

Shetland Inter-Island Transport Study

Tasks 1a & 1b – Aviation Baseline

On behalf of **Shetland Islands Council**



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1 Introduction

1.1 Overview

- 1.1.1 As part of the Shetland Inter-Island Transport Study (SITS), Northpoint Aviation has undertaken a comprehensive baselining of the current air infrastructure in the Shetland Islands. The review covers both aircraft and airfields within the inter-island transport network.

2 Overview of the Air Service

2.1 The Inter Island Air Service

2.1.1 In 1967 Loganair launched an inter-island scheduled network in Orkney, and a similar network in Shetland commenced in 1970. Public Service Obligations (PSOs) for such services became formalised in the early 1990s, as the EU developed these regulations as a compensatory mechanism to de-regulation.

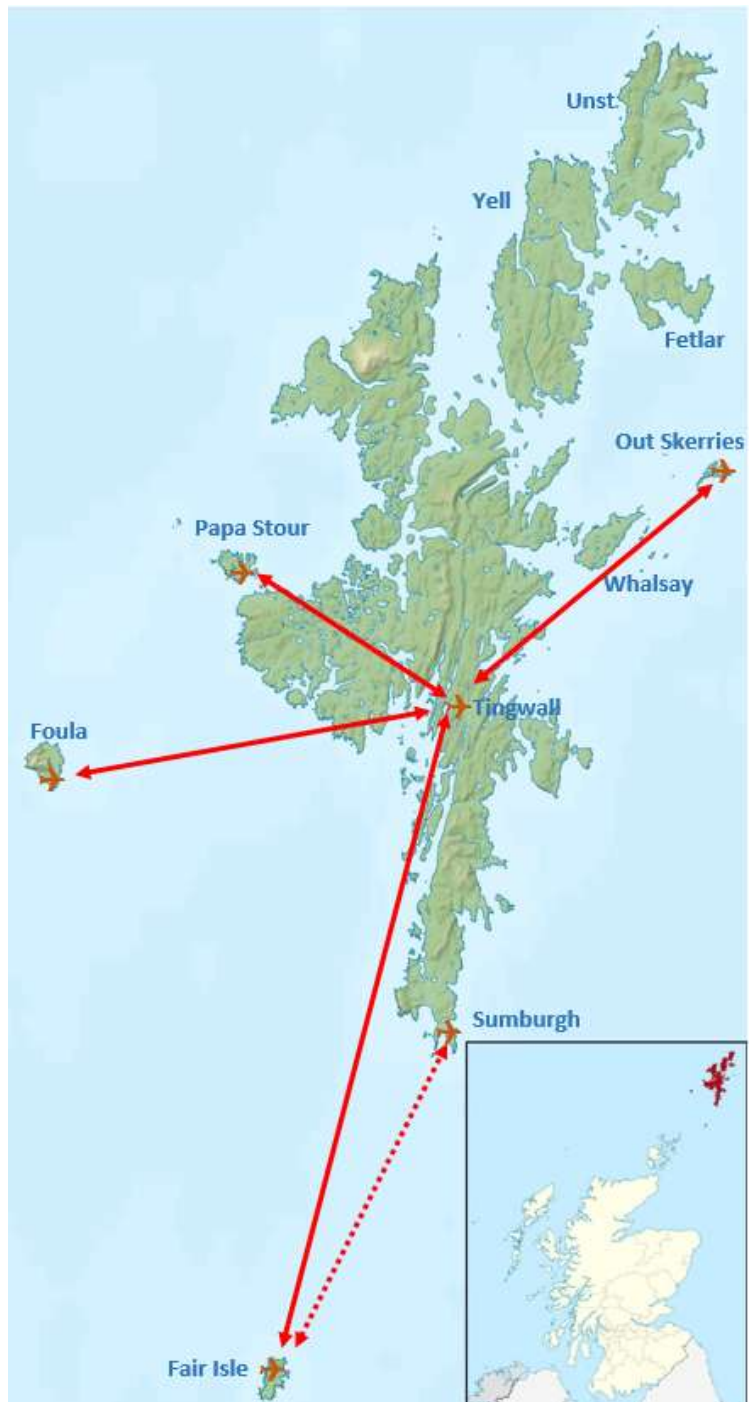
2.1.2 In 2006 Shetland Islands Council acquired two Britten-Normen (BN2) Islanders, thereby allowing the PSO tender to be one of operational fulfilment, rather than the operator being required to additionally supply the aircraft.

2.1.3 In June 2006, Directflight was awarded a PSO contract for the provision of an inter-island scheduled air service in the Shetland Islands, and Loganair relinquished their long record of inter-island passenger flying in the archipelago.

2.1.4 DirectFlight has continued to operate the service since that time, most recently re-winning the tenders in 2009 and 2013. The service is based at Tingwall airport near Lerwick.

2.1.5 Directflight operates 2 Britten Norman Islander Aircraft to the islands of Foula, Outer Skerries, Papa Stour and Fair Isle, and a Saturday service during the summer also links Sumburgh with Fair Isle.

2.1.6 The service has seen a decline in usage over the last decade, a decline that is particularly marked on Out Skerries and Papa Stour.



2.1.7 The service has seen a recent decline in usage

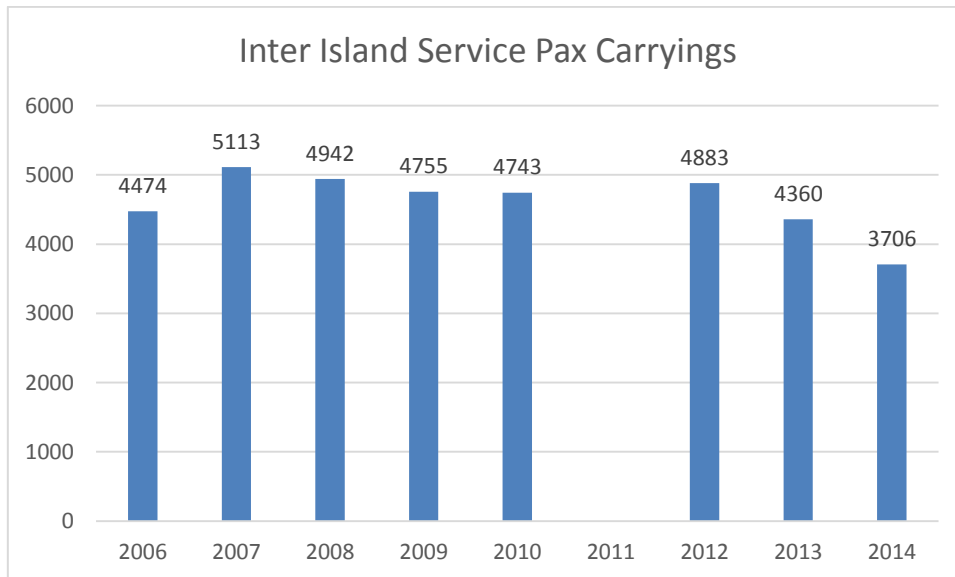


Figure 2.1: Inter-Island Air Services Passenger Carryings 2006-2011¹

2.1.8 The service experiences a strong seasonal swing, which is not completely predictable, as summer fogs can disrupt the operation during peak months.

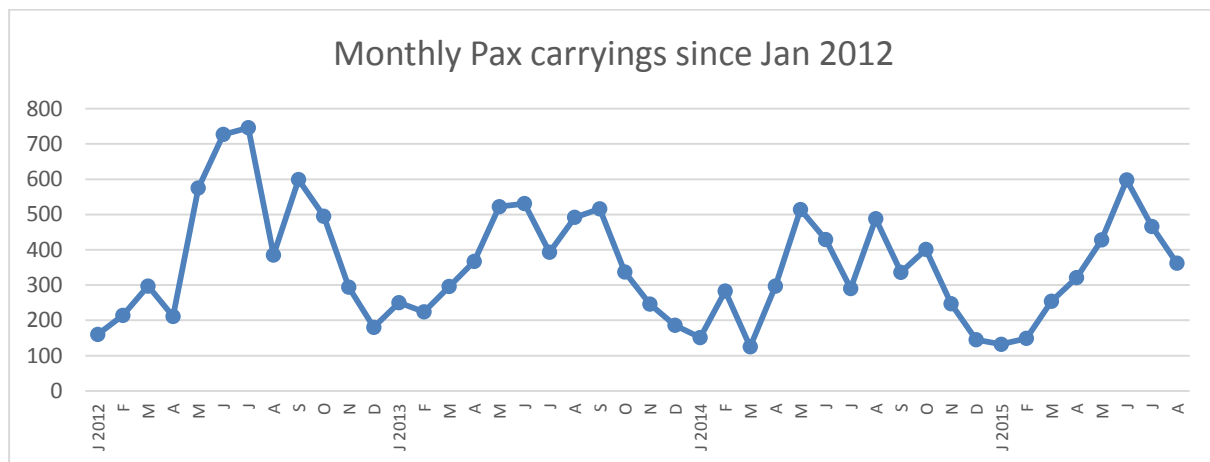


Figure 2.2: Inter-Island Air Services Monthly Passenger Carryings since January 2012

2.1.9 The service is also very unevenly spread across the islands in terms of usage.

¹ Note – data were not available for 2011.

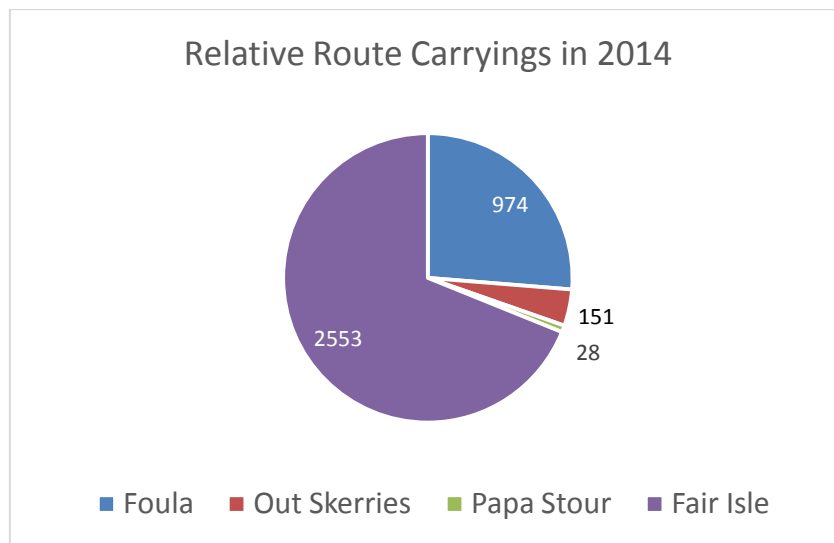


Figure 2.3: Relative Route Carryings 2014

2.1.10 The very different level of carryings is notable and trend lines present a clear and progressive decline on both Papa Stour and Out Skerries routes and a steadier picture but with recent decline in both Foula and Fair Isle routings. Please note the differing scale on each graph.

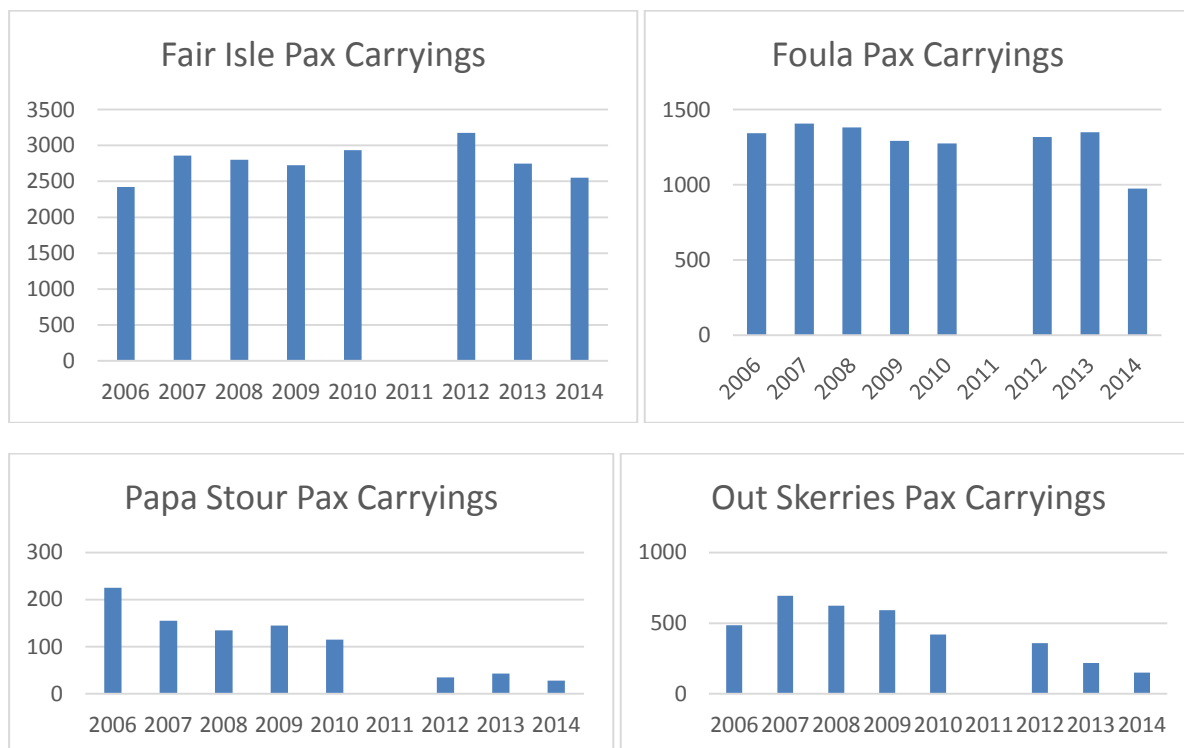


Figure 2.4: Carryings by Route by Year

2.1.11 This fall in 2014 was examined more closely with 2015 data (the first eight months were available). By comparing the first eight months of each year for which there were data, an attempt was made to establish if the 2014 totals represent a new lower equilibrium or an anomaly. Overall, there has been some rebound of numbers in 2015 but the combined totals appear to be down by approximately 8%-10%.

