NAL/PUR/STTD/330/21-Z[G]

PROCEEDINGS OF THE PRE-BID CONFERENCE TOWARDS PROCUREMENT OF LANDING GEAR TRIES FOR SARAS MK II AIRCRAFT.

The Pre-bid Conference was held and the following T&PC members attended the meeting: -

SI.	Name & I	Designation	Role
No.			
1	Dr. Abhay Pashilkar	Chief Scientist & PGD-CAP	Chairman
2	Mr. Ramaswamy Setty J	Sr. Principal Scientist, ACD	Member
3	Mr. Dilip Kumar Sahu	Sr. Tech. Officer-3, RNCAC	Member
4	Mr. Bhaskar Chakravarthy	Chief Scientist, RNCAC	Expert Member
5	Mr. Lakshminarayana	TTL-Mechanical Systems SARAS Mk2	Expert Member
6	Mr. Vineet Kumar	Chief Scientist, RNCAC	PD-SARAS
7	Mr. Mahesh Kadam,	Principal Scientist, STTD	Invitee
8	Mr. Sathish S	Scientist, STTD	Indenting Officer/ Member - Convener (TSC)

The list of Prospective bidders who attended the Pre-bid Conference is as per Annexure-I.

At the outset, the Chairman welcomed all the Members and the representatives of the Bidders and briefed in general the scope of the Project. The Indenting Officer to read out the clarification sought by the bidders and the replied thereto as detailed in Annexure-II (Part A: Technical Clarification and Part B: Commercial Clarification, if any).

The representatives present were satisfied with the replies given and it was informed that the corrections / additions / clarifications given, as discussed during the Pre-Bid Conference would be hosted on the website of CSIR-NAL and all prospective bidders are required to take cognizance of the proceedings of the Pre-Bid Conference before formulating and submitting their bids as stipulated in bidding Documents.

The meeting ended with a vote of thanks to the Chair.

Encl: as above.

Bhaskar Chakravarthy Expert Member

Dilip Kumar Sahu Member

Member - Convener (TSC)

Lakshminarayana Expert - Member

J. Ramaswamy Setty Member

F16/2022

Dr. Abhay Pashilkar

Chairman

Mahesh Kadam Invitee

S.No	Name & Designation	Organization
1	Mr. Vinay	Sofema, India
2	Ms. Ida Saturnin	Sofema, France
3	Mr. Sreejith P	Tentacle Aerologistix Pvt Ltd
4	Mr. M. S. Bora	Goodyear Asia Pacific Aviation Tires

Annexure-I: List of prospective bidders who attended the Pre-bid Conference on 9th Feb 2022 through webex

CSIR-NATIONAL AEROSPACE LABORATORIES

BENGALURU - 560 017

ANNEXURE - I

TENDER NO.: NAL/PUR/STTD/330/21-Z[G] DATE & TIME : 09-Feb-2022 @ 11.00 AM VENUE: THROUGH WEBEX

Pre-Bid Conference for Procurement of Landing Gear Tries for SARAS Mk II Aircraft.

SI. No.	Name & D	esignation	Role	Signature with Date
1	Dr. Abhay Pashilkar Chief Scientist & O PGD-CAP		Chairman	Aban 1 1/2/22
2	Mr. Ramaswamy Setty J	Sr. Principal Scientist, ACD	Member	-
3	Mr. Dilip Kumar Sahu	Sr. Tech. Officer-3, RNCAC	Member	Of .
4	Mr. Bhaskar Chakravarthy	Chief Scientist, RNCAC	Expert Member	S. Das 9/2/2022
5	Mr. Lakshminarayana	TTL-Mechanical Systems SARAS Mk2	Expert Member	D 9/2/2022
6	Mr. Vineet Kumar	Chief Scientist, RNCAC	PD-SARAS	Orr 9/8/2022
7	Mr. Mahesh Kadam,	Principal Scientist, STTD	Invitee	V
8	Mr. Sahil Bansal	Sr. Scientist, RNCAC	Invitee	a girla
9	Mr. Sathish S	Scientist, STTD	Indenting Officer/ Member - Convener (TSC)	8. 140 9102/22

ATTENDENCE SHEET -TSC COMMITTEE

CSIR-NATIONAL AEROSPACE LABORATORIES BENGALURU

COMMERCIAL QUERIES & CLARIFICATION

Tender No. Item Description

: NAL/PUR/STTD/330/21-Z[G] : Procurement of Landing Gear Tries for SARAS Mk II Aircraft.

Sr. No.	Query / Clarification Sought	Clarification/Amendment		
	— NIL —			

m Stores & Purchase Officer For and on behalf of CSIR

CSIR-NATIONAL AEROSPACE LABORATORIES BENGALURU

TECHNICAL QUERIES & CLARIFICATION

Tender No. Item Description

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: NAL/PUR/STTD/330/21-Z[G]

: Procurement of Landing Gear Tries for SARAS Mk II Aircraft.

