme. The switch to a composite wing changed completely the nature of the aircraft from its original design and, consequently, the work programme allocated to Shorts.

- (203) As indicated in the BERR/KPMG report provided by the UK authorities, the most risky areas in the manufacturing of the CSeries aircraft will be the engine gearbox and variable nozzle, the Resin Transfer Infusion (RTI) composite manufacturing process applied by Shorts in the manufacturing of the fully composite wing and the use of alloys on the fuselage.
- (204) The Commission, on the basis of information provided both by the UK authorities as well as the company, has identified the activities carried out by Shorts in the framework of the CSeries project as highly innovative and critical for the successful outcome of the CSeries programme, with the wing influencing such factors as the design, weight, aerodynamic efficiency, range and fuel consumption of the entire aircraft.
- (205) The work package assigned to the beneficiary of aid is marked by innovative features (a fully composite wing for an aircraft will be developed for the first time) and technical complexity linked to the RTI technology that will be for the first time applied to the development and manufacturing of a fully composite wing for a commercial aircraft of the size of the CSeries. The UK authorities have emphasized in the notified documentation that the technology required to develop and build the CSeries wing does not yet exist in the form necessary for commercial exploitation in an aircraft such as the CSeries.
- (206) The Commission notes that the UK Authorities confirmed that the eligible costs for the Bombardier CSeries programme are those up to the certification dates of the CS100 and CS300 aircraft variants only. For the avoidance of doubt, all post certification costs have been excluded from the amount of eligible costs.
- (207) As explained in section 3.4.3.5, whereas a composite wing is part of composite aerospace structures that the community is pursuing over the last 30 years<sup>39</sup> it is well supported that the innovation in the field of composite manufacturing and joining has not yet reached take off rates.
- (208) The UK authorities have informed the Commission that Shorts has participated in various Community- and United Kingdom-funded R&D programmes (such as TANGO, ALCAS, COMPROME, MAAXIMUS and NGCW), along with other industry participants, including Airbus. However, the Commission acknowledges that none of these projects are related to the CSeries programme. Indeed, none of these projects have yielded results that would enable Shorts to design and manufacture a composite wing for the size of the CSeries aircraft. Substantial additional investment in R&D will be required for it to be able to do so. The purpose of these programmes was to develop the composite process in order that it could be utilised for the manufacture of large scale primary aircraft structures and was not limited to wings.

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<sup>39</sup> The EU supported research projects ALCAS, SILANCER and TANGO exposed many areas where a lot a research needs to be done

- (209) The Commission, after assessing all the elements in its possession and the element brought by the complainant can conclude that the aid has an important incentive effect, securing that the project takes place at all, given its high specific risks and its financial perspectives.

#### 3.4.4. *Proportionality of the aid and limitation to minimum necessary*

- (210) The assessment of the proportionality of the aid is based on chapter 5.1 of the R&D&I Framework and 7.3.4. The key of the analysis lies in the scope of the measure (e.g. the eligible costs for the project and aid intensities) and the aid instrument (i.e. conditions of the repayable advance).
- (211) Moreover, pursuant point 7.3.4. of the R&D&I Framework, the Commission has to assess whether the aid in favor of Shorts is limited to minimum amount necessary.

##### 3.4.4.1. Categories of research activities

- (212) In accordance with point 5.1.1. of the R&D&I Framework, the Commission verifies the division of particular R&D activities into three categories: Fundamental Research, Industrial Research and Experimental Development.
- (213) The research and development activities conducted by Shorts in the frame of the wing development work-package of the C Series programme are divided into three stages: i) the test programme ii) the demonstrator programme and iii) composite wing design and development phase. The Commission confirms that on the basis of information received from the UK authorities, the nature of research activities carried out at these stages of the wing development programme can be classified of the decision as either industrial research and/or experimental development<sup>40</sup>.
- (214) Furthermore, the Commission agrees with the classification of the activities covered by BES product development process phases spanning the wing development work package of the C Series programme carried out by Shorts. Consequently, the Commission accepts that the Joint Conceptual Definition Phase (D2) and the Joint Definition Phase (D3) as described in the earlier parts of the decision are considered as industrial research activities on the basis that they require the development of new knowledge and skills in determining the design and manufacturing concepts for a composite wing. Furthermore, the Commission confirms that, as indicated by the UK authorities, the test and demonstrator programme are covered by these two phases. The Commission also affirms, in line with information submitted by the UK authorities, that small parts of the wing design and development phase of the wing development work-package are covered by the same phases of the BES process and consist of industrial research activities.
- (215) The Commission agrees that the remaining BES phases - Detail Design (D4) through to Certification (D6) - have been classified as Experimental Development, as these phases will take the output from the earlier phases of the BES to create the design and production plans for the manufacture of the first articles. Furthermore, the Commission notes that, in line with the substantiated view of the UK authorities, that

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<sup>40</sup> The classification is in line with the definition outlined in the Frascati Manual 2002, as indicated in the R&D&I Framework, point 5.1.1.

most of the composite wing design and development stage of the wing-development programme is covered by these phases.

- (216) The Commission, on the basis of detailed information provided by the UK authorities pertaining to the content and innovative character of research activities carried out in the framework of the wing development work-package of the C Series programme can conclude that the Industrial Research and Experimental Development activities as described by the UK authorities do comply with the definitions under point 2.2 f) and g) of the R&D&I Framework.