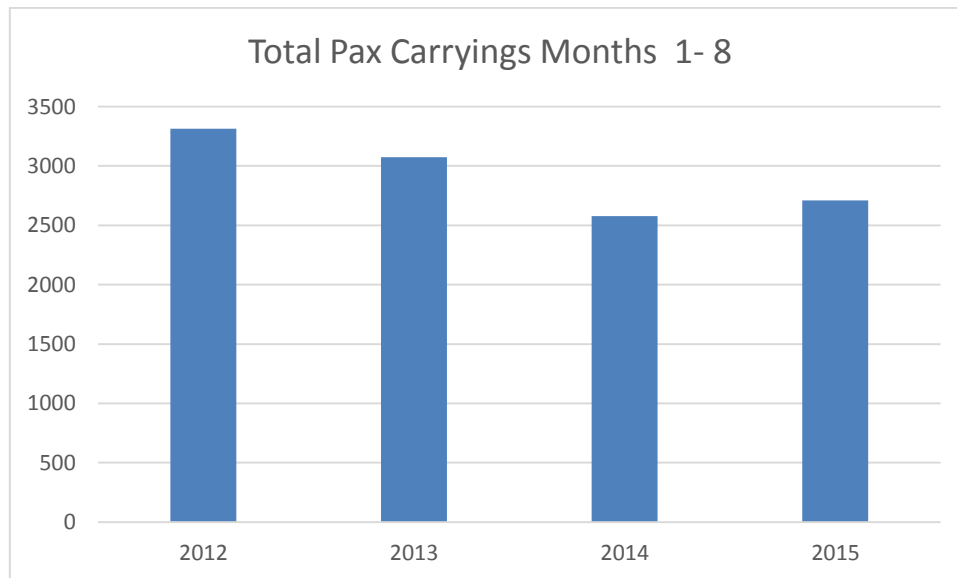


Figure 2.5: Total Passenger Carrying by Year – Months 1-8

- 2.1.12 Overall passenger load factors, based on the number of seats available compared to the number of seats used on the existing services, but neglecting cancellations due to weather, are reported by Directflight as Fair Isle 32%, Foula 15%, Out Skerries 3.5%, Papa Stour 2.3%. Factoring in weather cancellations has the effect of increasing the load factors, but also account would need to be taken of day trippers electing to cancel. Consideration however needs to be given to the relationship between flights on the same day. Day visitors to the islands need to be able to get space on both flights to and from the island. Similarly, islanders coming to the mainland for the day need a seat on both inward and outward flights. Also, some passengers may cancel on a morning flight when there is risk of weather disruption in the afternoon.
- 2.1.13 Directflight report that for the period 25 March 2014 to 25 March 2015 there have been only 11 passengers who were wait-listed, but unable to travel on the day to/from Fair Isle and 5 to/from Foula. This does however neglect the number who simply did not book because the aircraft was already full at the time that they attempted to book.
- 2.1.14 This is the 'demand' background, against which this air service review is being undertaken.

Key Point: The air service is very seasonal in nature, the various route passenger carryings are dramatically different, and the trend in carryings has been downward in recent years. The data provided by Directflight suggests that average load factors are generally well within the capacity of the aircraft, although there will clearly be certain flights and circumstances where capacity issues do exist.

3 Airfields

3.1 Facilities

3.1.1 The table below provides an overview of the Shetland Islands airfields (airstrips highlighted in pink are those used for scheduled inter-island air services):

Table 3.1: Shetland Islands Airfields

Airport	Shetland Runways by length	Role	Licensing
Sumburgh	runway: 15/33 1,426m / 4678 ft x 46 m / 151 ft asphalt runway: 09/27 1500m / 4,921 ft x 46 m / 151 ft asphalt	A divert airport for inter-island air service and supports Saturday service to Fair Isle in summer and communicates with Islander ref. local Sumburgh proximity traffic	HIAL – EASA Certificate required by 2017
Scatsta	06/24 1360m / 4462 ft x 31 m / 102 ft asphalt	A divert airport for inter-island air service and communicates with Islander ref. local traffic	BP Exploration Operating Company Limited – EASA Certificate required by 2017
Tingwall	runway: 02– 744m / 2440 ft x 18 m / 59 ft asphalt runway: 20 – 764 m / 2506 ft x 18 m / 59 ft - asphalt	Hub of inter-island air service and provides Flight Information Service and base for operations	SIC - CAA License – EASA Certificate currently not required
Unst / Baltasound	runway: 12/30 – 640 meters / 2099ft – asphalt x 28 m / 92 ft	Closed and no role	Unlicensed and out of service
Foula Airstrip	runway: 18/36 - 548m / 1699ft – x 15 m /49 ft - gravel	Air ground advisory service	Unlicensed but used with operator dispensation
Fair Isle	runway: 06/24 – 508m / 1667 ft x 22m / 72ft - gravel/dirt. Runway has a distinct 'hump' in the middle which is about 6 feet higher than both runway ends.	Air ground advisory service	National Trust - CAA License – EASA Certificate currently not required
Fetlar	01/19 - 481m / 1578ft – x 18m / 59ft gravel	Closed and no role	Unlicensed and out of service
Whalsay	runway: 02/20 - 460m / 1500ft x 18 m / 59 ft - The landing surface, which is wide constructed from rolled gravel.	Little ground support	Unlicensed but used with operator dispensation mainly to support Out Skerries service
Papa Stour	runway: 02/20 - 440m / 1450ft x 18 m / 59 ft - gravel	No air ground advisory service	Unlicensed but used with operator dispensation

Airport	Shetland Runways by length	Role	Licensing
Out Skerries	runway: 09/27 - 365m / 1200ft x 264 / 85ft – gravel (rough)	Little ground support, and shortest runway in system	Unlicensed, but used with operator dispensation

3.1.2 The table below sets out the ownership, management and licence of each airfield:

Table 3.2: Ownership, Management & Licence

Airfield	Ownership	Management	Licence
Tingwall	SIC Winter: Mon-Fri 0830-1700UTC. Summer: Mon-Fri 0730-1600UTC. Sat 0930-1400UTC (May to Oct only).	Shetland Islands Council Infrastructure Services Department Gremista, Lerwick Shetland ZE1 0PX. This licence shall remain in force until it is varied, suspended or revoked. Feb 2010. The Civil Aviation Authority (in this licence referred to as 'the CAA') in exercise of its powers under Article 211 of the Air Navigation Order hereby licenses the above-named aerodrome as an aerodrome to be used as a place of take-off and landing of aircraft engaged in flights for the purpose of the public transport of passengers or for the purpose of instruction in flying, subject to the following conditions ² .	Tingwall Aerodrome has a CAA Ordinary Licence (Number P614) that allows flights for the public transport of passengers or for flying instruction as authorised by SIC
Fair Isle IATA: FIE – ICAO: EGEF	The National Trust For Scotland - recipient of annual grant from SIC of approx.. £15,000 pa	The National Trust For Scotland Balnain House 40 Huntly Street Inverness IV3 5HR This licence shall remain in force until it is varied, suspended or revoked. Dec 2008. The Civil Aviation Authority (in this licence referred to as 'the CAA') in exercise of its powers under Article 128 of the Air Navigation Order hereby licenses the above-named aerodrome as an aerodrome to be used as a place of take-off and	Fair Isle Aerodrome has a CAA Ordinary Licence (Number P610) that allows flights for the public transport of passengers or for flying instruction as authorised by the licensee (The National Trust For Scotland).

² 1 The aerodrome is licensed for use only by the licence holder and by persons specifically authorised by him. 2 No aircraft shall take-off or land at the aerodrome unless such fire-fighting and rescue services and such medical services and equipment as are required in respect of such an aircraft in the CAA's publication CAP 168 (Licensing of Aerodromes) are provided there. Such services and equipment shall at all times when the aerodrome is available for the take-off or landing of aircraft be kept fit and ready for immediate turnout. 3 Changes in the physical characteristics of the aerodrome including the erection of new buildings and alterations to existing buildings or to visual aids shall not be made without prior approval of the CAA. 4 The licence holder shall, by the quickest means available, notify the CAA of any material change in the surface of the landing area, or in the obstruction characteristics of the approach, take-off or circuit in relation to the aerodrome. 5 The aerodrome is licensed for the take-off and landing of aircraft at night. Such systems of lighting appropriate to the Category of runway in use as described in the CAA's publication CAP 168 (Licensing of Aerodromes), shall be in operation at all times when aircraft are taking-off or landing at the aerodrome at night, provided that minor temporary unserviceability, not of a character likely to affect the safety of operations, shall not preclude the take-off or landing of aircraft. 6 Any public right of way crossing or bordering the landing area shall be adequately sign-posted with notices warning the public of danger from aircraft. 7 Expressions used in this licence shall have the same respective meanings as in the Air Navigation Order. 8 The 'Air Navigation Order' in this licence means the Air Navigation Order 2009 and any reference to the Order or to any Article of the Order shall, if that Order be amended or replaced, be taken to be a reference to the Air Navigation Order for the time being in force or the corresponding Article of that Order.

Airfield	Ownership	Management	Licence
		landing of aircraft engaged in flights for the purpose of the public transport of passengers or for the purpose of instruction in flying, subject to the following conditions ³	
Foula Airstrip IATA: FOA – ICAO: EGFO	Foula Airstrip (Number 2) Trust – recipient of annual grant from SIC of approx. £15,000 pa	<p>Scottish Charity 021728 registered 09 July 1993 c/o Wendy Hand 14 Market Street, Lerwick</p> <p>The principal object is to operate the airstrip for the benefit of the population of the Island of Foula and visitors; Any income which may be received by said Trustees, from the collection of landing dues or from any other source shall be applied exclusively in furthering the objects of the Trust namely the maintenance, improvement or extension of said airstrip and any buildings, equipment and machinery ancillary thereto and no part of any income shall be divisible amongst the Trustees or any other person. In the event of the use of the airstrip being permanently discontinued for any reason, the Trustees shall make over all funds, rights and obligations held by the Trustees to such body or bodies charitable in law which are solely or mainly for the benefit of the said Island of Foula and/or of the inhabitants of that Island as the Trustees in their sole discretion think fit or if, in the Trustees' opinion, it would be impracticable or unreasonable for any reason whatsoever to benefit the said Island or its inhabitants, to such body or bodies, fund or funds, charitable in law which are solely or mainly for the benefit of the Shetland Islands and/or the inhabitants of those Islands as the Trustees in their sole discretion think fit.</p>	Unlicensed
Papa Stour IATA - PPV	Owned by SIC	Manager responsible: SIC Director – Infrastructure Services	Unlicensed
Out Skerries / Bruray	Skerries Airstrip (SCIO), recipient of annual grant from SIC of approx.. £12,000 pa	Scottish Charities Nos 003058 Registered charity from 13 August 1975 Secretary Alice Arthur M.B.E. Vaarheim	Unlicensed

³ Same as Tingwall apart from 5. **The aerodrome is not licensed for the take-off or landing of aircraft at night.** And 8. The 'Air Navigation Order' in this licence means the **Air Navigation Order 2005** and any reference to the Order or to any Article of the Order shall, if that Order be amended or replaced, be taken to be a reference to the Air Navigation Order for the time being in force or the corresponding Article of that Order.

Airfield	Ownership	Management	Licence
		West Isle, Out Skerries, Shetland To advance community development by providing and maintaining the airstrip to enable current activities to be maintained and further expansion of existing facilities to enable potential future growth of the community	
Whalsay	Owned by SIC	Manager responsible: SIC Director – Infrastructure Services	Unlicensed and occasionally used by Islander serving Out Skerries and drop off point
Unst / Baltasound / RAF Saxaford IATA: UNT	Owned by SIC	As above	Non operational and unlicensed
Fetlar	On private land not owned by SIC		Non operational and unlicensed
Sumburgh IATA – LSI ICAO - EGPB Fully licensed	HIAL	HIAL fully owned by Scottish Government	Fully licenced and used for Fair Isle service on Saturdays only. Divert Airport for Tingwall
Scatsta IATA - SCS ICAO - EGPM Fully licensed	Owned by SIC	Leased to Oil consortium - Operated by Serco. Scatsta Aerodrome has a CAA Ordinary Licence (Number P777) that allows flights for the public transport of passengers or for flying instruction as authorised by the licensee (BP Exploration Operating Company Limited) Sullom Voe Terminal Mossbank Shetland ZE2 9TU	Divert Airport for Tingwall

3.1.3 The annotated figure below shows Tingwall Airport, the main hub for the inter-island service:



Figure 3.1: Tingwall Airport

Key Point: The ownership, licensing and management of the air services are very diverse, as are the length and condition of the runways.

3.2 Buildings and Fences

3.2.1 The table below shows the buildings and fences attached to each airfield:

Table 3.3: Buildings & Fences

Airport	Buildings	Perimeter Fencing
Tingwall	Passenger terminal and Directflight Office Airport management and ATC Building Fire Bay, Fuel Store (housing JET A1 Bowser) and Garage. Directflight operated hanger (owner SIC) AvGas Bulk Storage tank. JetA1 bowser Adequate free car parking	Recently heightened. All airside access is AFISO controlled.
Fair Isle	The airfield’s only other facilities are a platform and a small office building/shed and parking cover for fire tender.	Yes, apart from road accesses. Runway/airfield inspections prior to all aircraft movements.
Foula Airstrip	The airfield’s only facilities are a platform and a small office building/shed, with island’s only public toilet. Fire appliance building.	None. Runway/airfield inspections prior to all aircraft movements.

Airport	Buildings	Perimeter Fencing
Papa Stour	Small storage shed-contains generator for runway lighting.	None. Runway/airfield inspections prior to all aircraft movements.
Outer Skerries	Fire Appliance building including public toilet facilities.	Yes. Access gate is fire fighter controlled.
Whalsay	Waiting room including public toilet facilities. Fire appliance building (not in current use)	Yes. Runway/airfield inspections prior to all aircraft movements.
Unst / Baltasound	Unst airfield was built in 1968 and closed down and mothballed in 1996 and is currently used only occasionally by emergency rotary wing services. There is a disused terminal building and aircraft hangar (currently used by SIC and others for storage)	Yes. Access barrier not in current use.
Fetlar	There are no other facilities.	Not reported
Sumburgh	Hangarage; Passenger terminal, car parking – full range of modern airport facilities and capabilities	Yes and manned vehicle runway crossing barriers
Scatsta	Passenger terminal, car parking – full range of modern airport facilities and capabilities Night Operations capability	Yes

Key Point: The facilities at the island airports are also very diverse.

