



International Civil Aviation Organization

**ICAO Twelfth Meeting of the FANS Interoperability Team – Asia (FIT-Asia/12)**

Video Teleconference, 25 – 28 July 2022

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**Agenda Item 4: Review of ADS/CPDLC Operations and Performance**

**DATA LINK PERFORMANCE REPORT FOR INDIAN FIRs**

(Presented by Airports Authority of India)

**SUMMARY**

This paper presents the Data Link performance observed in the Chennai FIR during the period 1<sup>st</sup> January to 31<sup>st</sup> December 2021 and Kolkata FIR during the period 1<sup>st</sup> July to 31<sup>st</sup> December 2021, measured against the CPDLC RCP240 and ADS-C RSP180 specifications.

**1. INTRODUCTION**

1.1 Data extracted from the Chennai data link ground system for the period 1st January to 31st December 2021 and that from Kolkata system for the period 1<sup>st</sup> July to 31<sup>st</sup> December 2021 were used to measure FANS1/A system performance against the CPDLC RCP240 and ADS-C RSP180 specifications.

1.2 **Tables 1 to 5** summarize Automatic Dependent Surveillance – Contract (ADS-C) and Controller-Pilot Data Link Communications (CPDLC) performance where the Required Surveillance Performance (RSP) and Required Communications Performance (RCP) criteria stipulated in ICAO Doc 4444 – Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM) were not met. Actions taken to address performance not meeting the criteria are discussed, together with the outcomes of such actions.

**2. DISCUSSION**

VOMF FIR and VECF FIR ADS-C RSP180 Performance – Media Type, RGS and GES

2.1 **Table 1A & 1B** summarizes overall ADS-C performance per media type, Remote Ground Station (RGS) and Ground Earth Station (GES) for downlinks sent within VOMF & VECF FIRs during 2021.

FIR		VOMF						
Criteria		RSP180						
<div style="border: 1px solid black; padding: 2px;"> <b>Colour Key</b>  <span style="display: inline-block; width: 10px; height: 10px; background-color: #90EE90; border: 1px solid black; margin-right: 5px;"></span> Meets Criteria  <span style="display: inline-block; width: 10px; height: 10px; background-color: #FFFF00; border: 1px solid black; margin-right: 5px;"></span> 99.0%-99.84%  <span style="display: inline-block; width: 10px; height: 10px; background-color: #FF0000; border: 1px solid black; margin-right: 5px;"></span> Under Criteria                 </div>		Jan-June 2021			July-December 2021			
		Message Counts	95% % <= 90sec	99.90% % <= 180sec	Message Counts	95% % <= 90sec	99.90% % <= 180sec	
<b>By Media Type</b>								
SATCOM	44586	98.32%	99.39%	SATCOM	46737	98.23%	99.44%	
VHF	81936	98.75%	99.54%	VHF	101877	98.80%	99.49%	
HF	112	16.96%	33.33%	HF	79	47.68%	67.30%	
ALL	126634	98.52%	99.43%	ALL	148693	98.59%	99.46%	
<b>By Remote Ground Station (RGS) Ground Earth Station (GES)</b>								
Designator	Type	(only RGS/GES with message counts >100 recorded)						
EUA1	SAT	1112	96.76%	99.13%	EUA1	1327	95.03%	98.73%
IG1	SAT	167	86.53%	100.00%	IG1	219	81.58%	92.53%
IGW1	SAT	928	89.55%	94.82%	IGW1	1043	92.91%	98.07%
XXF	SAT	538	96.28%	99.45%	XXF	585	94.36%	98.47%
APK2	VHF	3127	95.09%	97.44%	APK2	7936	96.72%	98.37%
BTJ1	VHF	1819	99.51%	99.67%	BTJ1	2102	98.69%	98.91%
EUA2	VHF	291	97.25%	98.78%	EUA2	506	94.27%	99.06%
KUL2	VHF	3	100.00%	100.00%	KUL2	2	0.00%	95.71%
MEL1	VHF	2	100.00%	100.00%	MEL1	196	95.58%	98.64%
MLE1	VHF	93	92.27%	93.97%				
RGN	VHF	26	100.00%	100.00%	RGN	25	96.02%	96.29%
XXI	VHF	307	98.41%	99.72%	XXI	195	95.79%	97.71%
XXP	VHF	2859	94.96%	97.57%	XXP	3638	95.49%	97.38%