#### 3.4.4.2. The eligible costs

- (217) The Commission assessed the eligible costs of the project as submitted by the UK authorities and took into consideration statements of the complainant which found the amount of aid exaggerated in comparison with its own experience with costs of similar projects.

- (218) The eligible costs belong to the following categories:

- Personnel costs (researchers, technicians and other supporting staff to the extent employed on the research project) is based on the estimated ‘direct hours’ required to complete each activity within each development phase. These hours are termed “direct” as they will be incurred by Design Engineers, Test Engineers, Manufacturing Engineers, Tool Design Engineers, Quality Engineers and Production Operators physically working on the research, development, design and build of the initial test articles.
- Costs of instruments and equipment to the extent and for the period used for the research project. If such instruments and equipment are not used for their full life for the research project, only the depreciation costs corresponding to the life of the research project, as calculated on the basis of good accounting practice, are considered as eligible. The Composite Wing Development programme uses raw materials and hardware for the build of the first article wings which will be used in ground tests. These material costs are all incurred directly as a result of the Research and Development activities.
- Cost of contractual research, technical knowledge and patents bought or licensed from outside sources at market prices, where the transaction has been carried out at arm’s length and there is no element of collusion involved, as well as costs of consultancy and equivalent services used exclusively for the research activity;
- Additional overheads incurred directly as a result of the research project. Overhead costs included in the overhead base comprise: consumable supplies, maintenance, insurance and property taxes, energy costs (heating, lighting, etc), office expenses, telephone and telex, information technology (consumption costs)

- (219) The UK reviewed the tooling requirements for the C Series programme and excluded from the eligible costs the part of the tooling used in the R&D phase of the C Series programme which should have a useful life beyond this phase. Therefore, the investment in this tooling was removed from the eligible costs. Consequently, GBP [...] million was deducted from the total eligible costs. As a result of this, the amount

of the repayable advance was reduced by GBP [...] million, from GBP [...] million to GBP113,37 million. According to the decisional practice of the Commission in the aeronautic sector<sup>41</sup>, certification and post-certification costs are excluded from the eligible costs.

- (220) On the other hand, tooling specific to support the Test and Demonstrator programme is entirely included in the eligible costs as it will be fully utilised within the implementation of these programmes.
- (221) The UK authorities have clearly limited all costs to the duration and the extent of the research activities.
- (222) The Commission finds the classification and amount of the eligible costs to be in accordance with point 5.1.4. of the R&D&I Framework and with its practice in the aeronautic sector.

#### 3.4.4.3. Aid intensities and conditions of the repayable advance

- (223) The UK authorities provided the Commission with detailed information on the repayment in case of success, as well as they clearly defined the successful outcome of the research activities. In addition, their assessment of the proper conditions for the repayable advance was substantiated by a report by BERR/ KPMG<sup>42</sup>, incorporating findings of the Aerospace, Maritime and Defence Unit and the Strategic Policy Analysis Unit of the Dept. of Business, Enterprise and Regulatory Reform as well as findings of the Invest Northern Ireland and QinetiQ.
- (224) The repayment of the advance and return, have been made on a fixed [...] amount per aircraft (levy) over an initial production run which is subsequently reduced to a lower level (royalty) in case of production beyond the initial run.
- (225) The risk profile associated with the repayable advance has both equity and debt qualities. Consequently, the levy is independent of price and profitability but is not linked to the profits realized by the company on the sales of aircrafts.
- (226) The UK government, in its appraisal of the sales forecast, considered that [...] aircraft would be delivered during the period 2013 to 2030. The [...] sales profile was benchmarked against other market assessments, including the BERR/ KPMG report, and therefore deemed an acceptable quantity of aircraft for the return to be realised. Also, the conditions precedent in the Letter of Intent, as transmitted to the Commission by the UK authorities, required [...] to be available before disbursements can begin on the investment.
- (227) The conditions of the repayable advance as negotiated by UK government with Bombardier provided for [...] of the government's investment. Details of the arrangement have been provided by the UK authorities to the Commission. In addition, the launch investment becomes repayable in full in certain predefined mandatory prepayment events or an event of [...].

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<sup>41</sup> See footnote 11.

<sup>42</sup> BERR/KPMG Report, p.3.

- (228) In the event that the sales forecast of [...] planes is realised, 100% of the repayable advance would be reimbursed, with interest, by the end of [...] achieving a return of [...] % [...]. The interest rate payable on this investment of [...] % [...] (plus any additional return achieved [...]) is [...] above the reference rate for the UK provided in the Communication from the Commission on the revision of the method for setting the reference and discount rates<sup>43</sup>, . Thus, in case of a successful outcome, the advance would be repaid with adequate interest rate pursuant point 5.1.5. of the R&D&I Framework.
- (229) The UK authorities have presented the percentage of repayable advance that would be repaid against the sales scenario:

Percentage of Repayable Advance Repaid Against Sales			
Percentage of sales reached	Units sold	Year	Percentage of the advance repaid
[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]

