CONTRACT

FOR THE PROCUREMENT OF DATA LINK SERVICES

BETWEEN

STATE ENTERPRISE “ORO NAVIGACIJA”

AND

SITA ONAIR SWITZERLAND SARL

State Enterprise "Oro Navigacija" (hereinafter referred to as "Oro navigacija" or the "Customer"), represented by Director General Mindaugas Gustys, acting in compliance with the Articles of Association of the Enterprise,

and

SITA ONAIR SWITZERLAND SARL (hereinafter referred to as the "Supplier"), represented by CEO David Lavorel, acting in compliance with the Articles of Association,

(hereinafter each of the referred to as the "Party" or jointly as the "Parties"), have entered into the contract (hereinafter referred to as the "Contract") as follows:

I. GENERAL PROVISIONS

1. Acting in compliance with the Decision of the Public Procurement Commission, State Enterprise "Oro navigacija" (hereinafter referred to as the "Customer") concluded this Contract with the Supplier, whose Tender was recognised as the successful one based on the results of Procurement of Data Link Services by Way of negotiated procedure without publication of a contract notice (hereinafter referred to as the "Procurement").

2. The Supplier's Tender (Annex 3 to the Contract) and the Procurement Conditions (Annex 4 to the Contract) shall be integral parts of this Contract.

II. SUBJECT MATTER OF THE CONTRACT

3. The Supplier shall deliver to the Costumer 3 (three) Routers (hereinafter referred to as the "Routers"), including the installation of 2 (two) Routers, and provide Data Link Services (hereinafter referred to as the "Services") specified in the Technical Specification (Annex 1 to the Contract), and the Customer hereby undertakes to accept the provided Routers and Services, and to pay for them under the procedure and within the terms established in the Contract.

III. PRICE OF THE CONTRACT

4. The Contract price (excluding VAT): EUR 849 242,00 (eight hundred forty nine thousand two hundred forty two euros).

5. Fixed rate pricing shall be applied to the Contract. The prices of the Routers (including the software) and the rates of prices of the Services specified in Annex 2 shall remain unchanged for the entire period of validity of the Contract. All the expenses of the Supplier related to the delivery and installation of the Routers and Service provision (including transportation, packaging, flight tests, training and etc.) shall be included into the Contract price.

6. The structure of the Contract price has been specified in Annex 2 to the Contract. The Customer shall pay the Supplier for the actually delivered Routers and provided Services based on the price rates specified in Annex 2 to the Contract.

7. If the VAT rate changes, the amounts that must be paid to the Supplier under the Contract and to which VAT is applied shall also change accordingly. The changed VAT shall only influence payments provided for Routers and Services for which an invoice was not issued.

IV. TERMS OF DELIVERY AND SERVICE PROVISION

8. The Supplier shall provide the Customer with the schedule of installation of 2 (two) Routers not later that within 7 (seven) days after concluding the Contract. The Routers (2) shall be installed (including training of staff and flight tests) not later than within 6 month after concluding the Contract.

9. The Services shall be provided during the entire validity period of the Contract. The commencement date of Service provision: not earlier than 1st January 2019, and not later than 1st September 2019. The Customer undertakes to give a written notice of the exact date to the Supplier at least 3 (three) month in advance of commencement of Service provision.

V. PAYMENT CONDITIONS

10. The Customer shall pay the Supplier according to the following procedure:

10.1. for the Routers and the installation thereof:

10.1.1. the first instalment (100 per cent of the cost of three Routers and 50 per cent of the cost of the service of installation of two Routers) shall be paid after signing the Contract not later than within 30 days from the date of receipt of the Supplier's invoice. The Supplier shall submit the invoice not later than within 7 days from signing the Contract.

10.1.2. the second instalment (50 per cent of the cost of the service of installation of two Routers) shall be paid after the Supplier has installed two Routers not later than within 30 days from the date of receipt of the Supplier's invoice.

10.2. for the Services provided – not later than within 30 days from the date of receipt of the invoice which shall be submitted by the Supplier within 5 working days from the end of the last Service provision month.

11. The invoices shall be submitted via the Information System "E-Invoice" [Lithuanian: *E. sąskaita*]. The website for the Electronic Service "E-Invoice" is available at www.esaskaita.eu.

12. Payments shall be made in Euro by transfer to the account specified by the Supplier. The Supplier's bank account details are specified in Section XIV of the Contract.

13. Each Contracting Party shall pay bank charges applicable in the country thereof.

VI. OBLIGATIONS OF THE PARTIES

14. The Parties undertake to cooperate within the course of implementation of the Contract. Should any obstacles arise impeding proper implementation of the Contract, each Party shall take all means at one's disposal in order to eliminate such obstacles.

15. The Supplier shall undertake:

15.1. to promptly inform the Customer in writing about any circumstances impeding or potentially impeding provision of the Services by the established deadlines;

15.2. to ensure confidentiality and protection of information received from the Customer within the course of implementation of the Contract and associated with implementation of the Contract.

16. The Customer shall undertake:

16.1. to establish conditions needed for the Supplier for implementation of the Contract, to provide the required information and/ or documents to the Supplier;

16.2. to pay the Supplier for properly and in due time provided Services based on the prices specified in the Contract.

VII. *FORCE MAJEURE* CIRCUMSTANCES

17. None of the Parties shall be liable for partial or complete failure to implement the assumed obligations, if this failure to implement them resulted from *force majeure* circumstances as established by legislations of the Republic of Lithuania.

18. The Party unable to implement the obligations assumed under this Contract due to *force majeure* circumstances shall notify this to the other Party in writing within 10 (ten) days.

19. Overdue notification given to the other Party or failure to provide information shall deprive the Party from relying on *force majeure* circumstances as the grounds for exemption from liability for overdue implementation of the assumed obligations or failure to implement them and compensation of losses.

20. In the event of *force majeure* circumstances, implementation of obligations assumed by both Parties shall be postponed for a period established by the Parties without giving the Parties a right to terminate or to cancel this Contract.