3.3 Navigation Aids

Types of Air Traffic Services at Aerodromes

- 3.3.1 Air Traffic Control (ATC) at an aerodrome is responsible for the control of aircraft in the air in the vicinity of the aerodrome and for the control of all traffic on the manoeuvring area. All movements of aircraft and vehicles on the manoeuvring area are subject to prior permission from ATC.
- 3.3.2 Control of movements of vehicles and persons on the apron is the responsibility of the aerodrome authority. Movement of aircraft on the apron is subject to prior permission from ATC, who will provide advice and instructions to assist in the prevention of collisions between moving aircraft.
- 3.3.3 The total ATC responsibility at an aerodrome is shared between Aerodrome Control and Approach Control.
- 3.3.4 Three types of service are used at United Kingdom aerodromes for the control or supervision of aerodrome traffic. Where Air Traffic Control is required an Aerodrome Control Service (TWR) is provided. At other aerodromes, either an Aerodrome Flight Information Service (AFIS) or an Air-Ground Service (A/G) may be provided.
- 3.3.5 In the Shetland inter-island service, the Islanders use the control towers at Sumburgh and Scatsta to advise them of other traffic, particularly rotary traffic, and they use *Scottish* (based at Aberdeen) to report their flight and intentions, and for instructions away from the two main airports. Tingwall provides an AFIS service whilst Fair Isle, Papa Stour and Foula provide an Air Ground service. This is summarised in the table below:

Table 3.4: Air Traffic Control

Airport	ATC role	Manning	Training	Notes
Tingwall	Flight Information Service (AFISO) provided. Approved Aerodrome Traffic Zone (ATZ) in place.	Currently 4 AFISO's on staff.	Training, revalidation, etc in line with CAP 1032. Additional competency training/checks are part of the training programme.	A requisite Tower has been priced at £150k. Three fire fighters hold Air - Ground Licences. Runway lighting system programme.
Fair Isle	Air-Ground Service licence			No airfield lighting system.
Foula Airstrip	Air-Ground Service			SIC supplied windsocks to some island airfields Airfield lighting available
Papa Stour	None			A resident is trained / employed to carry out airfield/runway inspections. Also undertakes airfield maintenance. Lighting available.
Outer Skerries	Currently none			SIC supplied windsocks to some island airfields
Whalsay	None			An SIC employee is trained / employed to carry out airfield/runway inspections. Also undertakes airfield maintenance.
Unst / Baltasound	N/A			
Fetlar	N/A			
Sumburgh	Apart from local airfield control Shetland air traffic controlled from Aberdeen			Acts as divert for Tingwall / Inter island flights
Scatsta				Acts as divert for Tingwall / Inter island flights

- 3.3.6 The BN Islanders on the Shetland inter-island service operate only under Visual Flight Rules (VFR) as opposed to IFR (Instrument Flight Rules) flying. VFR are a set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going.
- 3.3.7 The Visual Flight Rules (Rules 25 to 29 of the UK Rules of the Air Regulations 2007) require an aircraft to be flown in accordance with the VMC (visual meteorological conditions) minima appropriate to the classification of the airspace. This UK legislation was however superseded in December 2014 by SERA - Standardised European Rules of the Air. There are slight differences between SERA and old UK RoA. Some current exemptions from SERA applied in

the UK could potentially affect the service and ORS4 1119 General Exemption E4072 Special VFR in a Control Zone was quoted as one such by DirectFlight. Additionally, when flying in controlled airspace (except Class E) unless otherwise authorised by the ATC Unit, the commander of the aircraft must file a flight plan, obtain an ATC clearance, maintain a listening watch on the appropriate frequency and comply with any instructions given by the ATC Unit. These rules concern issues such as permitted flight levels, visibility and aircraft speed. The pilot must be able to operate the aircraft with visual reference to the ground, see outside the cockpit, and visually avoid obstructions and other aircraft.



3.3.8 Islander pilots take particular care whilst circumnavigating Sumburgh on the way to Fair Isle; also with traffic connected with Scatsta, and with rotary traffic, which potentially is flying at similar heights to the Islander and across some flightpaths. Sumburgh is surrounded by Category D airspace (see appendix), and Tingwall and Scatsta have recognised Aerodrome Traffic Zones.

Key Point: The inter-island service has very basic navigational support needs and capabilities provided.

3.4 Rescue and Fire Cover

3.4.1 The International Civil Aviation Organization (ICAO) defines Aerodrome Rescue and Fire Fighting Service (RFFS) requirements in Annex 14, Volume 1 - Aerodrome Design and Operations. This Annex contains the Standards and Recommended Practices (SARPs) adopted by the Council under the provisions of the Convention. In accordance with the provisions of Annex 14, states are required to provide rescue and fire fighting equipment and services at an airport.

- 3.4.2 Public Use and Ordinary aerodrome licences makes it mandatory for licence holders to provide a RFF service appropriate to their aerodrome. The Air Navigation Order (ANO) requires licence holders to include in the Aerodrome Manual the scale of rescue, first aid and fire service facilities and the Aerodrome Emergency Procedures.
- 3.4.3 The United Kingdom (UK) Civil Aviation Authority (CAA) requirements related to licensed aerodromes are contained in Civil Aviation Publication (CAP) 168 - Licensing of Aerodromes. In particular, Chapter 8 defines the UK RFFS requirements and Chapter 9 defines the Emergency Planning requirements based on the ICAO SARPs.
- 3.4.4 Firefighting capacity is defined into 10 categories, which match size of aircraft (as measured by fuselage width and length) with appropriate firefighting capability. This is usually measured by quantity of fire retardant fluids and rate of delivery thresholds.
- 3.4.5 The CAA provide the following table of the minimum requirements relating to RFFS Categories 3–10 for licensed airfields:

Table 3.5: Minimum RFFS Requirements for Categories 3-10 Airfields

Aerodrome Category	Aeroplane overall length	Maximum fuselage width
3	12m up to but not including 18m	3m
4	18m up to but not including 24m	4m
5	24m up to but not including 28m	4m
6	28m up to but not including 39m	5m
7	39m up to but not including 49m	5m
8	49m up to but not including 61m	7m
9	61m up to but not including 76m	7m
10	76m up to but not including 90m	8m

- 3.4.6 The BN2 Islander has a fuselage 11m long and just over 1 metre wide. Accordingly by this CAA table for unlicensed airfields (below) fire category 2 might seem appropriate. Accordingly to this CAA table for unlicensed airfields (below) it would suggest fire category 2 as appropriate. Remission enables aerodromes to provide RFFS facilities to one category below that determined by the size of the largest aeroplane. Where the number of movements of the aeroplanes in the highest category normally using the aerodrome is less than 700 in the busiest consecutive three months, the level of protection provided shall not be less than one category below the determined category. Thus the outer island airfields are compliant with CAT1 fire service provision as there are less than 700 movements at these airfields within the busiest three months of the yearly cycle. These airfields have negotiated a remission from the CAA recommended three firefighters to actually rostering two firefighters and a third office staff member as being in attendance for every flight. The logic being that this third person would act as communications point, during any incident.

Table 3.6: Fire Cover Categories 1 & 2

Aerodrome Category (RFF)	Aircraft Overall Length		
1		up to but not including	9 m
2	from 9 m	up to but not including	12 m

- 3.4.7 Appendix 8C of CAA CAP168 concerns Initial Emergency Response (IER) Requirements for RFFS Category Special Aerodromes – Aeroplanes and Helicopters.
- 3.4.8 The CAA also make recommendations about the amount of fire retardant and feed rate of equipment. Burning fuels generate intense radiant heat. Firefighters should wear a fire proximity suit that is coated with material designed to reflect heat away from their bodies. Airport firefighters can also be trained as Emergency Medical Technicians to render medical care and first aid within the airport.
- 3.4.9 All rescue and firefighting personnel should be properly trained to perform their duties in an efficient manner and should participate in live fire drills commensurate with the types of aircraft and type of rescue and firefighting equipment in use at their aerodrome. Because airport firefighters have to be prepared for dealing with fires and rescues from aircraft, which thankfully happen rarely, training and drilling therefore play a critical role in maintaining competences.
- 3.4.10 The table below provides an indication of the fire cover at each Shetland airfield:

Table 3.7: Fire Cover at Shetland Airfields

Airport	Fire Equipment	Manning	Training	Notes
Tingwall	Fire Tender. Spare vehicle available for planned maintenance. RFF Category A2	Complement of 10 - 3 permanent staff on shift– 3 firemen including an Officer in Charge (OIC) plus - during any emergency- a fourth person as watchroom attendant. Usually provided by Shetland Islands Council (SIC) staff cover, but occasionally provided by Direct Flight (DF) in the past. Tingwall's RFFS operates to CAT 2 with a remission agreement to CAT 3.	Hot fire training at Sumburgh. Officer In Charge (OIC) 3 yr. validation at Teeside. Further OIC competency checks on station by HIAL staff planned.	The AFISO is part of the fire fighting team (as either a firefighter or the OIC)
Fair Isle	Fire Tender	2 fire crew and one for radio on each flight		Hot fire training dispensation because of FRS training locally. Temporary solutions have been provided by deploying Tingwall staff in the past
Foula Airstrip	Fire Tender	2 part time fire crew for each flight and one for radio on each flight		Most recent hot fire training at Scatsta but they only do revalidations not initial training. Orkney Island Council staff also provided training on a one off basis
Papa Stour	None			
Outer Skerries	None	Currently lapsed		
Whalsay	None			

Airport	Fire Equipment	Manning	Training	Notes
Unst / Baltasound	n/a			
Fetlar	n/a			
Sumburgh	<p>HIAL use Protector Fire Appliances. In addition, Sumburgh has water rescue facilities requiring Rescue Craft. RFF Category A5</p>	<p>Sumburgh has a fire simulator. The simulator is integral to the maintenance of skills for our Firefighters and ensure that various scenarios can be practiced and debriefed regularly.</p>	<p>Other extraneous tasks undertaken by the Fire Service range from Bird Hazard Control to passenger lift on/off.</p>	<p>The Chief Fire Officer is based at Inverness Head Office and is responsible for developing and reviewing Policy and Procedures in partnership with the airport fire managers. The Airport Fire management team comprise of team members from all of the 11 airports from the Group.</p>
Scatsta	<p>The Serco Fire Service team at Scatsta provide CAT 5 Fire cover on a daily basis. Scatsta Airport has the ability to accept Category 6 aircraft on request</p>	<p>Serco has provided a Fire & Rescue Service at Scatsta Airport since 1996. The airport currently handles SAAB 2000 fixed-wing aircraft, and Sikorsky 92 Helicopters. Six S92 helicopters are based at Scatsta with a seventh on its way</p>	<p>There are currently 29 Fire fighters employed at Scatsta inclusive of a Senior Airport Fire Officer and Deputy.</p>	<p>Shifts are broken down into 3 watches of 9 with a minimum riding strength of 8 for CAT 5 with 3 major Foam tenders and 2 utility vehicles based on the airport. The Fire Service team also provide H2 Fire category for all maintenance operations as required by Bristow's, 7 days a week.</p>

3.4.11 The photographs below show the fire appliances at Foula and Fair Isle.

Foula Airport Fire Tender



Fair Isle Airport Fire Tender



Key Point: The RFFS requirement is quite basic at CAT 1 or 2 level, but there are a range of issues of even maintaining this level of cover at Whalsay and Skerries in particular. Recruitment and recurrent training, and maintenance of expensive fire tenders are issues.

3.5 Regulatory Environment – Licences and CAA Exemptions

- 3.5.1 Aviation is a complex industry with modern technology and high energy machines entrusted with the carriage of the general public. As a result there is a sophisticated system of regulation to protect competencies, standards and operations.
- 3.5.2 In relation to general licensing, the CAA certify operators, such as Directflight with an Air Operator's Certificate (AOC). The holding and maintenance of this certificate is essential for the ongoing operation of the route. The Air Operator Certificate allows one to charge to fly passengers and / or cargo on an aircraft.
- 3.5.3 A "full" AOC, enables operators to fly from point A to point B. The conditions attached to a full AOC will be determined by the competence and ambitions of the organisation, for example:
- The AOC operating area may restrict flights to remain within the UK, or may permit operations to the near continent or be fully global.
 - Operations may be conducted in all weather, or may be restricted to day only, day and night under Visual Flight Rules (VFR).
 - Flights may be run as scheduled services, or as *ad hoc* charter
 - An Operating Licence is required.
- 3.5.4 The CAA grants two classes of Operating Licence.
- A **Type A** Operating Licence is required by operators of aircraft with 20 or more seats.
 - A **Type B** Operating Licence is required by operators of aircraft with 19 or fewer seats.
- 3.5.5 In order to ensure that the CAA can be satisfied that Operating Licence holders continue to meet the ownership and control criteria on an ongoing basis, licence holders are required to provide the CAA with an updated Company Particulars Form, on an annual basis for Type B licences or every 6 months in the case of Type A licence holders. Furthermore, all Operating Licence holders are required, under the terms of Regulation (EC) 1008/2008, to advise the CAA within 14 days of any significant change affecting the ownership of the licence holder and/or its parent or ultimate holding company.
- 3.5.6 In addition:
- Finance - Once a licence is granted, the CAA will in most cases continue to monitor their finances and may revoke the licence of any holder that it considers no longer has sufficient resources to carry on its business.
 - Insurance - Before an Operating Licence is granted, an applicant must provide evidence that it has in place adequate passenger insurance to cover any potential liability in respect of death or injury to passengers in the event of an accident, as well as insurance against third party damage. The CAA has minimum levels of insurance cover for different kinds of operators, details of which can be found in Licensing Airlines in the UK. Once a licence is granted the licence holder must ensure that it keeps appropriate insurance in place. Furthermore, Operating Licence holders are responsible for ensuring that the CAA is provided with confirmation of the renewal of insurance policies prior to the expiry of any existing policy.
 - Safety - Air Operator's Certificate - An Operating Licence cannot be granted until the applicant holds an Air Operator's Certificate (AOC) granted by the CAA's Safety Regulation Group.

- 3.5.7 Because of Directflight's diverse aerial operations, their AOC is more wide ranging than being restricted solely to BN2 Islander operations and UK airspace; likewise with their Operating Certificate.
- 3.5.8 The loss of a certificate / licence can occur through breaches of conditions, and financial insolvency is a common way that AOCs can be suspended. At the tender stage, it is usual for Principals to undertake a financial fitness test alongside their other due diligence on tender submissions.
- 3.5.9 Within Europe, there is a current effort to standardise safety across the continent in the form of EASA, which is the European Union Authority for aviation safety. Its main activities include the strategy and safety management, the certification of aviation products and the oversight of approved organisations and EU Member States. EASA was established in 2002 and there is a target of 2017 by which all UK aerodromes that have a paved runway of 800 metres or above will be included under the regulations, with aerodromes with less than 10,000 pax p.a. are excluded. On this basis all the airfields in the Shetland's Inter Island air service system fall outside this EU wide standardisation process, and will continue to be regulated by the UK Civil Aviation Authority (CAA).
- 3.5.10 The CAA currently licences aerodromes in line with in Article 208 of the Air Navigation Order 2009, which it applies to those aerodromes where flights are for the purpose of the commercial air transport of passengers or the public transport of passengers, and/or flying training in aircraft above specified maximum total weights authorised take place. As can be appreciated the unlicensed airfields of Shetland that are used for the commercial air transport of passengers (Foula, Papa Stour, Whalsay and Out Skerries) lie awkwardly on this boundary of regulation.
- 3.5.11 Nevertheless despite smaller aerodromes not needing a licence to carry out flying activities, the CAA is still responsible for all matters affecting the safety of aircraft at aerodromes through its regulation of aircraft operations and maintenance. CAP 793 Safe Operating Practices at Unlicensed Aerodromes provides guidance and advice on setting up and operating an unlicensed aerodrome.