- (230) The [...] rate of return of the repayable advance was benchmarked taking into account [...] which was considered the most supportable proxy for benchmarking the rate of return.
- (231) Moreover, the expected [...] rate of return for the support that UK authorities grant for the project has been assessed on the basis of return expectations of other investors in the project (such as the Canadian government, Bombardier itself), benchmarks for the level of return which could be expected and risks to which the investor is exposed.
- (232) In effective terms, Bombardier would start making repayments to the UK government on the sale of the [...] aircraft and continue until the [...] aircraft is sold. Should sales exceed the sales scenario assumed by UK authorities, Bombardier would start paying royalties for every aircraft sold above the [...] level until the sale of the [...] aircraft. The fixed [...] amount of levy per aircraft has been demonstrated in the table below<sup>44</sup>:

<sup>43</sup> OJ C 14, 19.1.2008, p.6

<sup>44</sup> Source: Letter of Intent of the UK government, p. 14.

Sales	Real Levy (£)
[...]	[...]
[...]	[...]
[...]	[...]
[...]	[...]

(233) The repayable advance will not exceed 34,01% of the eligible costs of the R&D project, i.e. lies even below the 40% ceiling introduced by the R&D&I Framework for experimental development and it is well below the allowable 60% repayable advances for industrial research.

*Issues raised by the complainant:*

(234) According to the complainant, the repayable advance which should finance the project was allegedly not set according to market terms. In particular, it should be impossible to calculate the gross grant equivalent of the aid in the form of a repayable advance since such advance is not available from the banks and, therefore, there is no reliable benchmark.

(235) Furthermore, the repayable advance is, according to the complainant, a particularly distortive form of aid.

*Conclusions of the Commission on the form of aid and conditions of the repayable advances:*

(236) The Commission notes that the UK authorities provided sufficient evidence that the forecast sales used as a reference for the reimbursement of the advance is prudent. It is considerably lower than the forecast used by Bombardier itself and is below or in line with market forecasts.

(237) This prudent target allows the Commission to conclude that the aid will in all likelihood fully reimbursed. Furthermore, the reimbursement mechanism will also ensure that Bombardier continues to pay a levy beyond the prudent forecast, in line with point 5.1.5 of the R&D&I Framework.

(238) Furthermore, the Commission clarifies that the repayable advance in this particular case is a form of aid, permissible under the R&D&I Framework<sup>45</sup>. Should the repayable advance be at market conditions, it would not be considered as state aid, pursuant to article 87. 1) of the EC Treaty.

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<sup>45</sup> Repayable advances are a common aid instrument in R&D&I aids. As an example, see Case C 9/2007 (ex N 608/2006) Spain - Industria de Turbo Propulsores (21 October 2008); Case N 453/02 France - Aide à la recherche et au développement à la société LATECOERE (13 May 2003), and Case N 647/2007 France - Aide individuelle à la R&D pour le projet "PAMELAT, Pointe avant mixte Latécoère, Recherche et innovation dans la filière composite aéronautique" (16 July 2008) and Case N 120/01 United Kingdom – Aid to Rolls-Royce for the development of the TRENT 600 and TRENT 900 engines (30 October 2001).

- (239) Contrary to the allegation of the complainant, the repayable advance is certainly less distortive than other forms of aid<sup>46</sup>, such as direct grants, also permissible under the R&D&I Framework.
- (240) Therefore, the Commission concludes that the form of aid and the conditions of the repayable advances are in conformity with the R&D&I Framework.

#### 3.4.4.4. Aid limited to minimum necessary

- (241) In addition to the proportionality check, under point 7.3.4. the Commission assesses whether the aid is limited to minimum amount necessary for the implementation of the project in question.
- (242) The Commission notes that the aid for the R&D project under assessment is granted by a repayable advance.
- (243) The repayable advance to Shorts is designed in such a way which enables the UK government to reimburse its entire amount with interests above the reference rate set for UK in case of success of the R&D project. Moreover, a royalty will be paid in addition to the advance and interests if the project is commercially so successful that between [...] and [...] units are delivered. The sales scenario and the definition of commercial success and the way the repayment methodology was set by the UK on the basis of economic studies is regarded as reasonable and prudent.
- (244) In the situation when the R&D project fails either due to its high technological risks or does not reach the commercial targets, the beneficiary will pay back only a part of the advance proportionally to a partial success reached. Thus the advantage granted has a very limited effect on the competition.
- (245) Moreover, the UK government did not apply the maximum aid ceilings set to 40% of the eligible costs for Experimental Development and 60% for Industrial Research. Instead, it reduced the aid intensity to 34,01% for both categories.
- (246) To conclude, the Commission considers that on the basis of the above stated the aid is proportional and limited to minimum necessary.

#### 3.4.5. *Impact on competition*

- (247) Section 7.1 of the Community Framework specify that the purpose of detailed assessment is to ensure that high amounts of aid for R&D&I do not distort competition to an extent contrary to the common interest, but actually contribute to the common interest.

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<sup>46</sup> See Commission decision in Case C 9/2007 *Spain - Industria de Turbo Propulsores* of 21 October 2008, para 138: “repayable advances are risk-sharing instruments which, in case of the success of the projects, allow for a more than proportionate reimbursement from the beneficiary: if sales forecasts are fulfilled, the aid is fully reimbursed, including interests. If sales remain below the forecasts, the reimbursement is reduced proportionally [and the distortion of competition is less, since the product has not been a success]. If sales are above forecasts, the reimbursement exceeds the amount of the advance received.”