21. None of the Parties shall be entitled to receive any compensations for losses resulting from full or partial failure to implement the Contract or termination thereof due to *force majeure* circumstances.

VIII. SECURITY FOR THE PERFORMANCE OF THE CONTRACT (LIABILITY OF THE PARTIES)

22. If the Supplier fails to fulfil his obligations on time, the Customer shall have the right to require an interest of 0.05 percent of the Contract price for each day of delay.

23. If the Customer fails to provide payment on time, the Supplier shall have the right to require an interest of 0.05 percent of the delayed amount for each day of delay.

24. Penalties provided in the Contract shall be recognized as predetermined minimal losses arising from the fact that the other party violated an appropriate contract condition, and whose size the injured party is not required to prove. Payment of penalties does not prohibit the injured party to demand compensation for losses which are not covered by the penalties.

25. With regard to the losses caused by the Supplier, the Customer is entitled to reduce the amounts payable in accordance with the Contract, by the amount of default interest and (or) penalties (hereinafter – Penalties) calculated in favour of the Customer, by unilaterally netting mutual obligations, i.e. by including the amount of Penalties payable by the Supplier to the Customer into the remuneration payable by the Customer to the Supplier for the services rendered. The amounts payable to the Supplier in accordance with the Contract shall be also reduced by the amounts paid to third parties by the Customer for eliminating the deficiencies of the Supplier's inadequate or delayed service.

IX. TERMINATION OF THE CONTRACT

26. The Contract may be terminated under a mutual written agreement between the Parties.

27. The Customer shall have the right to unilaterally terminate the Contract by informing the Supplier in writing 90 calendar days in advance, if:

27.1. the Supplier fails to carry out the order of the Customer to properly carry out his contractual obligations within a reasonable time period;

27.2. the Supplier is undergoing a bankruptcy, restructuring or liquidation procedure, or suspends his economic activities;

27.3. due to other reasons indicated in the Contract and the legislation.

28. The Supplier shall have the right to unilaterally terminate the Contract by informing the Customer in writing at least 90 calendar days in advance, if the Customer fails to provide payment for over 30 (thirty) calendar days.

X. APPLICABLE LAWS, DISPUTE SETTLEMENT PROCEDURE

29. This Contract shall be subject to the laws of the Republic of Lithuania.

30. All disputes of the Parties, which could arise within the course of implementation of this Contract or could be associated with implementation thereof, shall be resolved by way of negotiations of the Supplier and the Customer.

31. In the event of the Parties' failure to resolve a dispute arising out of implementation of this Contract by way of negotiations within 30 (thirty) days, such a dispute shall be handled by a court of law under the procedure established by the laws of the Republic of Lithuania based on the location of the registered office of the Customer.

XI. AMENDMENTS AND VALIDITY OF THE CONTRACT

32. The Contract shall be valid for 60 (sixty) months since the signing date thereof.

33. The provisions of the Contract may be amended only under the procedure established by the Law on Procurement by Entities Operating in the Water, Energy, Transport, and Postal Services Sectors of the Republic of Lithuania. Any amendments and (or) supplements to the Contract shall be deemed as valid, provided that they have been made in writing and signed by the authorized representatives of the Parties.

34. All annexes, amendments, and supplements to the Contract shall be integral parts of the Contract.

35. The Parties shall be obliged to notify each other about any changes in their legal addresses, telephone numbers or other information within 5 (five) days.

36. The Contract is concluded in two equally binding copies, each in Lithuanian and English languages, a copy to each party. In case of any inconsistency between languages, the parties shall follow the text in Lithuanian.

XII. OTHER PROVISIONS

37. The Customer is entitled, without any express written consent by the other party, to transfer the rights and obligations of the Customer provided for by this Contract to another state enterprise, joint-stock company or any other legal entity, which in case of reorganisation and/or changeover of the Customer in conformity with the procedure established by law would take over the rights and obligations of the Customer. The Customer has undertaken to give the other party to

this Contract a notice of transfer of rights and obligations to another legal entity within 5 (five) working days from the date of transfer of rights and obligations.

38. Persons authorized to maintain communications within the course of implementation of the Contract, their job titles, telephones, faxes, e-mail addresses:
for the Customer:

for the Supplier:

XIII. ANNEXES TO THE CONTRACT

39. Annexes to the Contract shall be as follows:
39.1. Annex 1. Technical Specification;
39.2. Annex 2. Price rates;
39.3. Annex 3. The Supplier's Tender;
39.4. Annex 4. Procurement Conditions.

XIV. LEGAL ADDRESSES AND BANK ACCOUNTS OF THE PARTIES

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VAT Number CH-112.159.240
Bank account N°937856-72-1
SWIFT: CRESCHZZ80A
IBAN: CH51 0483 5093 7856 7200

XV. SIGNATURES OF THE PARTIES

On behalf of
SE Oro navigacija"

(signature)

Mindaugas Gustys
Director General

Vilnius, 5th February 2018

On behalf of
SITA O

CEO

www.sitaonair.aero http://www.sitaonair.aero

Geneva, 14th February 2018

Annex 1
to the Contract

TECHNICAL SPECIFICATIONS OF AIR-GROUND DATA LINK SERVICES

1. Introduction

1.1. Scope

1.1.1. The State Enterprise Oro navigacija (ON), an ANSP of Lithuania, intends to implement Air-Ground Data Link Services in accordance with Commission Regulation (EC) No 29/2009 [1] and Commission Implementing Regulation (EU) 2015/310 [16].

1.1.2. The specification for the provision of VDL Mode 2 Service supporting ATC Data Link Services, in the context of the Eurocontrol LINK 2000+ Programme, is covered by Generic Requirements for a LINK 2000+ Air/Ground Communications Service Provider [2]. This document provides the requirements specification for the provision of ATN CPDLC services to airlines and aircraft that use the data link ATC services in the airspace managed by ANSP.