**Table 1A:** VOMF FIR ADS-C Downlink Latency per Media Type, RGS and GES

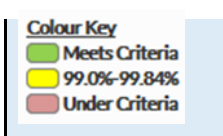
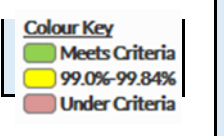
FIR	VECF		
Criteria	RSP180		
Period	July 2021 to December 2021		
<b>Colour Key</b> <span style="color: green;">■</span> Meets Criteria <span style="color: yellow;">■</span> 99.0%-99.84% <span style="color: red;">■</span> Under Criteria	Message Counts	95%  % <= 90sec	99.90%  % <= 180sec
	<b>By Media Type</b>		
SATCOM	95421	98.05%	99.54%
VHF	219966	98.99%	99.60%
HF	224	45.98%	64.96%
ALL	315611	98.67%	99.56%
<b>By Remote Ground Station (RGS) Ground Earth Station (GES)</b>			
Designator	Type	(only RGS/GES with message counts >100 recorded)	
IG1	SAT	1120	94.64%
AOR1	VHF	187	98.46%
APK2	VHF	8106	95.69%
BBI1	VHF	30	79.85%
CGN7	VHF	1	0.00%
DWC1	VHF	80	83.65%
DWC2	VHF	39	97.90%
FIF7	VHF	6	93.94%
HKG1	VHF	187	96.47%
IXZ1	VHF	2009	98.69%
JJN	VHF	6	91.82%
KNO1	VHF	25	90.99%
KWE	VHF	27	89.87%
KYZ	VHF	2	70.10%
MDL	VHF	816	97.84%
NYT	VHF	285	93.98%
RGN	VHF	634	96.87%
RGN1	VHF	2236	96.36%
RUH1	VHF	15	88.36%
SINA	VHF	10	91.44%
TIF1	VHF	1	0.00%
TPE	VHF	52	86.50%
TPE2	VHF	2	0.00%

**Table 1B:** VECF FIR ADS-C Downlink Latency per Media Type, RGS and GES

2.2 In both Chennai and Kolkata FIRs, SATCOM and VHF performance met the 95% criteria and marginally satisfied the 99.9% criteria. The performance of HF data link did not meet both the 95% and 99.9% criteria. However, the overall ADS Performance in both Chennai and Kolkata met the 95% criteria and marginally satisfied the 99.9% criteria.




VOMF and VECF FIR ADS-C RSP180 Performance – Aircraft Operator/Type

2.3 **Table 2A & 2B** summarizes overall ADS-C performance per Aircraft Operator/Type for downlinks sent within VOMF & VECF FIRs during 2021.

FIR	VOMF						
Criteria	RSP180						
Period	Jan-June 2021			Period	July-December 2021		
<b>Colour Key</b> 	Message Counts	95%	99.90%	<b>Colour Key</b> 	Message Counts	95%	99.90%
		% <= 90sec	% <= 180sec			% <= 90sec	% <= 180sec
<b>By Aircraft Operator / Type (only message counts &gt;100 recorded)</b>							
AAR/B744	6	100.00%	100.00%	ABD/B744	366	96.60%	98.19%
ABD/B744	267	88.30%	95.48%	ABW/B744	22	100.00%	100.00%
ABW/B744	14	100.00%	100.00%	ABW/B748	360	97.00%	98.13%
ABW/B748	394	95.84%	97.46%	AEA/B788	30	100.00%	100.00%
AFR/B77W	7	92.72%	100.00%	AFL/B77W	25	100.00%	100.00%
AIC/B788	1643	99.13%	99.62%	AIC/B77W	6	58.82%	100.00%
ARGO/A332	23	100.00%	100.00%	AOJ/GLF5	10	90.40%	91.34%
AWC/A21N	11	84.97%	100.00%	ASY/FA7X	8	86.98%	100.00%
AXY/E190	33	78.09%	100.00%	AWC/A21N	17	99.00%	100.00%
AZG/B744	137	90.66%	97.76%	AXY/E190	50	90.62%	99.25%
AZG/B748	380	100.00%	100.00%	AZG/B744	152	94.89%	96.42%
CES/A333	535	93.18%	95.08%	CFG/B763	18	100.00%	100.00%
CLX/B744	297	97.66%	98.01%	CLX/B744	620	97.20%	98.26%
CPA/A333	291	96.08%	98.00%	CLX/B7488	5	100.00%	100.00%
CPA/B744	1755	92.71%	96.32%	CPA/A333	1417	95.27%	97.29%
CPA/B77W	136	92.43%	100.00%	CPA/B744	1708	93.68%	96.53%
CSN/A333	83	95.41%	96.27%	CPA/B748	32	76.88%	85.07%
CTV/A339	4	100.00%	100.00%	CPA/B77W	132	92.55%	96.42%
FHDMO/FA8X	28	95.31%	99.65%	EXV/A320	354	93.71%	98.85%
GIA/A333	14	50.60%	52.41%	GEC/B77L	288	97.83%	100.00%
GIA/B77W	109	98.28%	98.91%	GIA/A333	12	100.00%	100.00%
GJW/A332	13	100.00%	100.00%	GIA/B77W	320	97.19%	98.30%
HFM/A343	42	73.85%	73.91%	ICV/B748	456	98.30%	98.52%
ICL/B744	9	88.50%	98.57%	IFA/CL60	48	97.45%	100.00%
JAL/B788	37	100.00%	100.00%	KAC/A20N	157	88.68%	99.83%