#### 3.4.5.1. Identification of the affected markets

- (248) Bombardier with its single-aisle CSeries family of 110 and 130 seat-aircraft targets the market for commercial aircraft in the 100-149 seating range capacity. This is a global market characterized by negligible transportation costs and no other tangible barriers to the import of the aircrafts.
- (249) The market for aircrafts is segmented according to the seating range of the aircrafts and the nature of the needs of the customers. The Commission on the basis of its practice perceives the segmentation of the overall market for aircrafts as follows: aircrafts below the 100 seating range are referred to as regional and aircrafts above this seating range as commercial aircrafts.
- (250) CSeries is defined as an aircraft with very different operating performances and characteristics from regional aircraft. The market targeted by the CSeries aircraft is referred to as the '100-seater' market. It is a segment that sees aircraft being referred to as large commercial jets. In an industry driven by economic efficiency and environmental sustainability, this segment has been known for sub-optimal economics of many of the aircraft on offer.
- (251) With the industry focusing significantly more on optimization and efficiency there are new growth opportunities for the 100 to 149-seat single-aisle commercial aircraft market. New generation of aircraft, specifically designed for this segment is defined by superior economics, comfort, lightweight design and built-in operational flexibility. These new designs will advance the retirement of older aircraft and stimulate demand for new services using aircraft of this capacity.
- (252) New aircraft demand for 100 to 149-seat aircraft is expected to amount to 6 300 deliveries over the next twenty years, with the world-wide fleet growing from 5 600 to 8 600 units. Industry forecasts show that nearly 50% of today's 100 to 149-seat fleet will be retired by 2027. The market will further grow by 35% and the remaining 15% will be contributed by companies entering new geographical areas.
- (253) The competitors of the CSeries are either downsized versions of aircrafts optimised at over 150 seats or upsized versions of 4-abreast regional aircraft optimised at less than 100 seats. In the lower end of the market CSeries will be competing with Embraer 190/195, Airbus A 318 and Boeing 737-600. At the higher end of the segment the CSeries will be competing with Airbus A 319 and Boeing 737-700 aircraft.
- (254) Although the 100-149 seats sector is not presently well served by other aircraft, it is still relatively important in current operating aircraft fleet albeit perhaps skewed towards the larger end of the segment. It is estimated that around 5 600 aircrafts are currently operating in today's fleet of 100-149 seating range aircrafts.
- (255) In terms of precise market share of in-service 100-149 seat fleet the current market, characterized by two large market players, is divided in the following way:
- a) Boeing / 737-600 (110-132) and 737-700 (126-149)/: 71%,
  - b) Airbus / A318 (107-117 seats) and A319 (124-134)/: 24%,
  - c) Embraer / 190 (98-114) & 195 (108-122) : 1% and,

- d) other aircraft manufacturers: 4%.
- (256) The future market for commercial aircraft in the 100-149 seating range for the production period for CSeries has been assessed by the UK authorities to be 6 300 aircrafts. Forecast deliveries, as provided to the Commission by the UK authorities, amount to [...] aircrafts which respectively give Bombardier a [15-25]\*% market share in the overall future market.
- (257) In the segment of up to 120 seats, which includes the smaller part of the 100 - 149 seat market Embraer has a very strong market position. Embraer is presently the leading supplier, in terms of both orders and deliveries made, of aircraft in the 100 – 120 seat segment. In fact, as provided in the information transmitted by the UK authorities to the Commission, Embraer accounted for 62 % of net orders (orders less cancellations) in the past five years in the segment of the commercial aircraft market of up to 120 seats.
- (258) The Commission is, however, aware that key to the above presented forecasts are the reactions of the competitors. It is expected that the launch of CSeries will cause a strong reaction from both the two large incumbent market leaders, as well as the smaller market player having a strong (almost exclusive) market position in the 100-120 segment of the analysed market.

*Issues raised by complainant*

- (259) According to Embraer, two markets will be affected by the aid measure. First, a market for single-aisle commercial jet aircraft of 100-149 seats and, second, a market for wings for single-aisle commercial jet aircraft of 100-149 seats.
- (260) In the definition of the aero-structure market the complainant refers to a previous Commission decision in a merger case where a market for aircraft engines was defined. In the Honeywell merger<sup>47</sup>, it was stated that the demand for engines derives from the demand for jet aircraft and therefore the sale of one being of no value without the sale of the other. Embraer claims that the definition a product market for jet components is derived from the definition of the market for aircrafts and that the same logic applies to wings for the single-aisle commercial jet aircraft of 100-149 seats.

*Conclusion on the identification of affected market*

- (261) The UK authorities presented information substantiating the fact that there is no independent demand or supply for wings in the relevant market for the CSeries. Unlike engines for commercial jets and other aero-structures and components for commercial aircraft, the manufacturing of wings is a core component that is rarely outsourced to a third party, given the risk of technology loss and the impact on the overall programme.
- (262) In Bombardier's manufacturing model, the wing is a critically important item and thus it is essential for Bombardier to keep its manufacturing in-house for strategic and risk management reasons. All previous wing packages were undertaken internally by

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\* Business secret. Range value.