1.1.3. The requirements submitted in this document represent particular needs of the ON in Air Ground Data Link Services implementation and provision.

1.1.4. The document aims to specify the requirements to be satisfied by each CSP, and makes reference to the following ON Specific Requirements:

- Service Volume – throughout which the CSP is required to provide the service.
- Capacity – stating the minimum number of uplink and downlink ATC application messages per hour that the CSP is required to support.

1.2. Conventions

1.2.1. Throughout this document the following words shall have the meanings prescribed:

- shall – indicates that the requirement is mandatory
- will – indicates a statement of intention
- should – indicates a preference
- may – indicates the choice of the supplier

2. ATN/VDL2 Communications Service

2.1. Preamble

2.1.1. The LINK 2000+ Programme has established a number of principles governing the provision of ATN/VDL2 service to ANSPs and equipped aircraft. These principles now apply to the European deployment of ATC Data Link.

2.1.2. In accordance with these principles an ON will select a Primary CSP to provide ATN/VDL2 service to equipped aircraft in the airspace under the jurisdiction of the ON. The ON will connect directly to the Primary CSP. Any equipped aircraft may choose to use the ATN/VDL2 service available from the Primary CSP to support ATC Data Link Services offered by the ON.

2.1.3. The Primary CSP shall offer ON the ATN G/G Routers for ATC system connection to the ATN Network (PENS or other). An offer shall comprise of three ATN G/G Routers. Two of them shall provide redundant network connection and the third shall be spare. Minimal requirements for the ATN G/G Router provision specified in Appendix C.

2.1.4. The Primary CSP shall provide an integration of these ATN G/G Routers with DL-FEPs of ATC system of the ON and ATN network.

2.1.5. However, some operators may choose to use the ATN/VDL2 service offered by an Alternative CSP (e.g. in order to maintain AOC communication with their existing provider) without a direct connection to the ON. Such Alternative CSPs, will interconnect either directly or indirectly with the Primary CSP to provide an ATN communication path to the ON.

2.1.6. The ATN/VDL2 service provided by an Alternative CSP shall also cover the airspace under jurisdiction of ON, but an ON shall be connected through the Primary CSP. Provision of the ATN/VDL2 service by an Alternative CSP should be under separate agreement with the ON.

2.1.7. This specification identifies the minimum ATN/VDL2 service requirements that a CSP must comply with, in order to offer connectivity to support ATC Data Link Services to any equipped aircraft.

2.1.8. Following Regional Requirements within the Baltic FAB the ON intends to implement AGDLS based on VDL2 Model B (MF) in the ON specified Service Volume.

2.2. Provision of the Service

2.2.1. The CSP shall offer connectivity to support ATC Data Link Services from an ON only when written authorization has been issued by the ON.

2.2.2. Such authorization will not be given until the CSP has demonstrated compliance with this specification by successful completion of the Validation Procedures specified in Section 6 of this document as well as compliance with any additional requirements specified by the ON.

2.2.3. The CSP shall provide a written undertaking to the ON to maintain compliance with the requirements of this document during operational service and such an undertaking will form part of the contract with the ON.

2.2.4. Authorization to offer connectivity to support ATC Data Link services to equipped aircraft may be withdrawn from a CSP in the event that non-compliance during operational service on the part of a CSP with any requirement specified by this document has not been corrected by the procedure described in Section 5.

2.2.5. The Primary CSP shall offer connectivity to support ATC Data Link Services to any equipped aircraft (including non-AOC aircraft) operating under the jurisdiction of the ON.

2.3. Service Volume

2.3.1. A CSP shall provide ATC Data Link Service within the ON specified Service Volume, which is defined by flight level limits and geographical points.

2.3.2. The sufficient VDL2 coverage shall be provided in Vilnius FIR from FL-285 and above with geographical coordinates of Vilnius FIR:

562043N 0183023E – 560400N 0204000E -560409N 0210352E, then along the common Latvian/Lithuanian state boundary to 554050N 0263750E, then along the common Belarus/Lithuanian state boundary to 535723N 0233054E, then along the common Polish/Lithuanian state boundary to 542148N 0224731E, then along the common Russian/Lithuanian state boundary to 551700N 0205700E – 560543N 0180107E – 562043N 0183023E

Figure 1. Vilnius FIR Boundaries

2.3.3. Vilnius ACC is responsible for ATC service provision within ON specified Service Volume.

2.3.4. The line of sight limitations of VHF propagation is an important factor in the siting of ground station(s). It is necessary to ensure that the ground station(s) is(are) installed in a manner which provides coverage throughout the DOC area.

2.3.5. En-route coverage can be provided using a small number of ground stations with a large DOC (for example, the range of a VHF signal from a station at sea level and an aircraft at 37 000 ft is approximately 200 NM). Hence, it is in fact desirable that the smallest number of ground stations possible be used to provide en-route coverage in order to minimize the possibility of simultaneous uplink transmissions from ground stations which may cause message collisions on the VHF channel.

3. Functional Requirements

3.1. General

3.1.1. The CSPs shall comply with all applicable requirements specified by the EUROCONTROL Specification on Data Link Services [4] that defines detailed requirements, explanatory materials and conformity assessment material providing means of compliance associated with the Single European Sky Implementing Rule on Data Link Services.

3.1.2. The EUROCONTROL Specification includes requirements for compliance with ICAO Annex 10 and Supplement 5 of ARINC 631 [5].