Key Points: The Air Operator's regulator (CAA) monitors various aspects of their operation for the purpose of licence award. The CAA also has responsibilities for airfield licensing and even for unlicensed airfields. Because of competency thresholds, EASA are in the background as regards the inter island air service, which falls below their level of direct interest.

3.6 Staffing Issues

- 3.6.1 In the remote and low population density settings of the Shetland Islands the manning of key functions within the network are challenging and prompt bespoke responses.
- 3.6.2 All of the issues relating to initial recruitment, induction, recurrent training, retention and robustness of round the year coverage when staff fall sick, leave or retire are amplified in the Shetland environment. This review summarises both the challenges to the operator and airfields as the two are symbiotically related and in some circumstances staff, or flexibility, from either party can sometimes help address systemic staffing shortcomings for the other.

Role	Comment	Robustness
Accountable Managers Airports	<p>SIC Director - Infrastructure Services fulfils this role for Tingwall and is responsible for Papa Stour and Whalsay</p> <p>National Trust fulfil this role for Fair Isle</p> <p>Island Airport Trusts have legal office holders but their responsibility for unlicensed airfields may be ambiguous</p>	<p>The expertise developed will not be easy to replace should staff move on. Seniority of SIC staff with other pressing responsibilities is a challenge.</p> <p>Unclear how NT manage this function, but it is apparently from their Inverness office.</p> <p>The Out Skerries challenge and Muir Bowden report highlights many of the issues for the management of risk at these airfields</p>
Accountable Managers Air Operator	<p>Directflight Accountable Managers are all based in Cranfield</p>	<p>Flight Ops, Ground Ops, Engineering and MD all have legally accountable roles.</p>
Pilots	<p>Currently 3 island based captains. A special sort of pilot is attracted to serve on this service and DF is fortunate to have a stable roster of such pilots. However recruiting and training any replacement, when required, should not be underestimated.</p>	<p>Aircraft are operated as single crew, and the three crew can cover holidays and sickness adequately. Directflight are considering certifying a fourth crew member (based at Inverness) as an extra backstop, but keeping their familiarity with the routes and hence their levels of expertise up is a management issue. A pilot unfamiliar with the routes cannot be safely just parachuted into the network at short notice. DF place high priority on regular exposure to the weather, challenges and topography of the routes.</p>
Aero Engineers	<p>Shetland based. Ideally DF would like to have 3 Shetland based engineers who could carry out daily and weekly tasks and even ideally begin to undertake some of the deeper checks locally.</p>	<p>Currently however they have one apprentice engineer who works in concert with local pilots, and any further cover is currently provided from Cranfield/Inverness.</p> <p>One of the main challenge with regards to recruitment is pay – the oil sector is subsuming candidates and outbidding aero engineering in terms of wages. The other more general challenge is attracting engineers to enter and remain in the General Aviation sector, which is an industry wide problem and recognised as such by CAA.</p> <p>Location and work challenge – the current engineering challenges at Tingwall do not offer great career development possibilities for candidates.</p>



Role	Comment	Robustness
		Housing – The unavailability and expense of housing in Shetland is an additional challenge when bringing in someone from outside. DF would like SIC help in housing such people under a reserved occupations approach and caution that significantly higher wages also need to be offered.
Out sourced Aero Engineering	Cormack Engineering Services at Cumbernauld	This well respected and vastly experienced Islander dealer, engineer and operator provides DF with a well-placed and accessible engineering support service. The company’s owner is coming up to retirement and it is important that DF and SIC monitor possible support services portfolio changes in the future.
Flight / Pilot Information staff	Flight Information Service (AFISO) provided at Tingwall Foula, Papa Stour and Fair Isle. Air To Ground Service	Currently 4 AFISO’s on staff, and three of these are also trained in fire and other duties. All but one have other roles in SIC and the number provides robustness and options for the council. Training, revalidation, etc. in line with CAP 1032. Additional competency training/checks are part of the training programme. Some of the fire staff are also trained in air to ground communications. This does not exist at Out Skerries and Whalsay. Pilots also use these staff for weather checks by phone before departure.
Customer Services staff	DF Staff based at Tingwall	These staff provide a range of functions from telephone booking, passenger and freight check-in and general communications. The local engineer and pilots also are part of this small team. A new base manager Elaine Hughes has just been appointed to replace her long time predecessor, and Alan Cameron supports her as station officer.
Rescue and Fire Fighting Service	Tingwall	Complement of 10 - 3 permanent staff on shift– 3 firemen including an Officer in Charge (OIC) plus - during any emergency- a fourth person as watchroom attendant- sometimes provided by DFL or else SIC staff cover. One of the fire-fighters is there to cover the blind spot from the control room windows (as agreed

Role	Comment	Robustness
	Islands	<p>with CAA as temporary expedient) and to provide communications back-up in case of an incident.</p> <p>Fair Isle and Foula have fire tenders and viable teams.</p> <p>Post of Airfield Operations Assistant at Papa Stour team has been created but not filled at time of writing.</p> <p>At Whalsay a current resident & SIC Transport employee has previous airport fire training.</p> <p>The closure of fire service in Out Skerries caused withdrawal of fire cover at the island with suspension of air services and limited re-introduction</p>
<i>RFFS</i>	<i>Recruitment</i>	<i>Training</i>
Tingwall	SIC staff provides convenient labour pool.	Hot fire training at Sumburgh. OIC 3 year validation at Teeside. Further OIC competency checks on station by HIAL staff planned.
Islands	Most islanders are multi-tasking and this part time job is often part of the mix. However the islands are very vulnerable to changes in circumstances and resignations	<p>At Fair Isle there is a hot fire training dispensation because of island's civilian Fire and Rescue Service training locally.</p> <p>HIAL do not currently provide training for island fire fighters.</p>

3.6.3 Suggestions on possible responses to challenges will be addressed later in the reporting cycle.

Key Points: All aspects of the staffing of the inter island service present challenges in the Shetland context. Unexpected staff shortages to complicate the service are a significant risk, and margins of error are often uncomfortably thin, and replacements often not easy or immediate.

4 Aircraft

4.1 Overview

- 4.1.1 This chapter considers the current aircraft used to operate the Shetland inter-island air service.

4.2 Current Age and Condition

- 4.2.1 The BN-2 Islander was developed in the 1960s to replace the Dragon Rapide which had initially served the Northern Isles from as early as the 1930s. Delivery of the Islander began in August 1967 and by 1982 over 1000 had been delivered.
- 4.2.2 Britten-Norman aircraft are now manufactured by B-N Group Ltd, the result of a subsequent corporate rebrand in April 2000, which reflects the broader aviation interest of the company ranging from maintenance, overhaul and repair work through to sub-contract engineering and design – all supported by approvals from the CAA, JAA and ISO 9001.
- 4.2.3 The emphasis was on producing a rugged and durable aircraft that had good field performance, low operating costs and was easy to maintain. Adaptable, versatile and durable, it has a remarkable record of addressing transportation problems simply and economically in some of the world's harshest environments. Ten seats, twin engines and a design driven by the requirements for ease of operation allow high levels of utilisation. The Islander's simple and rugged manufacture makes for daily operation in and out of rough grass and unprepared strips - as short as 330m - in all-weathers (note that the Out Skerries runway is only 365 m long). Indeed, its twin-engined reliability, 30 kts cross-wind limit and IFR cockpit fitment has seen the Islander operate regular scheduled services in the Scottish environment since the late sixties. The type has also served in the Inner Hebrides (out of Oban) since 2008 and was used as an Air Ambulance for much of this period. The aircraft's maximum operating ceiling, because it is unpressurised, is no more than 10,000 feet, although in the Shetland environment it never needs to fly so high.
- 4.2.4 One unusual feature is that there is no centre aisle between seats in the main cabin; instead there are three doors along each side of the fuselage for passenger boarding. It is a popular, fixed gear, high-wing twin that has three forward opening doors, two on the port side and one on the starboard. Passenger baggage is stored in a 30 cubic feet bin behind the cabin with an access door on the port side.
- 4.2.5 With accommodations for up to nine passengers plus a single pilot, the Islander can also be operated as a freighter carrying more than a tonne of cargo.
- 4.2.6 Enhancements and options over the years enabled the Islander to develop with its markets. For instance, a turbo prop version and a three engine version (the Trislander, with a third engine mounted high on the tail in a tractor position) were developed as were various military, reconnaissance and civil defence versions.
- 4.2.7 Shetland Island Council took the decision in the early 2000s to acquire their own Inter Island aircraft both to modernise the age of the aircraft operating on the network, and to facilitate a tender process where several operators could realistically compete to supply the service under dry lease arrangements. In 2006 Shetland Islands Council⁴ acquired two BN2 Islanders with slightly different specifications.

⁴ Technically G-SICA is leased from *Shetland Leasing and Property Developments Limited (SLAP)*, a subsidiary company of Shetland Charitable Trust.

- 4.2.8 G-SICA was manufactured in Romania under licence by IRMA⁵ and was delivered in September 2007 and is a Britten-Norman BN2B-20 Islander.
- 4.2.9 G-SICB is a BN-2B-20 version Islander; was delivered July 2006 and was previously operated as G-NESU and undertook work for Northumbria and North East Police by Police Aviation Services (PAS). G-SICB, because it was modified for previous tasks by PAS and because it has several coats of paint is a slightly heavier example, and hence its performance characteristics are more inhibited.
- 4.2.10 The current schedule can be completed satisfactorily with one aircraft, so in essence the second aircraft is a reserve which allows aero-engineering (main checks are undertaken off the Shetland Islands) and unscheduled withdrawals from service to avoid disruption. Indeed Directflight are proud of their record of maintaining continuous frontline aircraft availability for the service and could only remember once since the service commenced, when they had to charter in another aircraft to cover a 'double whammy' of a scheduled and unscheduled engineering service withdrawal.
- 4.2.11 As the aircraft are used interchangeably the capacity of the aircraft is set by the lowest common denominator, which is the performance of G-SICB.

Table 4.1: SIC Britten-Norman Islanders

Aircraft	Year of Build	Engines	APS weight ⁶	In cargo config
G-SICA	2006 (Serial no: 2304)	Lycoming IO-540-K1B5	2104 kg	2056 kg
G-SICB	1991 (Serial No: - 2260)	Lycoming IO-540-K1B5	2146 kg	2091 kg

- 4.2.12 G-SICB is 42 kg heavier than its sister ship. From its service history with Northumbria Police, G-SICB had several modifications which originally made it about 150 kg heavier than G-SICA. DirectFlight have progressively 'de-modded' it and now the difference is mainly down to extra paint layers and its older provenance.
- 4.2.13 Both aircraft have Lycoming IO-540-K1B5 engines. The Lycoming O-540 is a family of air-cooled six-cylinder engines made by Lycoming Engines. These engines produce 300 horsepower. The seats and trim are different, but not noticeably to the layman. The main gears are different, one being Fairey/Claverham the other APPH. Standardising would probably be sensible when the Claverham units are due for scrapping. However the APPH overhaul costs are extremely high.
- 4.2.14 Although the Islander is technically able to carry one pilot and one passenger on the flight-deck, with seating for eight passengers in main cabin, the Shetland service standardises the capacity as only being available on a guaranteed basis for seven passengers (partly because Shetlanders understandably tend to also want to carry significant luggage/shopping). It is possible that two more passengers can be carried on any specific day but that would be as a result of a calculation based upon the aircraft in service, the actual mix of males, females and children, and of luggage weights and weather conditions. Occasionally when limits are being approached passengers are weighed for actual, rather than the usual flight planning assumed, weights and likewise with luggage. Very large and heavy passengers can also complicate matters. Luggage is left behind in preference to passengers, if limits are being exceeded.
- 4.2.15 Out Skerries poses particular challenges which are aired elsewhere in this report.

⁵ Intreprinderea de Reparatii Material Aeronautic

⁶ Aircraft Prepared for Service

4.2.16 The long term future of the aircraft and possible alternatives is considered subsequently.

Key Point: The Shetland Islanders are ideally suited to what is required of them. The difference in their specifications does reduce the standard capacity that can be offered but the operator can work around this and there are few disappointments as a result.

4.3 Regulatory Compliance Issues and Risks

4.3.1 J. M. Thomson in his Muir Bowden report to SIC of June 2014 on the Operational Status of Foula and Out Skerries Aerodromes examined the issues surrounding the fact that unlicensed airfields are exempt from strict UK CAA, EASA and ICAO regulation.

4.3.2 However the report reminds that a duty of care exists on aerodrome operators to ensure that all associated activities are as safe as it is practical to provide, manage and oversee.

4.3.3 More pertinently, any holder of an air operator certificate is obliged under ANO article 12 to ensure that flights are operated safely. Additionally the CAA exemptions that permit Directflight operations into Shetland unlicensed airfields are dispensations that are specific to the operator and are based upon Directflight developed safety cases, methods of operation and discussions with the CAA.

4.3.4 The Muir Bowden report discusses the risk around changes that may occur at an EU, CAA, operator or local level to affect the current dispensations and in effect oblige Shetland to only operate into licensed airfields. The report also makes practical suggestions that these airfields should move in the direction of licensing for sound safety and operational reasons.

4.3.5 Areas of relevance and concern will revolve around physical condition of the runway and security of the perimeter; Rescue and Fire Fighting Service; pilot information; safety competences of staff, safe operating practices and competencies of key personnel.

4.3.6 The licensing of the strips would probably pre-empt any future legislation which would prevent unlicensed aerodromes being used for commercial air transport, but DF caution that the licensing would be expensive if the Argyll & Bute experience with Coll and Colonsay is considered.

4.3.7 In terms of risk, quite apart from locally generated risks either from the operating procedures of the operator or changes in airfield manning, funding or other circumstances there are wider risks which include changes in the regulatory environment, currently offered by the CAA and EASA.

Key Points: Areas of relevance and concern revolve around physical condition of the runway and security of the perimeter; Rescue and Fire Fighting Service; pilot information; safety competences of staff, safe operating practices and competencies of key personnel.