<sup>47</sup> Commission decision of 3 July 2001 in Case M.2220 *General Electric/Honeywell*.

Bombardier, with the exception of three business jet programmes. However, business jets are the smallest aircraft manufactured by Bombardier and are very different from large commercial aircraft with over 100 seats, such as the CSeries.

- (263) In terms of the CSeries programme, the UK argues that outsourcing the manufacturing of the wing to third parties would necessitate the establishment of a long term and strategic relationship with a risk-sharing partner. However, in the case of the CSeries wing work-programme, Bombardier does not yet have the full expertise in the design, development, engineering, integration and assembly of composite wings, especially for large commercial aircraft. Furthermore, the activities involve high risks (technological, financial and commercial) as the use of composite technology for manufacturing of complete wings for large commercial aircraft is untested, R&D is ongoing and considerable future investment will be required for the CSeries composite wing to be commercialised successfully.
- (264) Moreover the choice to implement the wing programme internally was determined by significant risks that the composite wing creates for the entire CSeries programme. As indicated in the information provided by UK authorities, Bombardier's risk mitigation strategy was based on internally incorporating Shorts' capabilities in composites technology, in line with its strategy.
- (265) The Commission therefore finds that the relevant market for the analysis of the distortive effect of aid being the subject of this decision is the market for commercial aircrafts in the 100 to 149 seating range. It however also considered the market for aero-structures and notes the following.
- (266) As indicated in the Aerostructures 2009 report of Counterpoint the aerostructures market is estimated to be worth a total of USD 35,9 billion in 2008, of which USD 5 billion is accounted for by composite aerostructures, and is expected to grow at a rate of around 2,5% per year over the next 10-years.
- (267) Almost half of the in-house work in the overall aerostructures industry (USD 15,9 billion) is performed by the prime manufacturers on their own programmes due to the complexity and technology. Another sizable part (USD 13,2 billion) is provided by large Tier 1<sup>48</sup> companies to primes.
- (268) The market is highly fragmented along size and geographic lines. Of the 30 or so aerostructures Primes, 20 are based in Europe (this includes the two companies Premium Aerotec and Aerolia which EADS plans to sell-off once market conditions improve)<sup>49</sup>.

The table below illustrates the sales share of the tier 1 suppliers in the sector in 2008 :

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<sup>48</sup> Tier 1 are typically capable suppliers who have proven themselves over time and are often closely tied into a relationship with one or two Primes.

<sup>49</sup> These primes are involved in a wide variety of work, not just civil and military aerostructures but also working on a variety of components of an aircraft (fuselage, wings, nacelles, undercarriage, pylons and empennage).

Tier 1 companies	Sales share
Spirit	16%
Goodrich	8%
Vought	7%
GKN	7%
Premium Aerotec	5%
Alenia	5%
Aerolia	4%
Mitsubishi	4%
Aircelle	4%
Kawasaki	2%
Latecoere	2%
Aeronova	2%
Fuji	2%
Sonaca	2%
EADS	2%
MRAS	2%
OTHERS	26%

#### Counterpoint, Aerostructures 2009 report

- (269) According to Counterpoint, there are 50 significant aerostructures companies in the North America and 50 more in Europe; with less than 20 significant companies in other regions. In addition, emerging suppliers in the Far East, India and Russia are increasing their efforts in securing major aerostructures packages on a global basis and developing their capabilities through indigenous programmes (civil and military).
- (270) Taking account of the size of the aerostructures markets, as well as its fragmented nature, growth dynamics and established supplier-prime relationships, the Commission does not find that the aid would lead to competitive disturbances should the market for aerostructures be considered relevant for the analysis.

#### 3.4.5.2. Distorting dynamic incentives

- (271) The main concern related to R&D&I aid to undertakings is that competitors' dynamic incentives to invest are distorted. In its analysis, the Commission will consider the following elements: aid amount and its closeness to the market, exit barriers and incentives to compete for a future market, as well as product differentiation and intensity of competition spurred by the granted aid.

##### *3.4.5.2.1. Aid amount and closeness to the market*

- (272) The total amount of repayable advance is GBP 113,37 million, this is 5,5% of total programme costs (GBP 2,07 billion) and 21,8% of the total value of the C Series work-package assigned to Shorts (GBP 520,5 million). With the sector investing more than GBP 2,9 billion in Research and Development each year<sup>50</sup> the aid makes up only 3,9% of this value of investments.
- (273) The repayable advance is considered less distortive than a grant with repayments at a real rate of return in the case of success and additional royalties if the programme exceeds Bombardier's expectations. As explained in recital (245) the aid intensity at 34,01% (both for industrial research and experimental activities) of eligible costs incurred by Shorts' is considerably lower than the R&D&I Framework's ceilings for

<sup>50</sup> SBAC Aerospace and Defence Industry Fact Sheet

repayable advances for industrial research (at 60%) and experimental development (at 40%).