3.2. Service Boundaries

3.2.1. Figure 2 illustrates the scope of the service and the service boundaries for ATN Data Link services.

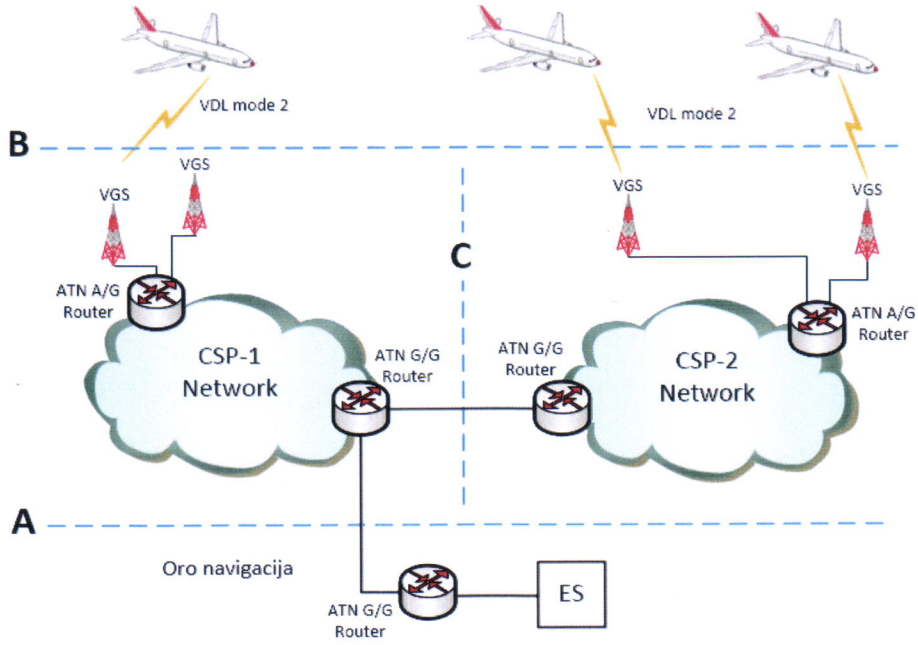

Figure 2. Service Boundaries and Interfaces

3.2.2. The CSPs shall provide the service to participating airlines (Reference Point 'B' in Figure 2) as specified below in section 3.4.

3.2.3. Service shall be an ICAO ATN compliant communications service permitting communication between ON and suitably equipped aircraft using VDL2 as the air/ground communications service.

3.2.4. The CSPs shall be responsible for configuring and maintaining its systems in order to ensure that the required communications service is provided in accordance with the Service Level requirements given in section 4.

3.3. Reference Point 'A' Connection to ON

3.3.1. The following requirements will ensure interoperability at Reference Point 'A' between the ATN Ground/Ground routers of the CSP and the ON. It places interoperability requirements on the interface to the CSP network's Ground/Ground Routers. This will ensure that application level hand-over (relying on the ACM service) with neighbouring ANSPs can be performed. Indeed, an aircraft flying between the airspace boundaries of two ANSPs shall be able to exchange at the same time application level messages with both its Current Data Authority and with its Next Data Authority.

3.3.2. The CSP shall advertise IDRP Routes via Interface 'A' to enable end-to-end communication between the ON and aircraft reachable via the Primary CSP, and those reachable via interconnected Alternative CSP. In the event that the ON is directly connected to more than one Primary CSP, all IDRP Routes advertised to the ON shall include sufficient information to enable the ON to determine the optimum route to an aircraft (with the possible exception of aircraft without a preferred CSP), in accordance with the ON's requirements.

3.3.3. The service offered by the CSP ATN Routers shall be compliant with ICAO Doc 9880 (ATN-OSI Manual) [6] for a Class 4 Router and the Eurocontrol Specification on Data Link Services [4].

3.3.4. The CLNP communication paths shall be compliant with the Eurocontrol Specification on Data Link Services [4].

3.3.5. The interface shall be the IP SNDCF. This shall be compliant with the draft SARPs for the IP SNDCF [SNDCF-IP].

3.3.6. The CSP shall provide a completed Protocol Implementation Compliance Statement (PICS) for the ATN service provided by their ATN Routers and CLNP communications path, including the IP SNDCF interface and IDRP compliance.

3.4. Reference Point 'B' Service Provision to Equipped Aircraft

3.4.1. Any CSP providing ATN/VDL2 services to participating aircraft under the jurisdiction of ON shall provide an interface at Reference Point 'B' in accordance with the following requirements.

3.4.2. The VDL2 Service provided shall be compliant with ARINC Specification 631 "VHF Digital Link Implementation Provisions" [5]. The CSP shall support all functionality specified by ARINC 631 [5] PICS as Mandatory for a Ground provider, and shall not implement functionality prohibited by these PICS.

3.4.3. The CSP shall support VDL2 operation on the number of frequencies necessary to ensure that the Service Level Requirements specified by Section 4 are maintained.

3.4.4. The CSP shall implement the Autotune procedure specified in ARINC 631 [5] to maintain the Service Level Requirements of Section 4 for communication with airborne aircraft, whenever this cannot be achieved on a single frequency. When so required, the CSP shall be capable of sending an Autotune command in an uplinked Ground Requested Air Initiated Handoff command, as well as in the uplink response to both a Link Establishment request and Air Initiated Handoff request.

3.4.5. When MF operation is in use, the CSP shall take all practicable measures to avoid degradation of VDL2 performance and/or capacity arising from co-site effects between VDL Ground Stations operating on different frequencies.

3.4.6. When multi-frequency operation is in use, the CSP shall implement a frequency management strategy to ensure that continuous VDL connectivity is maintained when an aircraft leaves the coverage of its current frequency while remaining in the CSP's CSC coverage.

3.4.7. The VDL2 Service shall provide access to an ICAO ATN compliant communications service provided by the CSP in accordance with the requirements of the EUROCONTROL Specification [4].

3.4.8. The service offered by the CSP's ATN Ground/Ground Router shall be compliant with ICAO ATN standards for a Class 4 Router in accordance with the requirements of the EUROCONTROL Specification [4].

3.4.9. The CSP's ATN Ground/Ground Router should implement the agreed resolution of PDR M2110003 ("IDRP Connection Recovery Problem").

3.4.10. The CSP shall propagate IDRP routes to aircraft over the air-ground link using the generic prefixes 'All AINSC' fixed (47002701) and 'All ATSC' fixed (47002781), with route aggregation applied in both cases.