4.4 Aircraft Emissions

4.4.1 The BN2 Islander engines burn AvGas (aviation gasoline). This is an aviation fuel used in spark-ignited internal-combustion engines to propel aircraft. Some grades of Avgas still contain tetraethyl lead (TEL), a toxic substance used to prevent engine knocking (detonation).

4.4.2 AvGas has an emission coefficient (or factor) of 18.355 pounds CO₂ per U.S. gallon (2.1994 kg/l) or about 3.05 units of weight CO₂ produced per unit weight of fuel used. The main petroleum component used in blending AvGas is alkylate, which is essentially a mixture of various iso-octanes. Some refineries also use reformate. All grades of AvGas that meet CAN 2-3, 25-M82 have a density of 6.01 lb/U.S. gal at 15 °C, or 0.721 kg/l. (6 lb/U.S. gal is commonly used for weight and balance computation.

4.4.3 There are two BN2 Islander aircraft serving the inter-island service.

4.4.4 G-SICA and G-SICB have fuel injection piston engines producing 300 horse power.

Key Points: There are two BN2 Islander aircraft operating the inter-island service, each of which is fuelled using AvGas and has fuel injection piston engines producing 300 horse power.

4.5 Ownership of Aircraft

4.5.1 In January 2007 a new Britten-Norman BN2B-20 “Islander” aircraft (G-SICA) was purchased by Shetland Leasing and Property Developments Ltd, a subsidiary of Shetland Charitable Trust, and leased to Shetland Islands Council / ZetTrans.

G-SICB BN-2B-26 Islander was delivered on 12th June 2006 and previously operated as G-NESU (mainly) and G-BTVN mainly for Northumbria and North East Police. It is owned directly by SIC. This aircraft has a slightly different specification, heavier weight and reduced performance over its newer sister.

Types of leases and their definitions

- Dry Lease Agreement - An agreement between undertakings pursuant to which the aircraft is operated under the AOC of the lessee. This is assumed to be the type of lease used with the Shetland aircraft.
 - Wet Lease Agreement - An agreement between air carriers pursuant to which the aircraft is operated under the AOC of the lessor.
 - Damp Lease - A wet lease with partial crew.
- 4.5.2 Domestic leasing only involves UK registered aircraft and is an arrangement either between two UK AOC holders or from a private company (e.g. leasing company or bank) to a UK AOC holder. Prior lease approval is required with the CAA, but such approval may well have fallen under the CAA’s General Approval of Leasing Agreements (in the CAA’s Official Record Series 4), provided it fits within the set criteria of the General Approval.
- 4.5.3 When leasing-in aircraft, the information detailed in AMC1 ORO.AOC.110 (GENERAL) along with the signed statement from the Lessee that all parties involved with the lease agreement are aware of their respective responsibilities under the lease agreement.
- 4.5.4 Once the arrangements have been accepted, the CAA and, if appropriate, the DfT, will issue the necessary Approvals, Directions, Exemptions, Permissions and Licence Validations (depending on the type of lease) before the aircraft can be legally operated under the agreement.
- 4.5.5 It is presumed that this process has been undergone at the outset of the arrangement and is still in place.

Key Points: One of the Islander aircraft is owned by a Shetland *Common Good* Trust and one is owned by Shetland Islands Council. Both are leased to the air service, which the CAA has the competency to review.

4.6 The PSO Tender Process

4.6.1 A Public Service Obligation is a defined EU category of State Aid whereby government is permitted to support air services, because the free market is not able to guarantee delivery of an adequate service.

- 4.6.2 The Regulations (Regulation (EC) No 1008 - 2008 Article 16, 17 and 18) identify that where an airport is serving a peripheral or development region in its territory or on a thin route to any airport on its territory, and that any such route is considered vital for the economic and social development of the region which the airport serves, then intervention is permitted.
- 4.6.3 The Shetland inter-island air service qualifies on all counts and there is no conceivable risk of a regulatory problem emerging to forbid the funding of such services. Indeed the regulations would permit higher levels of intervention, if it was so desired.
- 4.6.4 The obligation shall be imposed only to the extent necessary to ensure that route meets the minimum provision of scheduled air services satisfying fixed standards of continuity, regularity, pricing or minimum capacity, which air carriers would not assume if they were solely considering their commercial interest.
- 4.6.5 The regulations highlight various aspects such as non-discrimination of the supplier selected, end user affordability where subsidy may reduce fare prices, minimum intervention to achieve the desired ends, the necessity and adequacy of any intervention, proportionality with regard to costs *vis a vis* benefits, and ideally little or no wider implications on the EU aviation single market.
- 4.6.6 Rather than provide a long commentary on the intricacies of all this, there are several elements worth highlighting that are relevant to the Shetland context.
- 4.6.7 It is widely accepted that a 'minimum level' of PSO provision permits a double daily return with the aim of facilitating a full day's work (eg often defined as something like six hours) at either end of the route. PSO practice also accepts that Mondays through to Fridays as work days where such minimum levels are accepted, and even expected, in more populous situations. Weekend services provoke different government responses across the EEA. Some authorities ensure week round services, others support reduced weekend services, whilst still others do not support weekend services. Tourism is less weekday dependent, and for services where this is an important component weekend services can be very appropriate.
- 4.6.8 The term ***vital for the social and economic development of the region*** begs the question what social and economic development goals exist for these islands, and hence what is vital. This ties in with the near term economic ambitions and hence what is vital to achieve them.
- 4.6.9 Connectivity is an expression of the range, frequency of service, the economic importance of destinations and the number of onward connections available through each country's aviation network and there are several ways in which it can be measured. It is not only closely correlated with economic activity in a number of ways, but that there is a growing body of evidence that enhancing connectivity can have a material positive impact on economic performance, not just directly and through indirect and induced impacts (e.g. jobs and tourism spend), but also catalytically. This proposition has become one of the more interesting areas of analysis underpinning aviation debate currently throughout Europe.
- 4.6.10 The regulations consider the possibility of having recourse to other modes of transport and the ability of such modes to meet the transport needs under consideration, in particular when existing rail services serve the envisaged route with a travel time of less than three hours and with sufficient frequencies, connections and suitable timings. In the Shetland context the other modes of transport to the islands concern ferries, and their ability to deliver an effective day's work at either end of the route and the indication that travel times of three hours or less would offer a viable alternative assuming the frequencies were adequate. This interplay between aviation and ferries is one of the central issues surrounding this study.
- 4.6.11 The lifeline aspects of the air service and their complementarity with ferry services in situations where one can operate and not the other are also worth bearing in mind. Whilst visiting Fair Isle one of the islanders reminded of a situation where the ferry was unable to

operate for a sustained period, and the aircraft was not only ferrying people but also groceries and other essentials.

- 4.6.12 The PSO regulations make reference to the Outermost Regions (OMR) of the EU which essentially concerns the Spanish and Portuguese Atlantic archipelagos, and the French overseas departments in the Pacific, Indian Ocean and West Indies. According to the Treaty on the Functioning of the European Union, both primary and secondary European Union law applies automatically to these territories, with possible derogations to take account of their "structural social and economic situation ... which is compounded by their remoteness, insularity, small size, difficult topography and climate, economic dependence on a few products, the permanence and combination of which severely restrain their development. The Norwegians were recently investigating the possibilities provided by defining some of their territories such as Spitzbergen as an OMR (bearing in mind their special status within the EEA), and it is possible that Shetland could explore whether there are advantages in being so defined. One specific PSO implication is that tenders can be awarded for a maximum of five rather than four years.

Key Points: There are no significant risks with regard to PSO regulation and the regulations would not inhibit significant changes being adopted. The strategic expectation from the air service could be spelled out more clearly as this would help SIC better define the appropriate level of intervention.

4.7 Compliance with Legislation (Current and Planned)

- 4.7.1 In the author's view it is likely that the use of unlicensed airfields for scheduled passenger services will become increasingly untenable as the years pass.

- 4.7.2 Several risks combine to lead to this conclusion.

- EASA may extend its remit, and this can easily be prompted by an incident which may have nothing to do with the Shetland Islands. The relevant regulations may be tightened at an EU level in a way that makes it impossible for the CAA to continue with its derogations.
- The CAA may tire of the uncertainties and risks raised by the current derogations and begin pushing for the adoption of a migration path to licensing, and a change may be prompted by an incident that once again has nothing do with the Shetland Islands. A change of operator fulfilling the PSO may also prompt the CAA to review the derogations it has awarded to Directflight to fly into unlicensed airfields with paying passengers.
- Shetland Islands Council may come to the view that they are morally and in many senses legally responsible for all that occurs at Shetland Islands airfields, whether they are directly accountable or not (Fair Isle might be an exception). Indeed the badging of fire tenders and fire retardant suits used by island RFFS staff at all airfields has Shetland Islands Council livery on them, underscoring the impression that SIC is in control. Once again a change of posture may also be prompted by an incident, whether on the islands, or in a comparable environment such as Orkney or the Inner Hebrides.

- 4.7.3 This review, and the acceptance or otherwise, of its recommendations may well provide a wider and longer term context to guide both infrastructure investment and addressing the issue of Shetland airfield licensing.

Key Point: The airfield licensing issue should be addressed – either by cancelling services to those affected locations, or by developing a strategy for moving these airfields in the direction of eventual licensing.

4.8 Aircraft Emissions

- 4.8.1 The Islander engines produce 300 horsepower and fuel burns at different rates when taxi-ing and when flying, and on some of these routes the taxi-ing is a significant portion of the travel time. To be exact could be very complex. Online research reports rates for different purposes – (eg flight planning, sales claims, accident investigation) as being between 120 and 135 litres / hour.
- 4.8.2 The total flying time on the Inter island service has been estimated as 600 hours per year, and the two aircraft are shared across the service. Assuming an average fuel burn rate of 127.5 litres / hour this would represent 76,500 litres each year.
- 4.8.3 It is important to flag the medium term risk to the supply of AvGas that is currently essential for these engines.
- 4.8.4 The component in leaded AvGas that establishes the octane level is tetraethyl-lead, or TEL, an additive used in small quantities to raise the ignition point of the fuel so that it doesn't pre-ignite under compression before the spark plugs fire during the ignition cycle. That pre-ignition, or detonation ("knock" in auto engines), can tear aero engines apart at the high power settings at which they operate. So TEL allows the fuel to deliver high performance, and the octane number is a measure of how well it can protect against the onset of detonation. AvGas — now available in only one grade, 100 low lead (LL) remains the sole transportation fuel still containing lead.
- 4.8.5 Apparently there is no solution that will allow the existing 100-octane fuel to be unleaded and continue to be used.
- 4.8.6 An entirely new type of gasoline will have to be developed to meet the octane anti-detonation requirement plus all the other necessary properties implicit in a fuel that must operate properly (and safely) at altitude, not to mention its effect on the aircraft's fuel system. The challenge is to come up with a 100-octane fuel for the estimated 230,000 piston-engine aircraft worldwide that they can safely use without modification or — the worst-case scenario — being permanently grounded until a whole new class of large-displacement engines is developed.
- 4.8.7 The complexity of developing and approving an alternate unleaded fuel can only be appreciated when considering the ancillary requirements in addition to the octane, *i.e.*, the performance measures and properties.
- 4.8.8 Some of the more critical elements are:
- Vapour pressure, as the fuel cannot be allowed to vaporize at high altitudes
 - Freezing points
 - Materials compatibility with the fuel's different chemical components, examples being whether they could dissolve the seals or adversely affect gaskets in the engine, hoses, pumps, tubing and bladders in the fuel delivery system, etc., all requiring extensive testing
 - Electrical conductivity, which is necessary for proper functioning of modern fuel-level gauges
 - Impact of the distillation curve or when the energy is produced in the combustion cycle
- 4.8.9 The new fuel will have to be approved by regulators across the world and each engine producer will have to satisfy themselves that there are no adverse implications on engine performance or other critical elements. Any transitional programme also has to find a global

network of fuel producers and distributors and a delivery system and storage systems at all airports.

- 4.8.10 The US FAA think the fuel replacement project will take 11 years, or maybe longer, to make a successful transition to an alternative fuel. As a result, the agency is launching a government-industry initiative called PAFI (Piston Aviation Fuel Initiative) to work it all out. It is a major task, and there is no advance indication of what this fuel might cost and what transitional equipment costs there will be. Additionally will existing suppliers of AvGas withdraw in the meantime, or during the transition period as the commercial drivers for production wane?

Key Points: The eventual withdrawal of AvGas may provide future complications and cost to the service or could, in extremis, force a fleet renewal at some point (estimate 10 plus years).

4.9 The Tender Process

- 4.9.1 The separation of aircraft ownership and aircraft operator has worked well in that the fleet were upgraded by the public sector, whilst the tender is able to be open and non-discriminatory. It is notable that Transport Scotland has chosen a similar model for their upgrade of the Twin Otter (DHC-6) aircraft in the west of Scotland.
- 4.9.2 There is no lease charge between SIC and DirectFlight for the aircraft although SIC do pay a lease charge to SLAP for G-SICA. It is prudent that a lease charge includes an allowance to cover renewals (maintenance reserves) that will avoid unpalatable future one-off costs such as the renewing the paint scheme, renewing the aircraft interiors, and the main elements of the aircraft such as engines, propellers, and undercarriage are covered by set asides. SIC do carry the risk of future one off cost risks on G-SICB in the future.
- 4.9.3 It is noted that SLAP or SIC do not currently maintain a lease monitoring programme with both a reporting and inspection regime that would protect their interests and their assets.

Key Points: Public ownership of the aircraft, and their separation from the air operator, has apparently worked well so far.

5 Operational Review

5.1 Staffing and Crewing

Aircraft Crewing Arrangements

- 5.1.1 Three full time crew are based on the Islands and can provide year round cover, holiday cover and an acceptable level of fast response sickness cover.
- 5.1.2 On some days one crew member will cover the whole day, on others the duties are split. It depends largely on the weather and conditions at the time and whether any charters are booked. On the whole, particularly during the summer months, it is a challenge to manage the Flight Time Limitations Scheme (FTL's) around the flexibility of the service, leave and the 6 (and exceptionally 7) days a week operations.
- 5.1.3 DF is considering approving another Inverness based pilot on the type to further underpin resilience. However DF consider that regular exposure to and experience of the routes, weather and local topography are essential to deliver a safe operation, and will ponder how best to use such an additional resource effectively and safely in the system.

Airfield Staffing Arrangements

Fire Cover

- 5.1.4 Tingwall has solved its fire cover issues using the resources of the nearby SIC Infrastructure Department work pool.
- 5.1.5 The outlying islands do not have that luxury and depend upon islanders fitting this requirement into their multi-tasking lives. Sometimes the system breaks down (as in Out Skerries) and often the systems are under pressure.
- 5.1.6 Recruitment, retention, in service training and competency seem to be major challenges and it could be that SIC has to consider a more proactive intervention into these matters.
- 5.1.7 The maintenance of the fire tenders is also a matter that was raised during consultations, with some island's equipment degrading more quickly than others.