- (274) Furthermore, the granted aid targets R&D efforts to design and manufacture a composite wing on the basis of new composite materials technology and innovative manufacturing processes that will also advance the European technology base. Substantial industrial research and experimental development will be necessary for Shorts to be able to manufacture a wing that will allow the aircraft to be built, tested, certified and enter into service. Furthermore, it is important to note that the technology required in order to develop and build the CSeries wing does not yet exist in the form necessary for commercial exploitation in an aircraft such as the CSeries.
- (275) It should also be emphasised that there are no industrial work-sharing partners for the wing work programme carried out by Shorts. Bombardier will itself contribute GBP [350-450]\* million ([70-80]\*%) of the total investment requirements for the wing work programme to be undertaken at Shorts. The United Kingdom Authorities will provide, in total the remaining [20-30]\*%. The aid provided has been kept to the minimum necessary.
- (276) The Commission thus concludes that both the nature of the aid instrument (i.e. the repayable advance), the aid intensity in comparison to overall programme costs and the R&D investments in the sector, as well as the character of aided research activities limit the distortive effects of aid. Furthermore, taking account of the specificities of the aerospace industry and the underlying market failure described in the earlier part of the decision, any crowding out effects of the aid are highly unlikely.

#### *3.4.5.2.2.Exit barriers*

- (277) The barriers to exit from the aerospace industry are very high. Development of new aircrafts are capital intensive requiring high upfront investments into the R&D programme and highly specialised engineering plant and machinery that cannot easily be applied to other products or sold to other industries. Instead of exiting a market new growth opportunities are sought by stretching or shrinking existing models and adapting them for the evolving market niches.
- (278) The Commission concludes that the aid beneficiary, its competitors, as well as any potential new market entrants are all confronted with high exit barriers in the form of locked in R&D and capital expenditures. The aid is unlikely to lead to any competitors to Bombardier exiting the market. To the contrary, the aid being subject of this decision should further incentivise the market players to innovate.

#### *3.4.5.2.3.Incentives to compete for a future market*

- (279) The 100-149 commercial aircraft market is characterized by high growth opportunities and expected to be worth some USD1 trillion over the next 20-years. The CSeries is targeting [15-25]\*% of this market, which leaves incumbents able to compete almost exclusively for the remainder of the market.

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\* Business secret. Range value.

- (280) As the aid is offered to a beneficiary operating on a market characterized by high growth opportunities, all existing and potential competitors have high incentives to invest in R&D programmes to compete for having a part in this growing market. The Commission concludes that the aid granted for the wing development work-package of the CSeries programme will create new commercial opportunities on the market and increase economic incentives for competitors to increase their R&D efforts targeting the development of more efficient aircrafts.

#### *3.4.5.2.4. Product differentiation and intensity of competition*

- (281) New aircraft programmes drive innovation which contribute to productivity increases in the aerospace sector and, increasingly, ensure that aircraft are more efficient and environmentally friendly.
- (282) In the market targeted by the CSeries, suppliers typically offer ‘shrunk’ derived versions of larger aircraft or extended versions of smaller aircraft.
- (283) The CSeries will provide airlines with new choice of a highly efficient and environmentally friendly aircraft designed specifically to serve a niche segment (100 – 149 seats) that is poorly served by competitors’ current and anticipated models. The Commission assessed that the entry into service of the CSeries will cause a strong competitive reaction on the market and further increase competitors’ incentives to invest, innovate and develop new aircrafts that will be able to compete with the CSeries.

#### *3.4.5.3. Creation of market power*

- (284) Aid in support of R&D&I may have distortive effects in terms of increasing or maintaining the degree of market power in product markets. Market power is the power to influence market prices, output, the variety or quality of goods and services, or other parameters of competition on the market for a significant period of time, to the detriment of the consumer. In its analysis, the Commission will consider the following elements: market power of aid beneficiary and market structure, the level of entry barriers and the buyer power.

#### *Issues raised by complainant*

- (285) According to Embraer, the aid will represent a windfall profit for Bombardier which it might use for further strengthening of its market power and distorting competition also in other markets than those to which the CSeries is targeted, e.g. the market of regional jet aircrafts with 30-90 seats where Bombardier allegedly holds 54% market share or the market of regional jet aircraft with 61-90 seats with 64% market power. Shorts as the aid beneficiary manufactures components for Bombardier aircrafts traded on the regional jet markets, in particular CRJ 200 and CRJ 700. In both markets the main competitor of Bombardiers is Embraer.
- (286) In addition, the complainant considers the aid as maintaining an inefficient market structure. According to the complainant, Shorts is an inefficient firm whose operations can be sustained only with State aid. The aid is highly distortive because it has an effect of operating aid which is primary targeted at maintaining the current level of employment in Short Brothers. As examples of Shorts inefficiency, the complainant

gives low R&D investments during the last two years and the fact that Shorts recently laid off number of employees.