3.4.11. It is recommended that routes using the generic prefixes 'All AINSC' and 'All ATSC' should be statically configured in the CSP's Air/Ground router(s), to avoid the reduction process and ensure that only one advertisement of the routes occurs after IDRP connectivity has been established between air and ground.

3.4.12. The CSP's Air/Ground router(s) shall never propagate to an aircraft (AINSC or ATSC mobile) any route prefixes received from an aircraft in IDRP UPDATE PDUs.

3.4.13. The CSP's Air/Ground router(s) shall never propagate to a ground adjacency (AINSC or ATSC fixed) any route prefixes received from an aircraft in IDRP UPDATE PDUs, except for those carrying the aircraft's own RDI route prefix.

3.4.14. The CSP's VDL2 Service and ATN Air/Ground Router shall provide a communications path between participating aircraft and ON ATN Ground/Ground Router. The CSP's ATN Air/Ground Router(s) shall advertise to each aircraft, using IDRP, a route capable of reaching ON Routing Domain.

3.4.15. If the CSP operates more than one A/G Router, then following a VDL handoff between VGSs connected to different A/G Routers, the CSP shall take measures to minimise the time during which an obsolete air-ground IDRP route is maintained via an A/G Router through which an aircraft is no longer reachable.

3.5. Reference Point 'C' CSP Inter-Connection

3.5.1. The service interface at Reference Point 'C' will be subject to commercial and technical agreement between the two CSPs.

3.5.2. The CSPs shall implement a technical means to allow other CSP to interconnect with it, so as to provide a communications path to ON. CSP shall make every effort to facilitate the establishment of interconnections to other CSP with which the ON has established agreement. CSP shall not take any action which may obstruct the interconnection of other CSP.

3.5.3. Interconnected CSPs shall establish Service Level Agreements and Operating Procedures between them to ensure that overall service level requirements of section 4 are satisfied when the end-to-end path traverses the network of both CSPs.

3.5.4. The CSPs providing an interconnection at Reference Point 'C' shall design and maintain their system so as to route communication traffic bi-directionally via that interface without imposition of any deficit in performance or quality of service compared to communication traffic to/from its own network, except when such a deficit arises from external factors outside the CSP's control.

4. Service Level Requirements

The level of service provided shall conform to the applicable parts of the EUROCONTROL Specification [4], and to the specific requirements listed below.

4.1. Capacity

4.1.1. The service provided shall be capable of maintaining the service level requirements while carrying the minimum number of uplink and downlink application level messages (incl. LACK) specified by the ON per aircraft per unit of time in support of the ATC Data Link Service.

4.1.2. The requirement for uplink and downlink application messages per flight hour should enable a CPDLC message load of 60 messages per minute at peak times of Vilnius ACC.

4.1.3. The CSP shall be capable of supporting up to 80 flights simultaneously logged-on within the Service Volume.

4.1.4. The above figures are based on the ON traffic forecasts for the year 2020.

4.1.5. CSP is required to make ATC Data Link Services accessible to aircraft which are not customers of the CSP's AOC service.

4.2. Performance

4.2.1. The transit delay shall meet, or be better than, the transit delay specified in Table 1 measured between Reference Point 'A' and an aircraft using the service, taking into account any delay introduced by the ground network of any CSPs providing an interconnection.

	95% of all messages	**99 % of all messages**
Ground to air transit delay	4 seconds	8 seconds
Air to ground transit delay	4 seconds	8 seconds

Table 1. Transit Delay Requirements

4.2.2. The transit delay requirements of Table 1 shall be satisfied throughout the Service Volume specified by section 2.3.

4.3. Availability, Reliability and Continuity of Service

4.3.1. The Availability, Reliability and Continuity of Service shall be as specified in the following Tables for the end-to-end communications path segment between reference points 'B' and 'A'.

4.3.2. The CSPs shall ensure that the applicable requirements are met at all times during which ON provides an operational ATC Service.

	Requirement	**Interpretation**
Availability	99.99%	The proportion of the scheduled hours of operation during which the data link service shall be available, over the entire area in which service is provided and at adequate power levels required for normal operations.
Reliability	99.99%	The probability that the system will successfully deliver a message within 40 seconds.
Continuity of Service	6 min max. outage	The maximum permitted time between service failure and the restoration of the service.

Table 2. Availability, Reliability and Continuity of Service Requirements

4.4. Integrity

4.4.1. The CSPs shall satisfy the Integrity requirements specified by Table 3 below.

	Requirement	**Interpretation**

Integrity	10^{-5}	The undetected bit error rate for the service shall be better than 1 in 10^5 for network level packets transferred between reference points 'B' and 'A'.

Table 3. Data Integrity Requirements

4.5. Priority

4.5.1. The CSPs's ATN Routers shall enforce CLNP packet priority.

4.5.2. Higher priority packets shall be forwarded before lower priority packets in the same outgoing queue.

4.5.3. If an ATN Router discards packets due to congestion then lower priority packets shall be discarded before the higher priority packets.

4.6. Safety and Security

4.6.1. The CSPs shall ensure that only minimized users have access to their part of the Aeronautical Telecommunication Network.

4.6.2. In consultation with ON, the CSP shall establish procedures and rules for users that want to use the ATN/VDL Mode-2 network for test purposes, which have potential to impact on the operational service provided by ON.

4.6.3. The CSPs shall ensure that test users do not interfere with the operational users of the network.

4.7. Maintenance

4.7.1. The CSPs shall monitor and maintain the communications service and the systems used to provide the service in order to ensure that the specified service levels are achieved.

4.7.2. The CSPs shall undertake to correct in a timely fashion any significant non-compliance with applicable Standards (including any subsidiary normative standard) discovered during provision of the Service.