5.2 Timetable and Operations

Current Timetable – Drivers

- 5.2.1 The sector lengths on these routes vary from very short at 10 minutes from Tingwall to Papa Stour to the longest sector length of 25 minutes from Tingwall to Fair Isle.

Timetabled Sector lengths from Tingwall in Minutes

Fair Isle	Foula	Out Skerries	Papa Stour
25	15	20	10

- 5.2.2 Please note that actual flight times can vary from these times quite considerably mainly because of adverse headwinds and the relatively slow cruise speed of an Islander (c 139 knts).

5.2.3 The service has developed a tri-partite timetable that has a summer, deep winter and early and late winter timetable. The dates in 2015/2016 are as follows.

Table 5.1: Timetable

Season	Dates	Weeks
Summer	23rd February to 17th October 2015	34
Early and Late winter	12th October to 15th November 2015 & 18th January to 21st February 2016	9
Deep Winter	16th November 2015 to 17th January 2016	9

5.2.4 The deep winter timetable is driven by the shortened amount of daylight, and the summer timetable, particularly to Fair Isle, is influenced by stronger seasonal demand. Where night does not intrude, efforts are made to allow for an effective days' work at either end of the route on days when there are two return flights. The seasonal effects on this aspiration will be reviewed in a following section.

5.2.5 Under current operating procedures the Islander operates in official daylight (30 minutes before sunrise to 30 minutes after sunset). Runway lights (which Tingwall has) assist but do not allow operation in true darkness. Other parameters need to be satisfied as well.

Seasonal Variations in Timetables

Fair Isle

	Summer				Early and Late Winter				Deep Winter			
	Ting'l	Fair Isle		Tingwall	Fair Isle		Tingwall	Fair Isle		Ting'l		
DAY	DEPT	ARR	DEPT	ARR	DEPT	ARR	DEPT	ARR	DEPT	ARR	DEPT	ARR
MON	09:00	09:25	09:35	10:00	09:00	09:25	09:35	10:00	09:00	09:25	09:35	10:00
	11:15	11:40	11:50	12:15	11:15	11:40	11:50	12:15	11:15	11:40	11:50	12:15
	16:00	16:25	16:35	17:00	14:45	15:10	15:20	15:45	14:15	14:40	14:50	15:15
TUE	11:00	11:25	11:35	12:00	11:00	11:25	11:35	12:00	11:00	11:25	11:35	12:00
WED	10:00	10:25	10:35	11:00	10:00	10:25	10:35	11:00	10:00	10:25	10:35	11:00
	15:00	15:25	15:35	16:00	14:45	15:10	15:20	15:45	14:15	14:40	14:50	15:15
THU	10:10	10:35	10:45	11:10	10:10	10:35	10:45	11:10	10:10	10:35	10:45	11:10
	14:45	15:10	15:20	15:45	13:40	14:05	14:15	14:40	13:10	13:35	13:45	14:10
FRI	09:00	09:25	09:35	10:00	09:00	09:25	09:35	10:00	09:00	09:25	09:35	10:00
	15:00	15:25	15:35	16:00	13:40	14:05	14:15	14:40	13:20	13:45	13:55	14:20
SAT	10:55	11:20	14:25	14:50								
	Fair I	Sumburgh		Fair I								
SAT	11:30	11:45	14:00	14:15								

5.2.6 The Fair Isle timetable is the most comprehensive with services every weekday and double dailies on four of those days. In the summer the service incorporates a W service from Tingwall to the island, a rotate to Sumburgh and back before returning to Tingwall. The red timings are those that are changed because of the seasons, and as a result of increased demand in the summer.

Foula

Summer				Early and Late Winter				Deep Winter				
	Ting'l	Foula		Tingwall		Foula		Tingwall		Foula		Ting'l
DAY	DEPT	ARR	DEPT	ARR	DEPT	ARR	DEPT	ARR	DEPT	ARR	DEPT	ARR
MON	10:15	10:30	10:40	10:55	10:15	10:30	10:40	10:55	10:15	10:30	10:40	10:55
TUE	09:50	10:05	10:15	10:30	09:50	10:05	10:15	10:30	09:50	10:05	10:15	10:30
	16:20	16:35	16:45	17:00	14:50	15:05	15:15	15:30	14:35	14:50	15:00	15:15
WED	09:00	09:15	09:25	09:40	09:00	09:15	09:25	09:40	09:00	09:15	09:25	09:40
	16:20	16:35	16:45	17:00								
FRI	10:15	10:30	10:40	10:55	10:15	10:30	10:40	10:55	10:15	10:30	10:40	10:55
FRI	16:20	16:35	16:45	17:00	14:55	15:10	15:20	15:35	14:35	14:50	15:00	15:15

5.2.7 Foula enjoys double dailies throughout the year on Tuesdays and Fridays, and single rotates on Mondays. The compressed winter days are reflected in the red winter timings. On Wednesdays because of other timetable commitments and the compressed day, the winter has reductions to single rotates for both winter timetables.

Out Skerries

Summer				Early and Late Winter				Deep Winter				
	Ting'l	Out Skerries		Tingwall		Out Skerries		Tingwall		Out Skerries		Ting'l
DAY	DEPT	ARR	DEPT	ARR	DEPT	ARR	DEPT	ARR	DEPT	ARR	DEPT	ARR
MON	13:30	13:50	14:00	14:20								
WED	13:30	13:50	14:00	14:20								
THR	09:00	09:20	09:30	09:50	09:00	09:20	09:30	09:50	09:00	09:20	09:30	09:50
THR	16:00	16:20	16:30	16:50	14:55	15:15	15:25	15:45	14:25	14:45	14:55	15:15

5.2.8 Although the service is contracted to have a double daily on Thursday and single rotates on Mondays and Wednesdays, the current suspension on Fire Cover at the airfield has resulted in the Thursday service only being operated. As the report was being finalised the service has now been suspended completely from 23 November 2015 owing to lack of fire cover. This is based upon an operator's risk assessment and Whalsay was used regularly as a staging post for this service, because of the operator's self-imposed restrictions on the carriage of passenger numbers.

Papa Stour

Summer				Early and Late Winter				Deep Winter				
	Ting'l	Papa Stour		Tingwall		Papa Stour		Tingwall		Papa Stour		Ting'l
DAY	DEPT	ARR	DEPT	ARR	DEPT	ARR	DEPT	ARR	DEPT	ARR	DEPT	ARR
TUE	09:00	09:10	09:20	09:30	09:00	09:10	09:20	09:30	09:00	09:10	09:20	09:30
	15:25	15:35	15:45	15:55	14:00	14:10	14:20	14:30	13:45	13:55	14:05	14:15

5.2.9 Papa Stour receives a double daily service every Tuesday, and the timetabled times are significantly curtailed in the winter.

5.2.10 Over the network, Directflight previously trialled using two aircraft simultaneously. They experienced that the domino effect on the timetable, the limitations of strip staffing and difficulty in predicting when 2 aircraft would be available were incredibly difficult to manage

and it was determined at that time that it was unwise to attempt to schedule 2 aircraft as experienced at that time.

5.2.11 As a result of that trial services were increased to Fair Isle to deal with the capacity issues being experienced at that time, these were slotted into the timetable in such a way that the services could still be provided with one aircraft only.

5.2.12 DirectFlight do not feel that the 'virtual sixteen seat' option was manageable with the resources currently available and the high level of service disruption owing to weather (reported as between 20-40% of flights). It assumes the higher figures are some form of delay whilst the lower figure relates to cancellation. However more clarity on this aspect of the punctuality and reliability of the service would be helpful.

Key Points: The air service is skilfully designed to spread benefit and utility as widely as possible and to minimise the impact of the dark nights. This study will subsequently review if airfield lighting would facilitate enhanced timetable options.

5.3 Current Aircraft Usage

5.3.1 The current annual joint usage of the aircraft is 600 hours. This is shared approximately equally between each of the aircraft. The flying includes the scheduled service flying, any training or testing flying and the positioning flights to and from Cumbernauld.

5.4 Current Ticket Pricing

5.4.1 The current ticket pricing is fully prescribed and makes a distinction between children (2-11); Youths (12-24 and Seniors (60+). Residents receive favoured discounts on return flights that originate from the islands. These discounts approximate to 50% of the standard ticket price. In general terms the fares have quite easy flexibility and refund terms, which suits a service so impacted by weather.

Single						
Between And	Tingwall				Sumburgh	Out Skerries
	Fair Isle	Foula	Papa Stour	Out Skerries	Fair Isle	Whalsay
Adult	£42.75	£40.00	£35.00	£34.00	£40.70	£14.95
Youth	£28.85	£26.80	£18.50	£20.60	£28.85	£10.85
Child	£21.65	£17.50	£12.35	£11.35	£20.35	£7.50
Senior	£28.85	£26.80	£18.50	£17.25	£28.85	£10.85

Return						
Between And	Tingwall				Sumburgh	Out Skerries
	Fair Isle	Foula	Papa Stour	Out Skerries	Fair Isle	Whalsay
Adult	£81.40	£76.75	£67.00	£64.90	£77.00	£28.85
Youth	£54.60	£50.50	£34.00	£38.15	£54.60	£20.35
Child	£40.00	£32.00	£23.70	£21.65	£38.65	£13.95
Resident Rtn	£40.00	£40.00	£27.30	£26.80	£41.20	£19.60
Resident Child Rtn	£25.75	£25.75	£16.25	£17.50	£25.75	£9.80
Senior	£54.60	£50.50	£34.00	£31.95	£54.60	£20.35

- 5.4.2 The fares are, we understand, fully specified by the Council with no variations for peak, off peak, air operator discretion or summer or winter timetables.
- 5.4.3 Airfreight carriage costs £3 / package below certain weight limits, and a very flexible regime is operated with unaccompanied items being carried frequently. It is understood that this revenue stream is outside of the PSO specification.
- 5.4.4 It is also understood that there are several full aircraft charters throughout the year. The council is the most frequent client moving delegations or groups around, and also using the aircraft for dedicated freight flights when necessary. Other users such as amateur bird watchers are occasional charterers and this income and specification is also outside the PSO specification.

Key Point: Would a different, more flexible, way of pricing the air service be beneficial?

5.5 Current Sales and Marketing

- 5.5.1 The sales and marketing effort is driven by collaboration between Directflight and SIC. Both organisations have the service featured prominently on their websites, and the service is also mentioned frequently in the printed and online guides to the islands.
- 5.5.2 The Directflight customer service team, based at Tingwall Airport, have close dealings with regular travellers including advising on weather and likelihood of operation, and add considerable value and utility to users. The call centre system ensures the service has a strong human dimension and friendly feel.
- 5.5.3 The lack of online booking capability is identified as a weakness by some, and yet the high likelihood of weather disruptions and delays (reported as affecting a high proportion of flights) may not sit well with an automated booking and payment system. It is understood that the PSO contract originally required the operator to have such a system. However after consultation with the island communities it was concluded that the risks of such a system would exceed any of its benefits.
- 5.5.4 The PSO contract is not currently designed to encourage or reward flexible yield management and long term route development by the operator.
- 5.5.5 Many UK PSO tenders are based upon a deficit funding model. As a result, bidders cannot take an objective view on the optimal marketing spend for the route. If they budget too much marketing spending they may lose the tender competition. Therefore, the operator is likely to earmark a minimum marketing spend. This is a significant problem and goes to the heart of the issue of who actually has responsibility for the long term health of the network. We would contend that this responsibility must lie with the PSO sponsoring authority, and not with the air operator, as the operator is only the incumbent for a few short years.
- 5.5.6 A change of approach could have substantial positive impacts on long term branding, ownership and strategy and would result in SIC more formally retaining marketing responsibility, specifying a marketing budget or initiating partnership marketing (e.g. subcontracting to economic/tourism development agencies).
- 5.5.7 SIC could be encouraged to take this marketing responsibility much more seriously.
- 5.5.8 For instance in the tender competition
 - 1. SIC could retain marketing responsibility for the PSO routes, with operators excluding marketing costs in their submission; or

2. SIC could specify a minimum marketing spend in the tender documentation. Bidders would be asked to describe how they would market the route using this resource and any additional resource they might voluntarily provide. This would put all respondents on a level playing field and allow also route marketing to be properly resourced for the long-term good of the route.
- 5.5.9 SIC could assess the marketing or route development plans offered by the operator as part of the tender competition. The Buyer should also be active in fostering collaborative destination marketing approaches with other interested organisations such as the local economic development and tourist development bodies.
- 5.5.10 Marketing a PSO route is, in our view, essential to develop the route as a business that benefits from tourism and other users, and thereby can become more commercially viable. PSO Research⁷ suggests that many sponsoring authorities presume that the operator will market the route, and do not overly concern themselves with the details of this aspect of fulfilment.
- 5.5.11 This appears counterproductive as any success in building the patronage on the route has a direct impact on the subsidies required into the future.
- 5.5.12 Some thought needs to be directed to an appropriate level of resource for the marketing of PSO route(s). SIC and the operator could agree an ambitious route development plan and some suggestions will be aired in subsequent iterations of this report.

Key Point: Would changing the incentives and responsibilities deliver better route development outcomes?

5.6 Aircraft

Scheduled Maintenance

- 5.6.1 Cormack Islander Aircraft of Cumbernauld provide engineering support for DF. They are hugely experienced in Islander aircraft and hold EASA PART 145, Part M, Subpart G and Subpart F Approval to carry out maintenance on the type. They also have approvals to work on the Textron Lycoming Variants covering the engines of G-SICA and G-SICB. Time away from Shetland is minimised by going to Cumbernauld and not the aircraft manufacturer in Bembridge or elsewhere which was also an option.
- 5.6.2 As of writing it has not been established how often the aircraft need to be positioned and for how long, but as the schedule can be adequately fulfilled by one aircraft planning of these absences is not too challenging.
- 5.6.3 The day checks are carried out by an apprentice engineer in Tingwall under the supervision and authorities of the pilots. The ambition is to develop the local engineering team and a recruitment effort is underway, although there are challenges mainly because of the high wages in the oil sector and the remoteness of the work location and limited portfolio of engineering challenges.

Unscheduled Maintenance

- 5.6.4 The reserve aircraft is flexibly available to cover unscheduled maintenance and can be flexibly replaced should the selected aircraft develop a fault.