MAS/A333	4271	97.92%	99.21%	LNK/GLEX	18	94.62%	95.02%
MLT/GL5T	16	94.52%	100.00%	MAS/A359	687	98.39%	99.34%
MMD/F2TH	104	93.23%	96.91%	MAS/A3598	12	100.00%	100.00%
NJE/GLEX	30	89.24%	95.24%	MMZ/B763	81	94.71%	100.00%
OELUB/GA5C	3	100.00%	100.00%	MSZSZ/GLF6	14	82.38%	98.84%
OMA/B738	4	100.00%	100.00%	N/	27	89.95%	100.00%
PLM/A332	7	100.00%	100.00%	N/FA8X	19	84.21%	93.27%
QQE/CL60	25	52.44%	80.97%	N/GLEX	80	98.88%	99.29%
QQE/GLEX	65	80.48%	88.42%	N/GLF5	93	100.00%	100.00%
QTR/B77L	1355	98.16%	99.04%	OMA/A332	131	97.82%	98.04%
QTR/B77W	10831	96.80%	98.65%	OMA/A333	226	100.00%	100.00%
QTR/B789	205	100.00%	100.00%	PRZIQ/E295	14	93.17%	100.00%
SAZ/CL60	37	100.00%	100.00%	QQE/GL5T	86	97.89%	98.72%
SEY/A20N	20	100.00%	100.00%	QQE/GLEX	34	93.75%	98.49%
SHE/FA8X	57	97.04%	100.00%	QQE/GLF6	131	97.64%	98.68%
SUS/CL60	12	87.50%	100.00%	QTR/A332	898	100.00%	100.00%
				QTR/B77L	2228	95.50%	98.40%
				QTR/B77W	5059	95.08%	97.93%
				SEY/A20N	30	96.83%	97.66%
				SIA/B744	2597	95.34%	96.87%
SVA/B77W	510	96.23%	98.69%	SVA/B77W	699	98.86%	99.93%
SVA/B789	250	97.66%	97.97%	SVA/B789	506	98.62%	99.69%
T/GLEX	86	94.72%	96.70%	SVF/GLF5	13	100.00%	100.00%
TGW/B788	106	99.77%	100.00%	T/F2TH	69	93.66%	97.82%
THY/A333	1141	96.03%	97.55%	T/GLF6	25	100.00%	100.00%
THY/B77L	266	95.18%	97.82%	TCVTN/GLF4	6	100.00%	100.00%
				THY/A333	1229	97.03%	98.43%
				THY/B77L	204	93.46%	96.03%
VJT/B738	6	100.00%	100.00%	VPBRT/B737	9	87.78%	100.00%
VPCTC/	6	100.00%	100.00%	VTI/A20N	432	95.37%	98.61%
VTI/A20N	387	91.47%	95.43%	VTI/B789	20	100.00%	100.00%