5. Performance Monitoring and Network Management

5.1. Technical Support

5.1.1. The CSPs shall monitor all system functions within the scope of the service level requirements.

5.1.2. The CSPs shall identify to ON all recording and data logging mechanisms currently supported by their ATN/VDL2 network.

5.1.3. In addition, the CSP shall nominate a Manager who is personally accountable for the delivery and maintenance of the specified Services in accordance with the requirements of this document.

5.1.4. The CSP shall develop and agree with ON prior to commencing the service a manual of fault reporting procedures and escalation procedures to define, communicate and remedy faults and deficiencies.

5.1.5. The CSP shall install data recording and logging functions at critical points of observation in the network to support fault and performance analysis. Logging of network activity shall be performed against UTC time to facilitate correlation with other sources of information. The CSP shall agree with ON which points of observation will be subject to logging, but as a minimum, it is expected that they will include the VGS, the A/G Router, and where implemented, Reference Point 'C'.

5.1.6. The CSP shall provide upon user request (i.e. ON and Airline customer) all necessary technical assistance within one week, including (but not limited to) provision of logs of ATN, VDL and ACARS traffic against UTC time, to facilitate technical investigations into performance of the Service.

5.2. Problem Reporting

5.2.1. The CSPs shall develop and agree with ON on the problem reporting procedure to notify the users (i.e. ON and Airline customer) of detected problems, including any degradation in the service, impact on the service and progress regarding problem resolution. The CSP shall respond to reasonable requests from ON to minimize the operational impact of any problem or degradation.

5.2.2. The CSP shall provide a clearly identified "Point of Contact" that can be contacted whenever ON experiences technical problems with the services provided by the CSP.

5.2.3. The CSP shall analyse and attempt to resolve the reported problems and, if appropriate, take the required corrective actions needed to maintain the service.

5.2.4. The CSP providing an interconnection with the other CSP shall co-operate fully with ON and interconnected CSP to achieve a timely resolution of any technical problems identified in the service level of data traffic carried through the interconnection.

5.2.5. The identified "Point of Contact" shall be available at all times during which the ON is providing an operational ATC Service.

5.3. Performance Reporting

5.3.1. The CSPs shall provide a monthly Performance Level Report showing the service level achieved for the service provided. The required content of the Report should contain as much as practicable the information specified in Appendix A.

5.3.2. This report shall be sent to ON electronically within 30 (thirty) calendar days from the end of the subject month.

5.4. Planned Engineering Work

5.4.1. The CSP shall provide to ON at least 10 working day notice of any changes to the architecture, configuration or software versions of any component of the ATN, VDL and ACARS networks involved in provision of the Service, where that change impacts upon the Service. The CSP shall highlight any degradation in Service expected from the activity, and shall respond to reasonable requests from ON to minimize the operational impact of such degradation.

6. Communication Service Evaluation

6.1. Evaluation Process

6.1.1. Prior to offering an operational managed Data Link service, each CSP shall complete a process of evaluation to the satisfaction of ON. The evaluation process shall consist of the following steps:

- Delivery of documentary evidence to ON.
- Completion of laboratory acceptance tests.
- Completion of flight tests demonstrating fitness-for-purpose.

6.2. Delivery of Documentary Evidence

6.2.1. The CSP shall deliver to ON the appropriate documentation providing evidence of the ability of the CSP's ATN/VDL2 systems to satisfy the end-to-end functional and service level requirements specified by this document. The documentation delivered shall include (but not be limited to) the items listed in Appendix B.

6.2.2. ON will review this documentation to verify that it includes the necessary evidence of conformance with the end-to-end requirements.

6.2.3. The CSP shall provide any additional evidence of conformance with requirements specified by this document as required by ON.

6.3. Laboratory Acceptance Tests

6.3.1. The CSP shall perform a series of Laboratory Acceptance Tests to demonstrate end-to-end ATN connectivity with ON systems, together with performance and robustness of the VDL2 Service. The expected configuration and scope of these Acceptance Tests is described in Annex C of LINK 2000+ Generic Requirements for a CSP [2].

6.3.2. Prior to conduct of the Acceptance Tests, the CSP shall prepare an Acceptance Test Specification detailing the configuration and conduct of all tests to be performed. The Acceptance Test Specification shall include (but not be limited to) the tests described in Annex C of Generic Requirements document [2].

6.3.3. This testing aims to verify the CSP's end-to-end ATN VDL2 communication chain, by performing CM/CPDLC exchanges between air and ground applications. In addition, it seeks to demonstrate the robustness of VDL2 handoffs under a variety of conditions.

6.3.4. The Acceptance Test Specification shall be subject to review by ON. Any additional tests reasonably required by ON to demonstrate interoperability with the ON system shall be included.

6.3.5. ON will require its representatives to witness the conduct of Acceptance Tests by the CSP.

6.3.6. Following completion of the Acceptance Tests, the CSP shall deliver an Acceptance Test Report to ON, detailing all results. The CSP shall also make available all logs and records collected during the conduct of the tests.

6.3.7. ON may elect, at its sole discretion, to accept documentary evidence of satisfactory completion of certain Acceptance Tests by the CSP on a previous occasion, without requiring further conduct of such Tests.

6.4. Flight Tests

6.4.1. The CSP shall co-operate with ON in arranging the conduct of flight tests to demonstrate that the specified Services are fit for the intended purpose. The flight testing shall be performed over routes specified by ON.

6.4.2. Throughout every flight test, a continuous exchange of uplink and downlink CPDLC messages shall be maintained, at a nominal rate of not less than one message every 10 seconds in each direction.

6.4.3. Prior to conduct of the flight test, a Flight Test Specification shall be prepared detailing the configuration, and conduct of the proposed flight tests, including the aircraft and the routes to be flown. The Flight Test Specification shall be subject to review of ON and all reasonable requests for change shall be incorporated.