Sr. No.	Query / Clarification Sought	Clarification/Amendment
1	What is total number of cycles of Taxi-out - Takeoff and Landing - Taxi-in?	Tires need to be qualified as per TSO C62 c or higher. Refer Para 6.3.3 for details of take-off, overload and taxi cycles. LST curves provided in tender document are indicative of typical aircraft mission cycles. However, it may be noted that the testing conditions provided in TSO-C62 envelopes the taxi-out and take-off requirements defined in LST curves.
2	We need LST curve data in Excel or tabular format for discrete load, speed, and time values.	Provided in Annexure - A
3	In Sections 4.1.1 and 4.1.2, the description of the Load-Speed-Time (LST) curves for the Main and Nose tires, there are graphs whose titles say "Overload Take-off and Landing". Normally this would include higher than normal loads for the Taxi-out – Takeoff, and for the Landing – Taxiin conditions.When inspecting these curves, we find for the Main tire, only the Taxi- out – Takeoff DURATION is longer, and the Landing – Taxi-in LOAD and DURATION are greater. We find for the NOSE tire, the Taxi-out – Takeoff DURATION is longer, and the Landing LOAD only is greater than normal, the Taxi-in LOAD is the same, but the DURATION is greater. Have we interpreted these LST curves correctly? There are no increases to the Taxi- out LOAD and no increases to the Takeoff LOAD – is this correct?	Over load condition refers to zero flap condition of the aircraft operation with the critical aircraft weight. Taxi-in and Taxi-out loads are calculated based on weight and CG distribution. Values given in the LST curve are correct. For tire qualification, Refer Para 6.3.3 of TSO-C62 c or higher for over load conditions.
4	Are the cycles to be mission-type, i.e., Taxi-out - Takeoff + Dwell Time + Landing - Taxi-in; or	LST curves provided in tender document are indicative of typical

	Total number of Taxi-out - Takeoff cycles,	aircraft mission cycles. Sequence of			
	followed by total number of Landing - Taxi-in	the cycles to be considered as per TSO			
	cycles?	C62 c or higher, Refer Para 6.3.3.			
5	MLG and NLG Tire max Landing Impact Loading is not accounted for in the LST curves provided. Is this correct? This information is mentioned in pages 44 & 45 – Point 9	Yes, Correct. MLG and NLG Tire max Landing Impact Loading is not accounted for in the provided LST curves.			
6	Maximum braking drag load for MLG tire and Maximum steady braking load for NLG tire are not accounted for in the LST curves provided. Is this correct? This information is mentioned in pages 44 & 45 – Point 9	Yes, Correct. Maximum braking drag load for MLG tire and Maximum steady braking load for NLG tire are not accounted for in the provided LST curves.			

S. July S. July Signature of 10 & PL Aboly M. J.

Annexure - A



MLG Tire: Load-Speed-Time curve for Normal Take-off & Landing:

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Data Points	Description of Data Points	Time Taken (s)	Cumulative Time (s)	Speed (m/s)	MLG Load (kgf)	
A۲	Starting Time, To	(6)	0.0	0.0 ~	3575.2 ~	
Br	Time to reach taxiing speed	2.0	2.0	15.3 ~	3575.2 🛩	
Cr	Time at which taxiway of 1.5 km is covered	98.0	100.0	15.3 -	3575.2 -	
D 🗸	End of taxiing	5.0	105.0	0.0 -	3575.2 -	
Εr	Start of Engine Thrust for take-off	10.0	115.0 -	0.0 ∽	3575.2 -	
F	Start of Take-off run	2.0 -	117.0 🛩	0.0 r	3068.2 🖌	
G 🖌	End of take-off run	27.5 -	144.5 🗸	59.7 r	1157.8 v	
Н۲	Wheel load becoming zero	2.0 -	146.5 -	0.0 -	0.0	
۰ ا	Take-off to Landing Transition (10 sec is assumed for representative purpose in LST curve. Minimum flight time is 30 minutes)	10.0	156.5 ∽	0.0 ~	0.0~	
J۲	Landing Impact Time	2.0 -	158.5 🛩	61.2 🖌	2879.0 🖌	
Кr	Start of Brake Application	2.0 -	160.5 🛩	61.2 -	2879.0 ~	
L 🗸	End of Braked Run	16.7 -	177.2	0.0~	2879.0 -	
M 🖌	Time to start taxiing	2.0 -	179.2 -	0.0 -	3436.6 🛩	
Nr	Time to reach taxiing speed	2.0	181.2	15.3 -	3436.6	
0	Time at which taxiway of 1.5 km is covered	98.0	279.2	15.3	3436.6 🛩	
Р	End of Taxiing	2.0	281.3	0.0	3436.6	