**Table 2A:** VOMF FIR ADS-C Downlink Latency per Aircraft Operator/Type

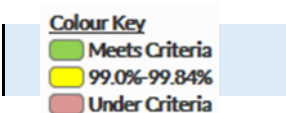
FIR	VECF		
Criteria	RSP180		
Period	July 2021 to December 2021		
<b>Colour Key</b>  Meets Criteria  99.0%-99.84%  Under Criteria	Message Counts	95%	99.90%
		% <= 90sec	% <= 180sec
<b>By Aircraft Operator / Type (only message counts &gt;100 recorded)</b>			
ABW/B748	1833	97.63%	98.27%
AFL/B77W	738	96.34%	98.95%
AFR/B77L	157	97.52%	98.80%
ALK/B744	19	94.18%	97.73%
AOJ/GLF5	22	92.51%	96.03%
BBC/B738	27	96.41%	96.59%
CLX/B744	2036	95.14%	96.88%
CPA/B77W	1951	95.39%	98.08%
DCW/GLEX	16	91.86%	94.67%
GIA/A333	34	92.25%	97.42%
GIA/B77W	78	89.00%	90.00%
HIM/A320	538	97.80%	98.20%
ICV/A333	14	93.13%	100.00%
JEF/CL60	20	90.04%	90.87%
MSR/A332	1782	98.48%	98.98%
N55/GLF5	34	88.64%	92.17%
N62/FA7X	45	80.61%	94.44%
OMA/B748	34	97.46%	98.28%
OMA/B77W	6	87.12%	91.27%
QTR/B77W	19268	96.58%	98.75%
QTR/B78X	18	86.98%	96.30%
RBA/B788	29	96.66%	97.22%
RSB/B744	366	98.11%	98.46%
TAX/A333	2523	97.13%	97.46%
UZB/B788	39	97.60%	98.15%
VPB/GLEX	12	92.83%	97.61%
VTI/A20N	745	94.48%	97.95%

**Table 2B:** VECF FIR ADS-C Downlink Latency per Aircraft Operator/Type

VOMF and VECF FIR CPDLC RCP240 Performance – Media Type, RGS and GES

2.4 The overall CPDLC performance per Media Type, RGS and GES for messages sent within the VOMF FIR during 2021, met the RCP240 performance criteria. However, in few cases it was between 99.0% - 99.84%.

2.5 **Tables 3** summarizes overall CPDLC performance per Media Type, RGS and GES for messages sent within the VECF FIR during 2021.

FIR		VECF				
Criteria		RCP240				
Period		July 2021 to December 2021				
<b>Colour Key</b> 		Message Counts	95% benchmark		99.9% Benchmark	
			ACP % <= 180sec	ACTP % <= 120sec	ACP % <= 210sec	ACTP % <= 150sec
<b>By Media Type</b>						
SAT	SAT	10061	99.30%	99.30%	99.50%	99.50%
VHF	VHF	11999	99.70%	99.70%	99.86%	99.86%
HF	HF	9	56.94%	56.94%	75.48%	75.48%
All	All	22069	99.49%	99.49%	99.67%	99.67%
<b>By Remote Ground Station (RGS) Ground Earth Station (GES)</b>						
Designator	Type	(RGS/GES with message counts >100)				
EUA1	SAT	326	95.33%	93.78%	95.88%	94.91%
IGW1	SAT	282	92.67%	98.38%	94.40%	99.30%
APK2	VHF	928	98.13%	98.68%	98.76%	99.81%
NO	VHF	2	0.00%	0.00%	0.00%	0.00%
XXI	VHF	49	96.91%	96.47%	97.17%	96.78%

**Table 3:** VECF FIR CPDLC Performance Latency per Media Type, RGS and GES.

2.6 The overall CPDLC performance per Media Type, RGS and GES for messages sent within the VECF FIR during 2021, met the RCP240 performance criteria. The performance of HF data link did not meet both the 95% and 99.9% criteria.

VOMF and VECF FIR CPDLC RCP240 Performance – Aircraft Operator/Type

2.7 **Tables 4A and 4B** summarize overall CPDLC performance per Aircraft Operator/Type for messages sent within the VOMF FIR during 2021, where performance did not meet the RCP240 performance criteria.