6.4.4. The pass criteria for the flight tests shall be that while the aircraft remains in airspace within which the CSP is required to provide coverage:

a) IDRP adjacency shall be maintained with the aircraft

b) no interruption shall occur to the continuous exchange of CPDLC messages

c) no CPDLC message shall fail to be delivered

d) transit Delay requirements specified by this document shall be satisfied over each individual ATS route along which the test aircraft has flown.

6.4.5. Following completion of the Flight Tests, a Flight Test Report shall be prepared, detailing all results. The CSP shall also make available all logs and records collected during the conduct of the tests.

6.4.6. ON may elect, at their sole discretion, to accept documentary evidence of satisfactory completion of certain Flight Tests by the CSP on a previous occasion, without requiring further conduct of such Tests.

6.5. Observation Process

6.5.1. Following successful completion of the evaluation process in accordance with Section 6 above, the CSP will be permitted to offer an operational service for a limited period constituting the Observation Period. The Observation Period shall last for a period specified by ON.

6.5.2. During the observation period, ON will monitor the functionality and performance of the Service provided by the CSP, and also the compliance of the CSP with the performance monitoring and network management requirements (Section 5).

6.5.3. Any shortcomings detected in the Service during the observation period will be addressed by means of the procedures outlined in Section 5 of this document.

6.5.4. Once all outstanding issues have been resolved to the satisfaction of ON, the CSP's Services as described in this document will be declared fully operational, and any remaining constraints will be withdrawn.

7. Abbreviations

A/G	Air/Ground
ACARS	Aircraft Communications Addressing and Reporting System
ACC	Area Control Centre
ACL	ATC Clearance
ACM	ATC Communications Management
AGDLS	Air Ground Data Link Services
AGR	Air/Ground Router
AMC	ATC stuck microphone check
ANSP	Air Navigation Service Provider
AOC	Airline Operational Communications
ATC	Air Traffic Control
ATM	Air Traffic Management
ATN	Aeronautical Telecommunication Network
ATS	Air Traffic Services
BIS	Boundary Information System
CLNP	Connectionless Network Protocol
CM	Context Management
CMS	Control and Monitoring System
CMU	Communications Management Unit
COTS	Commercial Off-The-Shelf
CPDLC	Controller/Pilot Data Link Communications
CSC	Common Signaling Channel
CSMA	Carrier Sense Multiple Access
CSP	Communication Service Provider
CSP-1	Primary CSP
CSP-2	Alternative CSP
DL	Data Link
DLS	Data Link Service
DLIC	Data Link Initiation Capability
DLE	Data-Link Entity
DLPS	Data Link Processing System
DOC	Designated Operational Coverage
ES	End System
FAB	Functional Airspace Block
FDPS	Flight Data Processing System
FEP	Front End Processor
FIR	Flight Information Region
FL	Flight Level
G/G	Ground/Ground
GGR	Ground/Ground Router
GS	Ground Station
GSIF	Ground Station Information Frame
GUI	Graphical User Interface
HMI	Human Machine Interface
HW	Hardware
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
ID	Identifier
IDRP	Inter-Domain Routing Protocol
IP	Internet Protocol
IS	Intermediate System
ISO	International Standard Organization
LAN	Local Area Network
LME	Link Management Entity
LRS	Legal Recording System
MAC	Media Access Control protocol

MF	Multi-Frequency
MPLS	Multi-Protocol Label Switching
MTBF	Mean Time Between Failure
MTTR	Mean Time To Repair
NAT	Network Address Translation
NPDU	Network Protocol Data Unit
NTP	Network Time Protocol
ON	Oro navigacija
OSI	Open Systems Interconnection
PDU	Protocol Data Unit
PENS	Pan-European Networks System
PICS	Protocol Implementation Compliance Statement
PM	Protected Mode
QoS	Quality of Service
RD	Routing Domain
RF	Radio Frequency
SARPS	Standards And Recommended Practices
SAT	Site Acceptance Test
SLA	Service Level Agreement
SM	Standard Mode
SNDCF	Subnetwork Dependent Convergence Function
SW	Software
TCP	Transmission Control Protocol
TP4	Transport Protocol Class 4
UTC	Coordinated Universal Time
VDL	VHF Digital Link
VDL2	VDL Mode 2
VHF	Very High Frequencies
VGS	VDL Ground Station
WAN	Wide Area Network

Appendix C ATN G/G Router Provision

C.1 ATN G/G Routing Services

C.1.1 The services implemented in the ATN G/G Router shall be compliant with all the requirements applicable to the ATN G/G routing function (class 4 router) presented in the Eurocontrol Specification on Data Link Services, [4] and in the ICAO Documents 9896 [7] and 9880 [6].

C.1.2 The ISO/IEC 9542 (ES/IS) shall be implemented as defined in the ICAO Documents 9896 [7] and 9880 [6] and in the Eurocontrol Specification [4].

C.1.3 The ISO/IEC 10589 (IS/IS) should be implemented as defined in the ICAO Documents 9896 [7] and 9880 [6] and in the Eurocontrol Specification [4].

C.1.4 For the interface with the ATN End-Systems,

- 8802-2 SNDCF shall be implemented in compliance with the ICAO Documents 9896 [7] and 9880 [6],
- IP SNDCF shall be implemented in compliance with the ICAO document [SNDCF-IP].

C.1.5 The ATN routers shall provide the following standard interfaces to connect them to the ANSP networks:

- 100 Base-T Ethernet Interface,
- Internet Protocol version 4.

C.1.6 The CSP shall provide information on the migration towards the version 6 of the Internet Protocols and especially on the appropriateness of his technical proposal.

C.1.7 The CSP shall provide the completed Protocol Implementation Conformance Statement (PICS) for its implementation of the Class 4 router as defined in this paragraph (including the IP SNDCF).

C.1.8 The CSP shall detail all the protocols/services supported by its implementation(s) of the ATN ICS standard.

C.1.9 The CSP shall state the software of the ATN routers.

C.1.10 The CSP shall specify the minimum requirements (e.g. hardware, Operating System...) to operate the software of the ATN routers.