#### *3.4.5.3.1. Market power of the beneficiary*

- (287) The market for commercial aircrafts in the 100-149 seating range is a new market for Bombardier. So far the company has been present on the regional aircraft market (regional jets, turboprops) and business aircraft markets, which are defined by aircrafts below 100 seating range.
- (288) According to data provided by the UK authorities, the aid granted to Shorts for the development of the CSeries aircraft targeting the 100-149 range of the commercial aircraft market is expected to have minimal distortive effect in terms of creating or maintaining market power of the aid beneficiary in the market for commercial aircraft in the 100-140 seating range. CSeries aircrafts are expected to gain a [15-25]\*% share in the future market of 6 300 aircrafts and will not endanger the position of the two dominant market players.
- (289) When analyzing the market for aircrafts it needs to be considered that demand for an aircraft is not uniform over its life cycle: sales tend to be predominant in the early years, when the model is new and to decline over time as competitors introduce new models. The highest demand for the CSeries is expected in [...] years' after its entry into service. [...] after [...], between about [...], competitors are expected to introduce new models that will be more advanced than the CSeries.
- (290) Furthermore, the reaction of the competitors needs to be taken into account. The market for commercial aircraft in the 100-149 seating range is dominated by two large incumbents. These two market players are focused on longer term developments of new single-aisle programmes, adapted to the complete range of their clients needs. It is in the late next decade that the entry into service of the new generation of single-aisle planes combining novel concepts with the most advanced technologies is expected. In fact, it is assumed that the CSeries would meet the demand for an advanced 100-149 seat aircraft until the replacement aircraft of the two competitors start entering into service, which is expected at the end of next decade. Moreover, the more advanced technologies in the new aircraft developed by the competitors could even lead to [...]. At the same time, it cannot be excluded that in the shorter term competitors will react to the competition from the CSeries aircrafts by [...].
- (291) The smaller competitor to the CSeries may retaliate both in the short-term by reducing prices for its planes, as well as in the long-term through the introduction of more competitive features to the plane.
- (292) The market share for the CSeries during the life of the programme is illustrated below in a diagram provided by the UK authorities.

[...]

#### *Conclusions of the Commission*

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\* Business secret. Range value.

- (293) The Commission concludes that the aid measure does not enable Bombardier to use market power to influence market prices, output, the variety or quality of goods and services, or other parameters of competition on the market for a significant period of time, to the detriment of consumers. To the contrary, it is very likely that Bombardier will be exposed to strong competitive restraints from the incumbent market players limiting Bombardier's possibilities in terms of gaining a market share that will raise competition concerns related to market power.
- (294) As for the effects of the aid on Bombardier's position on markets of regional jets as suggested by the complainant, the Commission notes that there will be no leverage of the knowledge gained from Shorts' R&D activities in the composite wings for the CSeries programme into its regional jet programmes. The UK provided information on the significant distinction of the CSeries from the regional aircrafts. The regional jets are built to their own designs and serve different customer bases (regional and "mainline" airlines).
- (295) Furthermore, the CRJ family is a smaller aircraft and uses different technologies, including for the wing, which is made of metal and is a derivative of the wing originally developed for the Challenger business jet. Inclusion of a new wing design would not necessarily be technically or economically feasible for future new aircraft programmes based on the CRJ aircraft. The allegation according to which Shorts is an inefficient firm is dealt with in point 3.4.5.4 below.

#### *3.4.5.3.2. Level of entry barriers*

- (296) Entry barriers in the commercial aircraft market consist primarily of technological and financial barriers, with the complexity of aircraft design increasing in proportion to size and thus driving up the costs of the development programme. Additional success factors include the ability to support an aircraft once in service.
- (297) Furthermore, the market for commercial aircrafts is also characterized by a barrier of high customer loyalty of airlines vis-à-vis incumbent aircraft manufacturers, which retain advantages based on their corporate sizes, the breadth of their product offering (beyond the single-aisle segment), their incumbency with customer airlines and the size of their current operating fleets.
- (298) Taking account of the above the aid targeting the CSeries R&D programme should in the longer-term lead to the lowering of entry barriers. Moreover, introduction of a product characterized by operating cost advantages, total-life cycle advantages, enhanced operational flexibility and environmentally friendly characteristics should further increase competitor's incentives to innovate and develop new technologies, being in the longer term even more competitive to the once applied in the development and manufacturing process of the CSeries aircraft, and in the long-run consequently further reduce technological and financial barriers to entry to the commercial aircraft market.
- (299) Thus, the Commission concludes that by granting the aid being the subject of this decision, it in fact contributes to lowering the existing significant entry barriers to the industry.

#### 3.4.5.3.3. Buyer power

- (300) Airlines and lessors are usually able to make aircraft procurement decisions without undue influence of manufacturers. Moreover, level of commonality between different aircraft types within a manufacturer's products remains an advantage from the point of view of the mentioned above undertakings.
- (301) Resulting from the underlying structure of the relevant market and buyer power, the pricing of the C Series will be determined by the market depending on many variables such as price of competing aircraft and the additional value added for C Series aircraft customers as compared to other aircraft available to them. The price of the C Series will not [...]. Consequently, as indicated in the information provided by the UK authorities, any increase in costs will simply [...].
- (302) Taking account of the above the Commission sees the possible negative impact of aid in terms of creating or maintaining market power of the beneficiary as limited on the basis of the underlying structure of the market dominated by two large players, the strong position of buyers and [...]. Moreover, considering the position of buyers on the market and the innovative features of the C Series aircrafts the aid should rather contribute to creating sufficient competition on the market.