⁷ **Merkert, R. and O'Fee, B. (2013)** Efficient procurement of public air services - Lessons learned from European transport authorities' perspectives, Transport Policy (June 2013)

- 5.6.5 Of course should an aircraft be in Cumbernauld then this option does not exist, and disruption to the service would result.
- 5.6.6 However DF report that during all their years of operation they have only had to charter in an aircraft only once when they ran out of options. They also reported that only once has an aircraft been grounded on an island destination with even fewer facilities and support available.
- 5.6.7 It is worth mentioning that Loganair have significant Islander engineering capability in Kirkwall in a dedicated hangar there and to date both operations have not found a way to cooperate to their mutual benefit. The potential for aircraft cover, spares, engineering manning support, training and even some checks being undertaken in Kirkwall rather than Cumbernauld could make sense. It should be noted however that DirectFlight have had several discussions in this vein with Loganair over the years, but an instance has still not occurred where either party were able to provide aircraft or engineer to cover upon request, because of their own commitments. There is likely to be no easy early win from such a course.
- 5.6.8 It is also worth mentioning that the hangar in Tingwall is very comfortable and could be undertaking so much more support work than currently. Manpower shortages and expertise seem to be the main challenge in upgrading this facility.
- 5.6.9 It has always been DF's intention to seek agreement from the CAA to perform an increased amount of maintenance on island when Engineering staff complement has been suitably stabilised and increased. However this is contingent upon available staff and housing for those staff mentioned above.

Key Point: Aircraft maintenance arrangements are not seriously inhibiting the service, mainly because of the high level of redundancy in the fleet. If one aircraft can satisfactorily back up one frontline aircraft then one reserve aircraft is likely to more efficiently back up two frontline aircraft as a way of dramatically increasing the supply of seats, if that was so desired.

5.7 Performance Characteristics of Aircraft in Shetland Destinations

- 5.7.1 The Islander is an ideal aircraft for the Shetland airfields, and as a result the Council decided to buy two examples in the mid noughties thereby committing to a solution for the next generation.
- 5.7.2 In general terms the aircraft can take off with 215 metres of runway length and needs 300 metres for landing.
- 5.7.3 Out Skerries runway length of 365m providing the lowest margin of error.
- 5.7.4 The use of Whalsay as a staging post to serve Out Skerries as a result of a DF safety assessment and the current lack of RFFS and Air Ground services at Out Skerries appears sub-optimal, and no doubt partly explains the fall in passenger numbers to that destination.
- 5.7.5 The upper limit of 7 passengers as standard on the service also appears sub-optimal and is partly a result of the different performance characteristics of the two aircraft. Upgrading either the engines of G-SICB or removing the layers of paint from the aircraft cannot be justified under current demand. However if capacities were being exceeded by demand on a regular basis lifting the standard carryings of the aircraft might make sense.

Operational Envelope and restrictions

- 5.7.6 Directflight impose maximum wind limitations on the strips which are not simple cross wind limits. The effects which are of concern stem from the surrounding topography and the limits have been derived through years of experience. Beyond their published limits, predictable

local vortices are created which may be dangerous. Simple extension of any relevant strip will not improve the turbulence characteristics to be found there. All aircraft will be similarly vulnerable to these vortices with minor differences of behaviour due to wing loading and excess power available. Without re-siting the strips to other locations on the islands (if other locations exist) these limitations will be similar for all types of aircraft.

Key Point: DirectFlight place great emphasis on pilot local knowledge and experience in these challenging flying conditions

5.8 Replacement Aircraft Possibilities

- 5.8.1 In 2010 Mott MacDonald completed A Review of Air Services in the Highlands & Islands for both Hitrans and ZetTrans and that review examined other possible aircraft types and their relevance and implications. In 2014 Directflight produced a useful clean sheet of paper review of options that also examined the potential for other aircraft types on the Inter Island service subsequent to the BN2 Islander becoming obsolete.
- 5.8.2 The current Islander fleet should have another 20 – 30 years life in them, and perhaps more. If an aircraft is well maintained and various parts renewed, the only core element that cannot be replaced is the fuselage, which could develop fatigue cracks or corrosion and eventually be deemed not airworthy. One limitation may be the withdrawal of manufacturer support for very old aircraft types or their components, at some point in the future.
- 5.8.3 The Directflight paper observes that there is a perception that the BN2B (piston engine aircraft) is “outdated”. This probably derives from the design being fundamentally the same as it was when it was first produced in the 1960s. However they point out that its essential attributes are not outdated. It has very simple systems, is very unsophisticated, has good short field performance and is relatively economical. Admittedly it is noisy (like the Twin Otter) and is limited to a maximum of 9 passengers (or less as we have seen in Shetland environment).
- 5.8.4 The Turbine (as opposed to piston) Islander which was a derivative Islander design and may be seen as an obvious future upgrade and desirable for several reasons such as its slightly higher operating weights, its turbine smoothness and quieter cabin. However, these apparent benefits also create a number of deficiencies which severely militate against it as a natural replacement for the piston version – these include:
- The turbine version is heavier principally in order to carry the heavier fuel loads required to give a range/endurance similar to the piston version. Turbine fuel is heavier than gasoline and turbine engines consume greater quantities for similar power outputs. There are slight increases to load carrying ability because of the slightly heavier structure, but these are not really significant compared to other losses.
 - Field performance (the distance needed to take off and land) is adversely affected because of the increased weight. Even though turbo props usually have reversible thrust propellers the BN2T does not. This would not normally enable shorter field length to be scheduled, but is very useful as a stopping mechanism. The lack of reversible propellers is more significant in terms of increased brake and undercarriage wear, meaning increased costs.
 - A very significant drawback to operating a turbine engined aircraft on the Shetland Inter Island service is the very short sector times. Turbine engines suffer fatigue related to the number of cycles (starts and shutdowns) they perform rather than in relation to the total time they are running which is the case with a piston engine. Overhaul costs for turbine engines are around 5 – 6 times those of piston engines. This problem could be mitigated to a degree in an installation with propeller brakes, which allow the turbines to stay powered whilst the propeller is stationary, but no such installation exists for a BN2T. The

turbine would still need to be shut down whilst refuelling and the cyclical costs would still probably be much higher than a piston engine in an equivalent power range.

- The systems which accompany turbine installations, generators, hydraulic pumps, controls etc are also more sophisticated and hence expensive than piston engine technology. The maintenance costs of a turbine Islander are estimated at at least twice that of a piston BN2. Jet fuel is cheaper than gasoline, but the increased fuel consumption of a turbine cancels out those savings.
- For all the improvement in smoothness and increases in some elements of performance, the BN2T is still a 10 seat aircraft.
- The initial purchase price of a used BN2T is thought to be around 2 times that of a piston version. A typical 20 year old example is currently advertised at \$1,250,000. New airframes are custom built.

5.8.5 Writing in 2010, Mott MacDonald noted that the then Loganair BN2 aircraft were built between 1982 and 1987, and were last refurbished three years before 2010. By 2020, the design will be 55 years old, and these individual aircraft over 30 years old. In theory, there is no reason why these aircraft should not continue to operate for many decades yet, although the cost of regular refurbishments will continue to rise. Loganair believe that 'the aircraft have a further ten years of service capability subject to no major anti-corrosion or structural issues being located during the routine annual checks and SB190 structural checks. Any discoveries of this nature could lead to a premature need to replace the aircraft given the likely costs of repairs. In the event of an Islander replacement becoming necessary, we would expect to replace the aircraft with newer Islander aircraft'.

5.8.6 Because the Scottish Government has recently acquired two new DHC-6 Twin Otter, some form of standardisation using this aircraft type might offer some attractions. The aircraft has good STOL requirements, is now being manufactured again by Viking of Vancouver (albeit it largely unchanged from an early design) and can carry 19 passengers. Directflight make the following observations:

- Use of a Twin Otter (or any similar aircraft) on the Shetland Inter Island Islands Service would involve a substantial revision to the PSO and the funding needed to sustain it.
- Though the DHC-6 Twin Otter is billed as a STOL aircraft and does indeed have very good performance, in order to operate to Commercial Air Transport standards, many of Shetland's airfields would need lengthening, regrading and widening. Even Fair Isle would require some extension by an estimated 100 – 150m (exact dimensions would be subject to a very detailed analysis), plus other infrastructure improvements such as RFFS CAT3 (applicable at all operating locations). The other strips would require considerable work to bring them to licensed standards. The DHC-6 is classed as a complex motor powered aircraft (because it has more than 1 turboprop engine) and as such cannot use "landing sites" such as unlicensed airstrips which are accessible to the BN2. Effectively, this means that all destinations served by a DHC-6 would need to be licenced aerodromes and at present only Fair Isle is compliant.
- Presuming the home base of the Inter Island Service remained as Tingwall, the hangar would require adaption to accommodate.
- Tingwall only has limited quantities of Avtur sufficient to top up Air Ambulance or SAR flights and a larger bowser or modified fuel farm would be required to service the increased demand. If a DHC-6 service were based at Sumburgh hangarage would also need to be found, which is difficult currently.
- Passenger demand for an aircraft of greater capacity than the BN2 seems justifiable for Fair Isle only on rare occasions and perhaps Foula on very rare occasions.

- The drawbacks associated with turbine engines highlighted in BN2 turbine discussion above apply to the DHC-6, although it is equipped with reversible propellers and is thus more suited to the task.
 - The airframe is very expensive to purchase either used or new (a 1979 model still commands over \$2,500,000 and a new version [Viking DHC-6-400] costs around \$7,300,000 plus delivery charges etc. It is also an expensive airframe to maintain with costs estimated to be around 3-4 times that of a BN2. The direct operating costs are obviously proportionately higher.
 - A further direct operating cost would probably be that for the second pilot. The aircraft is certified as a single pilot aircraft, but both current UK operators (Loganair and Isles of Scilly Skybus) operate them with two pilots for sound reasons. Directflight would perform a risk assessment prior to pronouncing any policy on pilot numbers. If multi-crew operation was held to be preferable, the present pilots could potentially be dual rated on the BN2 and the DHC-6 or solely on the DHC-6. However, there would inevitably be a need to recruit additional pilots.
- 5.8.7 The 2010 study can be characterised as championing the virtues of the single engine STOL solutions offered by aircraft such as the Cessna Caravan and Grand Caravan, which have been certified by the US FAA and many other aviation authorities around the world for passenger flying. The UK CAA have resisted certification for scheduled passenger flights citing UK's heavy population density and, in the Scottish island context, significant over water transits providing more serious implications should that single engine fail.
- 5.8.8 This study claims that the safety standards of the twin-piston-engined Islander are being overtaken by the new breed of single-turbine-engined aircraft. The main concern regarding single-engine aircraft is if the sole engine fails.
- 5.8.9 Under current CAA regulations, the aircraft may fly into and out of airstrips using its single turbine engine under Visual Flight Rules, but (because of its single-engine) may not fly under IFR or in IMC⁸ for en-route operations in cloud or at night, or into airfields that require IFR operations. As a result, its utility is currently severely compromised, and it could not meet the needs of island populations for services in all weathers. But as the Motts report points out, this is a CAA regulatory, and not a performance or operational, constraint.
- 5.8.10 Indeed the Directflight report notes three versions of the Caravan that may be of value to the Highlands and Islands Region:
- the (land) Caravan with up to nine seats that could replace the Islander on all its current operations, subject to CAA approval for IFR operations in IMC and to sufficient runway length being available; but also subject to the airlines being able to afford the capital cost compared to the low lease-rates available on the Islander
 - *the amphibious Caravan which is the same aircraft but with floats added for access to water aerodromes, but which is also able to land on airstrips while equipped with floats – it flies more slowly than the land version because of the drag caused by the floats.*
 - the (land) Grand Caravan, at around \$3 m, which is an extended version of the Caravan capable of carrying 13 passengers and additional cargo. Although smaller than the Twin Otter by five seats, it could replace that aircraft at greater speed and possibly with higher frequencies. This was the strategy adopted by Loganair when it replaced the larger ATP on routes from Stornoway and Sumburgh with higher frequency operations by the Saab.

⁸ **Instrument Meteorological Conditions (IMC)** is an aviation flight category that describes weather conditions that require pilots to fly primarily by reference to instruments, and therefore under Instrument Flight Rules (IFR), rather than by outside visual references under Visual Flight Rules (VFR).

It could also open up new routes which are too small for the Twin Otter, and too distant for the Islander.

- 5.8.11 Loch Lomond Seaplanes (LLS) currently operates one amphibious Turbine Caravan, and also one (smaller) amphibious piston engine Cessna Stationair which carries five passengers. The 2010 report stated that the costs of flying one passenger on the Caravan covers the Direct Operating Costs on the sectors flown, although DirectFlight caution that these aircraft are several orders of magnitude more expensive to operate and maintain than land based aircraft. They also caution that the sea states around Shetland would significantly inhibit amphibious operations and that this option really does not survive serious scrutiny.
- 5.8.12 All of these aircraft are in current production, and are equipped with the latest avionics enabling them to access airstrips using GPS approaches, if permitted as in North America, large parts of Europe and for General Aviation at, so far, six airfields in the UK (2010).
- The main problem relates to the current inability of any single-engine turbine aircraft to gain acceptance by the UK CAA for operations at night or in cloud (referred to as SE-IMC), irrespective of the capability of the aircraft. It is almost certainly only a matter of time – most of the world has now accepted the safety of single turbine aircraft in IFR conditions, including the USA, Canada, and much of Europe, including Norway which has significantly poorer weather conditions than Scotland, plus even shorter daylight hours in winter.
 - There may be additional airport costs should these aircraft replace the Islander at airports such as Oban, as their marginal increase in length may be reflected in a higher category of Rescue and Fire Fighting Services (RFFS) requiring larger appliances and additional staff, even though the Caravan has the same seating capacity as the Islander and uses Jet A1 (Kerosene) as opposed to AvGas.
 - The other problem that SIC could face is if they chose to operate the (larger) Grand Caravan into unlicensed airstrips. These locations would need to invest heavily into additional infrastructure and manpower to meet the much stricter requirements that the CAA (following EU regulations) imposes on aircraft carrying ten or more passengers. Initially, these aircraft would be restricted to the ten HIAL airports, plus Scatsta and possibly Oban, which are already equipped for aircraft larger than the Islander.
 - One potential problem anticipated is that passengers might prefer not to use a single-engined aircraft, and the manufacturer stated that no potential passenger had ever refused to board their aircraft. However consumer resistance might be a significant factor.
 - Legislation allowing Single Engine (Turbine) flights over water will be adopted throughout Europe in late 2016. This is a by-product of the Single Engine (Turbine) - IMC change. Single engine Visual Flight Rules (VFR) CAT has always been possible, but operation beyond gliding range of a suitable safe place to land was forbidden.
 - The new legislation allows for a 15 minute risk period per flight where it is accepted that, subject to new equipment and reliability standards, the aircraft may cross open water or transit areas where a forced landing may be problematic. This provision also covers landing in inhospitable terrain – such as much of Shetland. The new provisions expect operators to be flying in or above cloud and to designate for each route, and be able to glide and navigate to, safe landing areas (aerodromes or simple fields of sufficient size without obstacles) in the event of an engine failure.
 - Without developing instrument let-down procedures for each island (which could be possible with GPS, though the resulting minima would not be much less than existing

VFR minima) at great expense, the alternative is to continue with a VFR operation. Some investment in navigation systems is becoming necessary as airports (eg Sumburgh) produce more and more GPS based approaches and gradually phase out land based aids. The current VFR limits allow transit to the islands at 650 ft above mean sea level whereas the new legislation expects an arrival en route over a safe place to land at 1000 ft above that point. Permission would probably be granted to fly a route using the 15 minute risk period under VFR without the provision to otherwise be able to arrive over a safe place at 1000 ft, but the 15 minute maximum exposure may still limit the service to Fair Isle if not the other islands. Taking account of the en route availability of Sumburgh and any suitable fields, plus the cruising speed of the most likely SET contender (Cessna 208) it may be possible to devise a compliant route but discussion with the CAA would be involved. The aircraft, being a single engine turbine, would be able to use unlicensed strips, but would require the Shetland strips to be lengthened and upgraded to account for poorer field performance compare to the BN2. A single engine turbine would still suffer the drawbacks of turbine engine cycles/maintenance costs. The standard Cessna 208 has 9 passenger seats although a UK/EASA certificated 14 seat version exists. A version of the 208 is also available with increased baggage capacity in a belly pannier. A new C208 costs in the region of \$2,500,000, with 10 year old models still reaching around \$2,000,000.

