

APOLLO 13

LM RENDEZVOUS CHARTS

PART NO.	S/N
SKB32100076 - 392	1002

DATE March 9, 1970

LM RENDEZVOUS CHART BOOK

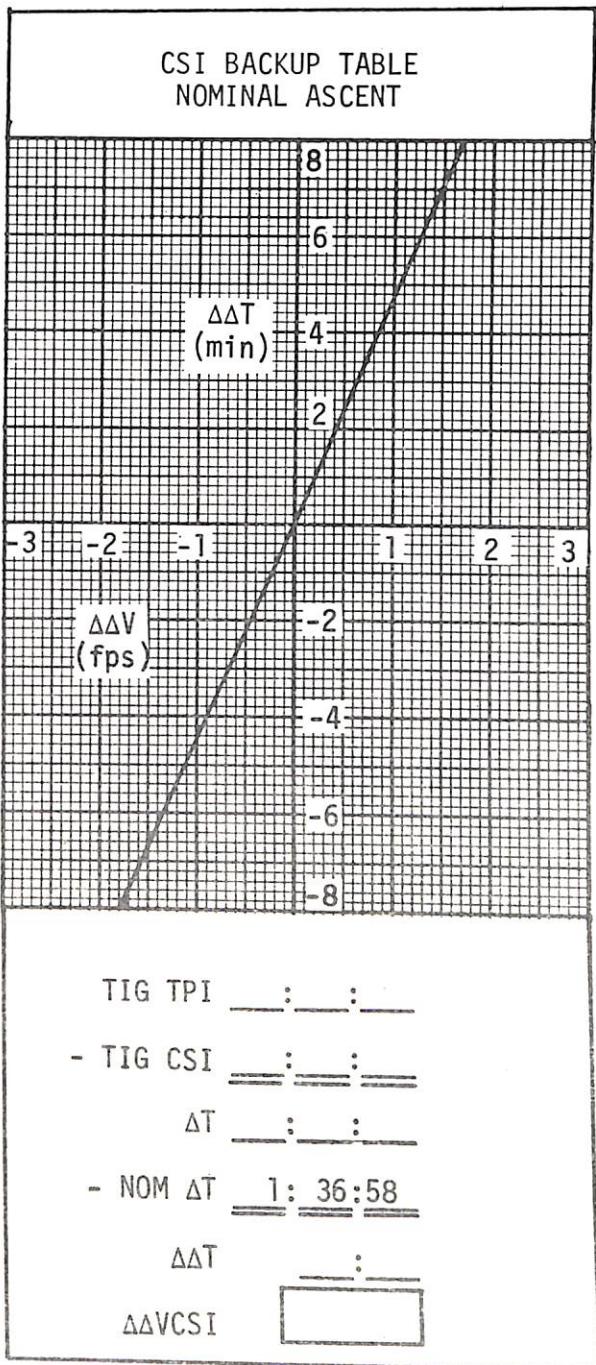
RDOT1	F1	RDOT2	F2	RDOT3	F3	R3	F4
-240.0	47.3	-140.0	45.2	-70.0	-27.6	120.0	-15.2
-241.0	48.4	-141.0	43.4	-71.0	-26.6	121.0	-15.5
-242.0	49.4	-142.0	41.6	-72.0	-25.6	122.0	-15.7
-243.0	50.5	-143.0	39.8	-73.0	-24.5	123.0	-15.9
-244.0	51.5	-144.0	37.9	-74.0	-23.5	124.0	-16.1
-245.0	52.5	-145.0	36.1	-75.0	-22.5	125.0	-16.3
-246.0	53.6	-146.0	34.3	-76.0	-21.4	126.0	-16.5
-247.0	54.6	-147.0	32.4	-77.0	-20.4	127.0	-16.7
-248.0	55.7	-148.0	30.6	-78.0	-19.4	128.0	-16.9
-249.0	56.7	-149.0	28.7	-79.0	-18.3	129.0	-17.1
-250.0	57.8	-150.0	26.9	-80.0	-17.3	130.0	-17.3
-251.0	58.8	-151.0	25.1	-81.0	-16.3	131.0	-17.5
-252.0	59.9	-152.0	23.2	-82.0	-15.2	132.0	-17.7
-253.0	60.9	-153.0	21.4	-83.0	-14.2	133.0	-17.9
-254.0	62.0	-154.0	18.6	-84.0	-13.1	134.0	-18.1
-255.0	63.0	-155.0	17.7	-85.0	-12.1	135.0	-18.4
-256.0	64.1	-156.0	15.9	-86.0	-11.1	136.0	-18.6
-257.0	65.1	-157.0	14.0	-87.0	-10.0	137.0	-18.8
-258.0	66.2	-158.0	12.2	-88.0	-9.0	138.0	-19.0
-259.0	67.2	-159.0	10.3	-89.0	-8.0	139.0	-19.2
-260.0	68.3	-160.0	8.5	-90.0	-6.9	140.0	-19.4
-261.0	69.3	-161.0	6.6	-91.0	-5.9	141.0	-19.6
-262.0	70.4	-162.0	4.8	-92.0	-4.8	142.0	-19.8
-263.0	71.4	-163.0	3.0	-93.0	-3.8	143.0	-20.0
-264.0	72.5	-164.0	1.1	-94.0	-2.8	144.0	-20.2
-265.0	73.5	-165.0	-.7	-95.0	-1.7	145.0	-20.5
-266.0	74.6	-166.0	-2.6	-96.0	-.7	146.0	-20.7
-267.0	75.7	-167.0	-4.4	-97.0	.4	147.0	-20.9
-268.0	76.7	-168.0	-6.3	-98.0	1.4	148.0	-21.1
-269.0	77.8	-169.0	-8.1	-99.0	2.4	149.0	-21.3
-270.0	78.8	-170.0	-10.0	-100.0	3.5	150.0	-21.5
-271.0	79.9	-171.0	-11.9	-101.0	4.5	151.0	-21.7
-272.0	81.0	-172.0	-13.7	-102.0	5.6	152.0	-21.9
-273.0	82.0	-173.0	-15.6	-103.0	6.6	153.0	-22.1
-274.0	83.1	-174.0	-17.4	-104.0	7.7	154.0	-22.4
-275.0	84.2	-175.0	-19.3	-105.0	8.7	155.0	-22.6
-276.0	85.2	-176.0	-21.1	-106.0	9.7	156.0	-22.8
-277.0	86.3	-177.0	-23.0	-107.0	10.8	157.0	-23.0
-278.0	87.4	-178.0	-24.9	-108.0	11.8	158.0	-23.2
-279.0	88.4	-179.0	-26.7	-109.0	12.9	159.0	-23.4
-280.0	89.5	-180.0	-28.6	-110.0	13.9	160.0	-23.6
-281.0	90.6	-181.0	-30.4	-111.0	15.0	161.0	-23.8