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MLG Tire: Load-Speed-Time curve for Overload Take-off & Landing:

Data Points	Data Points	Time Taken (s)	Cumulative Time (s)	Speed (m/s)	MLG Load (kgf)
Α -	Starting Time, To		0.0	0.0	3575.2
В	Time to reach taxiing speed	2.0	2.0	15.3	3575.2 \
С	Time at which taxiway of 2.5 km is covered	163.4	165.4	15.3	3575.2 -
D	End of taxiing	5.0	170.4	0.0	3575.2 +
Е	Start of Engine Thrust for take-off	10.0	180.4	0.0	3575.2
F	Start of Take-off run	2.0	182.4	0.0	3068.2 -
G	End of take-off run	33.0	215.4	70.5 -	2041.9
Н	Wheel load becoming zero	2.0	217.4	0.0	0.0
I	Take-off to Landing Transition (10 sec is assumed for representative purpose in LST curve. Minimum flight time is 30 minutes)	10.0	227.4	0.0	0.0
J	Landing Impact Time	2.0	229.4	84.9	3239.5
К	Start of Brake Application	2.0	231.4	84.9 -	3239.5
L	End of Braked Run	19.7	251.1	0.0	3239.5
М	Time to start taxiing	2.0	253.1	0.0	3575.2
N	Time to reach taxiing speed	2.0	255.1	15.3	3575.2
0	Time at which taxiway of 2.5 km is covered	163.4	418.5	15.3	3575.2
Р	End of Taxiing	2.0	420.5	0.0	3575.2



NLG Tire: Load-Speed-Time curve for Normal Take-off & Landing:

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Data Points	Data Points	Time Taken (s)	Cumulative Time (s)	Speed (m/s)	NLG Load (kgf)
А	Starting Time, To		0.0	0.0	599.6 🛩
В	Time to reach taxiing speed	2	2.0	15.3	599.6 -
С	Time at which taxiway of 1.5 km is covered	<mark>9</mark> 8.0	100.0	15.3	599.6
D	End of taxiing	<mark>5.0</mark>	105.0	0.0	599.6 -
E	Start of Engine Thrust for take-off	10.0	115.0	0.0	599.6
F	Start of Take-off run	2.0	117.0	0.0	787.7 🗸
G 🗸	End of take-off run	27.5	144.5	59.7	174.4 -
н	Wheel load becoming zero	2.0 <	146.5	0.0	0.0
I	Take-off to Landing Transition (10 sec is assumed for representative purpose in LST curve. Minimum flight time is 30 minutes)	10.0	156.5	0.0	0.0
J	Landing Impact Time	2.0	158.5	61.2	1083.5
К	Start of Brake Application	2.0	160.5	61.2	1083.5
L	End of Braked Run	17.8	178.3	0.0	1083.5
М	Time to start taxiing	2.0	180.2	0.0	599.7
N	Time to reach taxiing speed	2.0	182.2	15.3	599.7
0	Time at which taxiway of 1.5 km is covered	98.0	280.2	15.3	599.7
Р	End of Taxiing	2.0	282.3	0.0	599.7



NLG Tire: Load-Speed-Time curve for Overload Take-off & Landing:

Data Points	Data Points	Time Taken (s)	Cumulative Time (s)	Speed (m/s)	NLG Load (kgf)
А	Starting Time, To		0.0	0.0	599.6
В	Time to reach taxiing speed	2	2.0	15.3	599.6
С	Time at which taxiway of 2.5 km is covered	163.4	165.4	15.3	599.6
D	End of taxiing	5.0	170.4	0.0	599.6
E	Start of Engine Thrust for take-off	10	180.4	0.0	599.6
F	Start of Take-off run	2	182.4	0.0	787.7 -
G	End of take-off run	32.98	215.4	70.5	225.4 🛩
Н	Wheel load becoming zero	2	217.4	0.0	0.0
I	Take-off to Landing Transition (10 sec is assumed for representative purpose in LST curve. Minimum flight time is 30 minutes)	10	227.4	0.0	0.0
J	Landing Impact Time	2	229.4	84.9 ~	1126.3
К	Start of Brake Application	2	231.4	84.9 ~	1126.3
L	End of Braked Run	20.8	252.2	0.0	1126.3
М	Time to start taxiing	2	254.2	0.0	599.6
N	Time to reach taxiing speed	2	256.2	15.3	599.6
0	Time at which taxiway of 2.5 km is covered	163.4	419.6	15.3	599.6
Р	End of Taxiing	2	421.6	0.0	599.6