#### 3.4.5.4. Maintaining inefficient market structures

- (303) R&D&I aid may, if not correctly targeted, support inefficient undertakings and hence lead to market structures where many market players operate significantly below efficient scale. In its analysis, the Commission will consider whether the aid is granted in market featuring overcapacity, in declining industries or in sensitive sectors. Concerns are less likely in situations where State aid for R&D&I aims at changing the growth dynamics of the sector, notably by introducing new technologies.
- (304) Shorts, being a subsidiary of Bombardier, is a financially well performing company within the Bombardier Aerospace group showing good financial prospects itself. In FY 2008, Shorts made an operating profit of USD 125 million (and a profit after tax of USD 128 million) on turnover of USD 947 million. In comparison in FY 2007, Shorts made an operating profit of USD 33 million (and a profit after tax of USD 24 million) on turnover of USD 860 million. These results are in contradiction to the complainant's statement on inefficiency of Shorts as a part of Bombardier. Similarly, the argument on low R&D investments over the last two years and a reduction in the number of employees are not evidence of Shorts' inefficiency since the R&D investments are of a cyclical character, linked to programme cycles. Shorts' R&D investments depend upon its priorities and needs at that time to support its work programmes, which in some recent years have needed [...]. Since it acquired Shorts in 1989, Bombardier has invested nearly GBP 1,3 billion in the company, including investments in facilities, new product development and training. Whilst Shorts had reduced its workforce between 2001 and 2007, it was not due to inefficiency or a lack of profitability, but largely due to the cyclicity of the industry. In addition, the UK authorities confirmed that aid granted to Shorts on the past for various projects was in accordance with the EU rules on State aid.
- (305) Bombardier Aerospace accounted for 55% of group sales with a 5,8% EBIT margin in FY 2008 realizing revenues amounting to USD 9 713 million. In FY 2007 the company realized revenues of USD 8 296 million giving an EBIT at the level of 3,9%.

Financial forecasts for the group indicate further improvement in profitability, as well as cash flows with the aerospace division targeting an EBIT margin of between [...].

- (306) According to data provided by the UK authorities including sales prospects, it is obvious that the market on which the beneficiary operates does not feature overcapacity characteristics and is not a declining industry. In fact, the 100-149 seating range commercial aircraft market is featuring strong growth prospects.
- (307) The Commission hence concludes that the aid is granted to an efficient undertaking and will contribute to increasing the dynamics of the sector through the market entry of a new efficient market player with a product developed on the basis of innovative technology. There are no indications that the aid should contribute to the maintenance of inefficient market structures. To the contrary, it should create the incentive for stronger competition on the market characterized by dominance of two strong market players.

#### *3.4.6. Balancing test*

- (308) Pursuant point 7.5 of the R&D&I Framework, the Commission balances the effects of the measure in light of the positive and negative elements assessed above and determines whether the resulting distortions adversely affects competition and trading conditions to an extent contrary to common interest.
- (309) The assessed aid measure aims at the research in and development of a new generation aircraft with technical parameters which enable significant increase in fuel-efficiency due to its mass reductions and diminishes its impacts on the environment in terms of reduced emissions and lower level of noise.
- (310) The measure contributes to the global improvement of the aeronautic sector with respect to the level of R&D&I and to the diffusion of results on the level of both the Community as well as international cooperation.
- (311) The aid addresses a market failure – specifically linked to the asymmetry of information – where the market is incapable of assessing the risk-reward features of the project adequately. Even if the conditions of the repayable advance especially regarding the interest rate [...] above the reference rate might not be unreasonable on market terms, the current economic crisis does not enable the beneficiary to raise sufficient funding without the State aid. With regard to the situation of this particular case, the repayable advance represents the least distortive form of funding and is accepted as proportionate since its impact on competition is limited.
- (312) The aid itself provides an incentive effect to the company since it changes its behaviour and motivates it to invest into a large R&D&I project of Community interest which it would be otherwise unable to implement.
- (313) The negative side of the balancing test is represented by a selective favouring of the beneficiary with the potential to distort or threaten to distort competition. However, due to the relevant market structure and conditions of the aid measure, the negative effects of the aid are limited. The repayable advance is considered to be the least distortive form of aid applicable to the project and moreover the aid intensities are considerably below the ceilings. In addition, the UK reduced the total amount of the

aid by GBP [...] million during the preliminary examination conducted by the Commission.

- (314) Not only that the aid measure does not support the creation of a position of power nor maintaining inefficient market structures, it even might reinforce competition on the market for 100-149 seat aircrafts which is currently dominated by only two players.
- (315) Summing up, the Commission concludes that the balancing test for the aid under assessment is positive since the positive effects of the measure significantly outweigh the negative ones.

#### **4. DECISION**

- (316) The Commission assessed the information available including issues raised by the complainant with due care within the preliminary examination period and reached the conclusion that the measure in question is compatible with the common market on the basis of Article 87(3)(c) of the EC Treaty.
- (317) The Commission accordingly decided not to raise objections to the notified aid measure.

If this letter contains confidential information, which should not be disclosed to third parties, please inform the Commission within fifteen working days of the date of receipt. If the Commission does not receive a reasoned request by that deadline, you will be deemed to agree to the disclosure to third parties and to the publication of the full text of the letter in the authentic language on the Internet site:

[http://ec.europa.eu/community\\_law/state\\_aids/index.htm](http://ec.europa.eu/community_law/state_aids/index.htm).

Your request should be sent by registered letter or fax to:

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Yours faithfully,  
For the Commission

Neelie KROES  
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