- Disregarding the foregoing, it would still require an in depth risk assessment to embark on operating a single engine aircraft down the spine of Shetland Mainland and across the sea between Sumburgh and Fair Isle. There may be passenger/SIC resistance to overwater flight by a single engine aircraft and this would need to be addressed by education/Safety Case. The legislation would probably demand carriage of a life-raft, but the practicality of its use would need further assessment. The consequence of losing an aircraft to an en route engine failure also introduces a new, untested dimension to the insurance costs.
- In the longer term the Single Engine Turbine may well offer the most likely next generation aircraft transition, if the Islander is eventually judged as obsolete. However the author notes various operators hold very different views on this prospect.

Rotary Solution

- 5.8.13 One recent development SIC should be aware of was the recent decision by the Irish Department of the Arts Heritage and the Gaeltacht to scrap the Islander service to the Aran Islands and replace it with an rotary service run by Executive Helicopters.
- 5.8.14 The details of this development, and subsequent suspension of its enactment, owing to furious local opposition is an intriguing decision. Helicopters are typically much more expensive to operate than fixed wing aircraft, but it is likely that when total cost (including maintaining several airports and all their staff) was factored in the choice becomes more balanced.
- 5.8.15 It should be noted that there is also a rotary PSO to Værøy in the Lofoten islands in Norway, and its most isolated island in the chain. The service flew over 9,000 passengers in 2014.

Key Points: There are no easy replacement aircraft types for the Islander. Each has its pros and cons. SIC has already, quite recently, decided the Islander is its aircraft type for the next generation. A replacement aircraft type will only be seriously evaluated whenever that time for type renewal approaches and in light of the circumstances of the time, unless there is a pressing reason (such as some ferry resourcing choice) to re-open that debate now.

Appendix A Classifications of Airspace and Use of VFR

CAA Classifications of Airspace and use of VFR

		UK ATS AIRSPACE CLASSIFICATIONS					
Civil Aviation Authority		CONTROLLED AIRSPACE				OUTSIDE CONTROLLED AIRSPACE	
		A	C	D	E	F	G
I F R	ATC SEPARATION PROVIDED	IFR ↔ IFR	IFR ↔ IFR IFR ↔ VFR IFR ↔ SVFR ¹	IFR ↔ IFR IFR ↔ SVFR ²	IFR ↔ IFR	ATSOCAS Services PARTICIPATING TRAFFIC: Procedural, Deconfliction	ATSOCAS Services Procedural, Deconfliction Traffic, Basic
	TRAFFIC INFORMATION PROVIDED			IFR ATO VFR <small>for traffic avoidance advice only (ATIS)</small>	IFR ATO IFR <small>(where practicable)</small>	NON-PARTICIPATING TRAFFIC: Traffic, Basic	
	SPEED LIMITATION	Not applicable (unless notified for ATC purposes)	Not applicable (unless notified for ATC purposes)	below FL100 250 KIAS	below FL100 250 KIAS	below FL100 250 KIAS	below FL100 250 KIAS
	RADIO					Not required	Not required
	ATC CLEARANCE REQUIRED?	YES	YES	YES	YES	NO	NO
V F R	ATC SEPARATION PROVIDED		VFR ↔ IFR SVFR ↔ IFR	SVFR ↔ IFR SVFR ↔ SVFR	Not provided	ATSOCAS Services PARTICIPATING TRAFFIC: Procedural, Deconfliction Traffic, Basic	ATSOCAS Services Procedural, Deconfliction Traffic, Basic
	TRAFFIC INFORMATION PROVIDED		VFR ATO VFR	VFR ATO IFR VFR ATO VFR	IFR ATO IFR <small>(where practicable)</small>		
	VMC MINIMA						
	SPEED LIMITATION	VFR FLIGHT NOT PERMITTED SVFR AVAILABLE IN CTRs	below FL100 250 KIAS	below FL100 250 KIAS	below FL100 250 KIAS	below FL100 250 KIAS	below FL100 250 KIAS
	RADIO				Not required	Not required	Not required
ATC CLEARANCE REQUIRED?		YES	YES	NO	NO	NO	

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250 KIAS Not applicable to military aircraft

¹ Helicopters may fly at or below 2000FT AMSL clear of cloud with the surface in sight and a flight visibility of at least 1500 metres.
² SVFR in CTR only.
NOTE: Air Navigation Order 2005 Schedule 5 UK PPL and NPFL license privileges apply.

Aircraft (except helicopters) at 140KIAS or less: clear of cloud with the surface in sight in a flight visibility of at least 1500 metres. Helicopters at a speed which, having regard to the visibility is reasonable: clear of cloud with the surface in sight in a flight visibility of at least 1500 metres.

Appendix B PSO Regulations

PSO Regulation (EC) No 1008 - 2008 Article 16, 17 and 18

Article 16

General principles for public service obligations

1. A Member State, following consultations with the other Member States concerned and after having informed the Commission, the airports concerned and air carriers operating on the route, may impose a public service obligation in respect of scheduled air services between an airport in the Community and an airport serving a peripheral or development region in its territory or on a thin route to any airport on its territory any such route being considered vital for the economic and social development of the region which the airport serves. That obligation shall be imposed only to the extent necessary to ensure on that route the minimum provision of scheduled air services satisfying fixed standards of continuity, regularity, pricing or minimum capacity, which air carriers would not assume if they were solely considering their commercial interest. The fixed standards imposed on the route subject to that public service obligation shall be set in a transparent and non-discriminatory way.
2. In instances where other modes of transport cannot ensure an uninterrupted service with at least two daily frequencies, the Member States concerned may include in the public service obligation the requirement that any Community air carrier intending to operate the route gives a guarantee that it will operate the route for a certain period, to be specified, in accordance with the other terms of the public service obligation.
3. The necessity and the adequacy of an envisaged public service obligation shall be assessed by the Member State(s) having regard to:
 - a) the proportionality between the envisaged obligation and the economic development needs of the region concerned;
 - b) the possibility of having recourse to other modes of transport and the ability of such modes to meet the transport needs under consideration, in particular when existing rail services serve the envisaged route with a travel time of less than three hours and with sufficient frequencies, connections and suitable timings;
 - c) the air fares and conditions which can be quoted to users;
 - d) the combined effect of all air carriers operating or intending to operate on the route.
4. When a Member State wishes to impose a public service obligation, it shall communicate the text of the envisaged imposition of the public service obligation to the Commission, to the other Member States concerned, to the airports concerned and to the air carriers operating the route in question. The Commission shall publish an information notice in the Official Journal of the European Union:
 - a) identifying the two airports connected by the route concerned and possible intermediate stop-over point(s);
 - b) mentioning the date of entry into force of the public service obligation; and
 - c) indicating the complete address where the text and any relevant information and/or documentation related to the public service obligation shall be made available without delay and free of charge by the Member State concerned.
5. Notwithstanding the provisions of paragraph 4, with respect to routes where the number of passengers expected to use the air service is less than 10 000 per annum, the information notice on a public service obligation shall be published either in the Official Journal of the European Union or in the national official journal of the Member State concerned.
6. The date of entry into force of a public service obligation shall not be earlier than the date of publication of the information notice referred to in the second subparagraph of paragraph 4.
7. When a public service obligation has been imposed in accordance with paragraphs 1 and 2 the Community air carrier shall be able to offer seat-only sales provided that the air service in question meets all the requirements of the public service obligation. Consequently that air service shall be considered as a scheduled air service.
8. When a public service obligation has been imposed in accordance with paragraphs 1 and 2, any other Community air carrier shall at any time be allowed to commence scheduled air services meeting all the requirements of the public service obligation, including the period of operation that may be required in accordance with paragraph 2.

9. Notwithstanding paragraph 8, if no Community air carrier has commenced or can demonstrate that it is about to commence sustainable scheduled air services on a route in accordance with the public service obligation which has been imposed on that route, the Member State concerned may limit access to the scheduled air services on that route to only one Community air carrier for a period of up to four years, after which the situation shall be reviewed. This period may be up to five years if the public service obligation is imposed on a route to an airport serving an outermost region, referred to in Article 299(2) of the Treaty.
10. The right to operate the services referred to in paragraph 9 shall be offered by public tender in accordance with Article 17, either singly or, in cases where justified for reasons of operational efficiency, for a group of such routes to any Community air carrier entitled to operate such air services. For reasons of administrative efficiency, a Member State may issue a single invitation to tender covering different routes.
11. A public service obligation shall be deemed to have expired if no scheduled air service has been operated during a period of 12 months on the route subject to such obligation.
12. In case of sudden interruption of service by the Community air carrier selected in accordance with Article 17, the Member State concerned may, in case of emergency, select by mutual agreement a different Community air carrier to operate the public service obligation for a period up to seven months, not renewable, under the following conditions:
 - a) any compensation paid by the Member State shall be made in compliance with Article 17(8);
 - b) the selection shall be made among Community air carriers in compliance with the principles of transparency and non discrimination;
 - c) a new call for tender shall be launched.

The Commission and the Member State(s) concerned shall be informed without delay of the emergency procedure and of its reasons. At the request of a Member State, or on its own initiative, the Commission may, in accordance with the procedure referred to in Article 25(2) suspend the procedure if it considers after its assessment that it does not meet the requirements of this paragraph or is otherwise contrary to Community law.

Article 17

Public tender procedure for public service obligation

1. The public tender required in Article 16(10) shall be conducted according to the procedure set out in paragraphs 2 to 10 of this Article.
2. The Member State concerned shall communicate the entire text of the invitation to tender to the Commission except where, in accordance with Article 16(5), it has made the public service obligation known through the publication of a notice in its national official journal. In such case the tender shall also be published in the national official journal.
3. The invitation to tender and the subsequent contract shall cover, inter alia, the following points:
 - a) the standards required by the public service obligation;
 - b) rules concerning amendment and termination of the contract, in particular to take account of unforeseeable changes;
 - c) the period of validity of the contract;
 - d) penalties in the event of failure to comply with the contract;
 - e) objective and transparent parameters on the basis of which compensation, if any, for the discharging of the public service obligations shall be calculated.
4. The Commission shall make the invitation to tender known through an information notice published in the Official Journal of the European Union. The deadline for submission of tenders shall not be earlier than two months after the day of publication of such an information notice. In case the tender concerns a route to which the access had already been limited to one carrier in accordance with Article 16(9), the invitation to tender will be published at least six months before the start of the new concession in order to assess the continued necessity of the restricted access.
5. The information notice shall provide the following information:
 - a) Member State(s) concerned;
 - b) air route concerned;
 - c) period of validity of the contract;
 - d) complete address where the text of the invitation to tender and any relevant information and/or documentation related to the public tender and the public service obligation shall be made available by the Member State concerned;
 - e) deadline for submission of tenders.
6. The Member State(s) concerned shall communicate without delay and free of charge any relevant information and documents requested by a party interested in the public tender.
7. The selection among the submissions shall be made as soon as possible taking into consideration the adequacy of the service, including the prices and conditions which can be quoted to users, and the cost of the compensation required from the Member State(s) concerned, if any.

8. The Member State concerned may compensate an air carrier, which has been selected under paragraph 7, for adhering to the standards required by a public service obligation imposed under Article 16. Such compensation may not exceed the amount required to cover the net costs incurred in discharging each public service obligation, taking account of revenue relating thereto kept by the air carrier and a reasonable profit.
9. The Commission shall be informed in writing and without delay of the results of the public
 - a) tender and of the selection by the Member State including the following information: numbers, names and corporate information of tenderers;
 - b) operational elements contained in the offers;
 - c) compensation requested in the offers;
 - d) name of the selected tenderer.
10. At a request of a Member State or on its own initiative, the Commission may request Member States to communicate, within one month, all relevant documents relating to the selection of an air carrier for the operation of a public service obligation. In case the requested documents are not communicated within the deadline, the Commission may decide to suspend the invitation to tender in accordance with the procedure referred to in Article 25(2).

Article 18

Examination of public service obligations

1. Member States shall take all necessary measures to ensure that any decision taken under Articles 16 and 17 can be reviewed effectively and, in particular, as soon as possible on the grounds that such decisions have infringed Community law or national rules implementing Community law.

In particular, at a request of a Member State or on its own initiative, the Commission may request Member States to communicate, within two months:

- a) a document justifying the need for the public service obligation and its compliance with the criteria mentioned in Article 16;
 - b) an analysis of the economy of the region;
 - c) an analysis of the proportionality between the envisaged obligations and the economic development objectives;
 - d) an analysis of the existing air services, if any, and of the other modes of transport available which could be considered a substitute for the envisaged imposition.
2. At the request of a Member State which considers that the development of a route is being unduly restricted by the terms of Articles 16 and 17, or on its own initiative, the Commission shall carry out an investigation and, within six months of receipt of the request and in accordance with the procedure referred to in Article 25(2), shall take a decision on the basis of all relevant factors on whether Articles 16 and 17 shall continue to apply in respect of the route concerned.