C.1.11 The CSP shall quote separately the Hardware/Operating System for ATN routers.

C.1.12 The ATN routers should provide doubled physical and logical interfaces to the Network. The failure of only one point of attachment should not impact the services supported by the equipment (all the connections supported at 8208, IDRP or TP4 levels shall be maintained). The CSP should detail the proposed technical solution and, if any, the functions which shall be supported by the WAN IP to handle such redundancy mechanism.

C.2 Availability, Reliability & Maintainability Requirements

As a component of the overall technical system, the ATN routers contribute to the end-to-end technical performances. The following requirements have been derived to ensure that the ATN routers meet the required performance, in terms of availability, continuity of service, integrity, reliability and transit delays, without jeopardizing compliance with ED-120 Required Communication Technical Performances.

C.2.1 The MTBF of the service provided by an ATN router, including the interfaces to the IP network should be greater than 50 000 (fifty thousand) operating hours.

C.2.2 The CSP shall provide the theoretical MTBF of the ATN routers and the IP interfaces.

C.2.3 The MTTR the ATN routers and the IP interfaces shall be less than 20 (twenty) minutes for level 2 maintenance.

C.2.4 ATN routers shall display unambiguous information about their status on their front panel.

C.2.5 The Control & Monitoring System shall provide unambiguous information about the status of the ATN routers.

C.2.6 Each software component being involved in the ATN service provision shall be monitored by automated means (watchdog mechanism...) for detection of critical conditions, abnormal process termination (crash, fatal error...) and process misbehaviours (infinite loop, deadlocks...). When such a condition is encountered the software shall be automatically restarted using the latest configuration successfully activated. The interruption of service (including detection and recovery) should not exceed 6 minutes.

C.2.7 When an ATN router or an IP interface experiences one of the following critical events, power reset, loss of communication link and failure in attempting to activate a configuration , the equipment shall be automatically restarted using the latest configuration successfully activated. The interruption of service (including detection and recovery) should not exceed 6 minutes.

C.3 Capacity and Router Processing Performance

C.3.1 The capacity of the ATN router in terms of simultaneous connections shall be sufficient to prevent denial of service in ON airspace.

C.3.2 The ATN router should support (work properly) at least 20 adjacent IDRP ground neighbours at the same time.

C.3.3 The ATN router should support (work properly) at least 30 adjacent network systems (End-system) at the same time.

C.3.4 The ATN router should support (work properly) at least 500 routes learned from IDRP at the same time. This includes routes from aircrafts and routes from other service providers (ANSP, ACSP).

C.3.5 The ATN Air/Ground router should support at least 1000 air/ground connections (8208) at the same time.

C.3.6 Any processing performed by the ATN router including the interface to the IP network should not jeopardize the compliance with the following performance requirement. The probability that the ATN/VDL2 infrastructure will successfully deliver a packet within 40 seconds shall be greater than 99.99%.

C.3.7 Any processing performed by the ATN router including the interface to the IP network shall not affect the payload of the exchanged packets (8208 and IP).

C.3.8 Whatever the number of connections currently supported, any processing performed by the ATN router including the interface to the IP network should not delay an exchanged packet for more than 50 milliseconds.

C.3.9 In line with the requirements above, the CSP shall detail in his tender the limitations in terms of capacity of his ATN routers.

C.4 Software assurance level

C.4.1 The ATN G/G Router including the interface to the IP network should be compliant with the Assurance Level 4 as defined in the EUROCAE Document ED-109 [8].

C.5 Documentation

C.5.1 The documentation shall be written in the English, information presented in a clear and logical manner, with cross-referencing between drawings, diagrams and text.

C.5.2 The documentation shall be both in printed form and as computer readable files, 2 copies of each.

C.5.3 The following documentation shall be provided:

C.5.3.1 Hardware and Software Documentation

C.5.3.2 Installation Manual

C.5.3.3 Configuration Manual

C.5.3.4 A list of configuration/parameter files

C.5.3.5 Maintenance Manual

C.5.3.6 Network Design Documentation

C.5.3.7 Operational Documentation.

C.6 Installation

C.6.1 The Supplier shall take full responsibility of the equipment shipping, installation and start-up (integration). Supplier has the right to use Sub-Suppliers. In this case the Main Supplier shall appoint a contact person who takes full responsibility of the installation and Start-up works and is available at the site during the installation and start-up period. ON shall be informed about all Sub-Suppliers involved.

C.6.2 After signing the contract, the Supplier shall deliver a main schedule for installations and start-up to ON.

C.6.3 The Supplier shall inform ON about the number of persons provided by the Supplier on site during each work phase.

C.6.4 The Supplier shall inform when, what kind of and for what purpose ON's resources are needed for installation.

C.7 Training

C.7.1 The Supplier, prior to testing and operation of the ATN G/G Routers, shall provide technical and operational training on-site for 6 participants of ON to enable correct use, operation and maintenance of the Routers.

C.7.2 Training shall be theoretical and practical and shall be conducted either in the Lithuanian or in the English language.

C.7.3 Training documentation shall be either in Lithuanian or English.

C.7.4 After completion of the training the Supplier shall issue Certificates for training participants.

Annex 2
to the Contract

PRICE RATES

No.	Object of the Procurement	Maximum quantity for the period of validity of the Contract	Price rate of 1 measurement unit (EUR) excluding VAT	Price rate (EUR) excluding VAT
A	*B*	*C*	*D*	*E=C*D*
1.	**Routers (including the software)**	3 pieces		
2.	**Implementation of Data Link Services (routers)**	2 pieces		
3.	**Project management costs and other costs associated with project**	-		
4.	**Data Link Services**	not more than 48 months		

On behalf of
SE „Oro navigacija“

Mindaugas Gustys
Director General

Vilnius, 5th February 2018

On behalf of
SITA ONAIR SWITZERLAND SARL

SI

http://www.sitaonair.aero

Geneva 27th February 2018