FIR	VOMF					
Criteria	RCP240					
Period	Jan-June 2021					
<b>Colour Key</b> <span style="color: green;">■</span> Meets Criteria <span style="color: yellow;">■</span> 99.0%-99.84% <span style="color: red;">■</span> Under Criteria	Message Counts	95% benchmark		99.9% Benchmark		95%
		ACP	ACTP	ACP	ACTP	PORT
		% <= 180sec	% <= 120sec	% <= 210sec	% <= 150sec	% < 60secs
<b>By Aircraft Operator / Type (only message counts &gt;100 recorded)</b>						
AFR/A359	42	97.62%	100.00%	99.21%	100.00%	89.81%
AFR/B772	2	100.00%	100.00%	100.00%	100.00%	69.23%
AIC/A20N	41	90.81%	100.00%	91.20%	100.00%	87.88%
AIC/B77W	18	100.00%	100.00%	100.00%	100.00%	94.69%
AZV/B77W	12	97.16%	100.00%	98.63%	100.00%	92.59%
ETD/A321	29	100.00%	100.00%	100.00%	100.00%	92.80%
ETD/B787	1	0.00%	100.00%	0.00%	100.00%	0.00%
GFA/A321	16	100.00%	100.00%	100.00%	100.00%	93.41%
GIA/B77W	20	98.54%	97.66%	99.25%	98.47%	100.00%
HVN/A359	4	100.00%	100.00%	100.00%	100.00%	92.05%
IFA/CL60	9	90.69%	100.00%	91.55%	100.00%	89.09%

Table 4A: VOMF FIR CPDLC Performance Latency per Aircraft Operator/Type

FIR	VOMF					
Criteria	RCP240					
Period	July-December 2021					
<b>Colour Key</b> <span style="color: green;">■</span> Meets Criteria <span style="color: yellow;">■</span> 99.0%-99.84% <span style="color: red;">■</span> Under Criteria	Message Counts	95% benchmark		99.9% Benchmark		95%
		ACP	ACTP	ACP	ACTP	PORT
		% <= 180sec	% <= 120sec	% <= 210sec	% <= 150sec	% < 60secs
<b>By Aircraft Operator / Type (only message counts &gt;100 recorded)</b>						
AFL/A333	31	100.00%	100.00%	100.00%	100.00%	94.80%
AIC/A20N	103	97.24%	100.00%	97.68%	100.00%	89.54%
ARGO/A333	4	100.00%	100.00%	100.00%	100.00%	89.73%
CCA/A333	17	100.00%	100.00%	100.00%	100.00%	88.47%
DLH/A333	5	100.00%	100.00%	100.00%	100.00%	90.57%
EXV/A320	80	99.12%	99.56%	99.65%	100.00%	92.63%
GFA/A321	39	98.08%	100.00%	98.28%	100.00%	97.53%
GIA/B77W	136	98.56%	97.81%	98.80%	98.26%	99.41%
JAL/B788	34	100.00%	100.00%	100.00%	100.00%	93.44%
LOT/B789	7	94.06%	92.79%	95.57%	94.69%	98.98%
SVA/A333	25	99.84%	100.00%	100.00%	100.00%	88.19%

Table 4B: VOMF FIR CPDLC Performance Latency per Aircraft Operator/Type

2.8 **Tables 5** summarizes overall CPDLC performance per Aircraft Operator/Type for messages sent within the VECF FIR during 1<sup>st</sup> July to 31<sup>st</sup> December 2021.

FIR	VECF					
Criteria	RCP240					
Period	July 2021 to December 2021					
Message Counts	95% benchmark		99.9% Benchmark		95%	
	ACP % <= 180sec	ACTP % <= 120sec	ACP % <= 210sec	ACTP % <= 150sec	PORT %<60secs	
<b>Colour Key</b> <span style="color: green;">■</span> Meets Criteria <span style="color: yellow;">■</span> 99.0%-99.84% <span style="color: red;">■</span> Under Criteria						
By Aircraft Operator / Type (only message counts >100 recorded)						
ABW/B748	190	97.54%	96.84%	98.01%	97.50%	97.21%
AFR/B77L	25	100.00%	100.00%	100.00%	100.00%	94.10%
AOJ/GLF5	6	96.14%	90.83%	100.00%	94.70%	100.00%
AUA/B772	113	98.52%	98.35%	98.65%	98.49%	99.00%
AZG/B744	39	98.76%	100.00%	100.00%	100.00%	90.97%
BAW/B77W	216	98.53%	100.00%	98.81%	100.00%	98.24%
BBC/B789	1	100.00%	100.00%	100.00%	100.00%	0.00%
BTX/FA8X	3	100.00%	100.00%	100.00%	100.00%	90.63%
CAT/D328	2	84.98%	100.00%	92.02%	100.00%	61.75%
CLX/B744	295	96.21%	96.07%	96.76%	96.38%	97.05%
EVA/B78X	9	100.00%	100.00%	100.00%	100.00%	94.25%
EXV/A320	102	91.70%	100.00%	92.85%	100.00%	89.29%
FDX/B77L	117	99.00%	100.00%	99.35%	100.00%	94.87%
GIA/B77W	15	83.19%	82.90%	85.36%	85.95%	97.07%
GJW/A332	2	0.00%	0.00%	0.00%	100.00%	0.00%
HIM/A320	78	99.84%	99.44%	100.00%	100.00%	86.06%
IRM/A343	2	100.00%	100.00%	100.00%	100.00%	94.83%
IRM/A346	8	90.97%	100.00%	93.70%	100.00%	77.55%
KAL/GLEX	1	100.00%	100.00%	100.00%	100.00%	0.00%
MSE/E35L	4	100.00%	100.00%	100.00%	100.00%	60.83%
MSR/A332	106	98.34%	99.11%	98.79%	99.29%	83.96%
N62/FA7X	6	72.12%	100.00%	81.21%	100.00%	41.41%
N77/GLF6	2	0.00%	100.00%	0.00%	100.00%	0.00%
N95/FA8X	7	100.00%	100.00%	100.00%	100.00%	90.61%
OMA/A332	25	100.00%	100.00%	100.00%	100.00%	92.77%
OMA/A333	214	97.76%	100.00%	99.23%	100.00%	94.86%
QQE/GLEX	4	80.31%	100.00%	81.94%	100.00%	76.19%
QQE/GLF6	25	98.06%	100.00%	99.55%	100.00%	92.98%
QTR/B77W	1738	97.22%	98.37%	98.23%	98.78%	96.09%
RJA/B788	59	98.32%	97.54%	98.84%	98.03%	100.00%

<b>RMY/B762</b>	<b>2</b>	<b>0.00%</b>	100.00%	100.00%	100.00%	<b>0.00%</b>
<b>T7A/GLF6</b>	<b>1</b>	100.00%	100.00%	100.00%	100.00%	<b>0.00%</b>
<b>T7G/GLF6</b>	<b>16</b>	<b>94.60%</b>	<b>94.77%</b>	<b>96.14%</b>	<b>96.81%</b>	<b>93.75%</b>
<b>T7S/GLEX</b>	<b>2</b>	100.00%	100.00%	100.00%	100.00%	<b>62.82%</b>
<b>TAX/A333</b>	<b>281</b>	98.52%	99.34%	<b>99.44%</b>	100.00%	<b>94.90%</b>
<b>TLM/A339</b>	<b>40</b>	100.00%	100.00%	100.00%	100.00%	<b>91.79%</b>
<b>UAF/C17</b>	<b>13</b>	<b>87.90%</b>	100.00%	<b>88.68%</b>	100.00%	<b>85.21%</b>
<b>UPS/B744</b>	<b>58</b>	97.17%	97.58%	<b>97.39%</b>	<b>98.01%</b>	<b>96.68%</b>
<b>VTI/A20N</b>	<b>78</b>	97.68%	98.98%	<b>98.41%</b>	100.00%	<b>94.62%</b>
<b>VTI/A320</b>	<b>3</b>	100.00%	100.00%	100.00%	100.00%	<b>80.49%</b>
<b>VUA/A20N</b>	<b>5</b>	100.00%	100.00%	100.00%	100.00%	<b>70.37%</b>

**Table 5:** VECF FIR CPDLC Performance Latency per Aircraft Operator/Type

2.9 The issues related to ADS & CPDLC performance not meeting the criteria in some of the cases will be taken up with SITA to identify the causes and rectify the same.

### **3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.

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