CSI BACKUP TABLE NOMINAL ASCENT	
TIME (Min)	NOMINAL
-30 R1	DSKY>TM (-283.3)-1.4
-20 R2	(-173.9) -.9
-10 R3	(- 94.0) -.5
-10 R3	(154.1)
F1	(93.0)
+F2	(-17.3)
	(75.7)
+F3	(-2.8)
	(72.9)
+F4	(- 22.4)
	(50.5)
+ΔΔVCSI	(0.0)
ΔVCSI	(50.5)

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MISSION APOLLO 13, DECEMBER 12, 1969

RDOT1	F1	RDOT2	F2	RDOT 3	F3	R3	F4
-282.0	91.6	-182.0	-32.3	-112.0	16.0	162.0	-24.0
-283.0	92.7	-183.0	-34.2	-113.0	17.0	163.0	-24.2
-284.0	93.8	-184.0	-36.0	-114.0	18.1	164.0	-24.5
-285.0	94.8	-185.0	-37.9	-115.0	19.1	165.0	-24.7
-286.0	95.9	-186.0	-39.8	-116.0	20.2	166.0	-24.9
-287.0	97.0	-187.0	-41.6	-117.0	21.2	167.0	-25.1
-288.0	98.1	-188.0	-43.5	-118.0	22.3	168.0	-25.3
-289.0	99.2	-189.0	-45.4	-119.0	23.3	169.0	-25.5
-290.0	100.2	-190.0	-47.2	-120.0	24.4	170.0	-25.7
-291.0	101.3	-191.0	-49.1	-121.0	25.4	171.0	-25.9
-292.0	102.4	-192.0	-51.0	-122.0	26.5	172.0	-26.1
-293.0	103.5	-193.0	-52.9	-123.0	27.5	173.0	-26.3
-294.0	104.6	-194.0	-54.7	-124.0	28.6	174.0	-26.5
-295.0	105.6	-195.0	-56.6	-125.0	29.6	175.0	-26.7
-296.0	106.7	-196.0	-58.5	-126.0	30.7	176.0	-26.9
-297.0	107.8	-197.0	-60.4	-127.0	31.7	177.0	-27.1
-298.0	108.9	-198.0	-62.2	-128.0	32.8	178.0	-27.3
-299.0	110.0	-199.0	-64.1	-129.0	33.8	179.0	-27.5
-300.0	111.1	-200.0	-66.0	-130.0	34.9	180.0	-27.7
-301.0	112.2	-201.0	-67.9	-131.0	35.9	181.0	-27.9
-302.0	113.2	-202.0	-69.8	-132.0	37.0	182.0	-28.1
-303.0	114.3	-203.0	-71.6	-133.0	38.0	183.0	-28.3
-304.0	115.4	-204.0	-73.5	-134.0	39.1	184.0	-28.5
-305.0	116.5	-205.0	-75.4	-135.0	40.1	185.0	-28.7
-306.0	117.6	-206.0	-77.3	-136.0	41.2	186.0	-28.9
-307.0	118.7	-207.0	-79.2	-137.0	42.2	187.0	-29.1
-308.0	119.8	-208.0	-81.1	-138.0	43.3	188.0	-29.3
-309.0	120.9	-209.0	-83.0	-139.0	44.3	189.0	-29.5
-310.0	122.0	-210.0	-84.9	-140.0	45.4	190.0	-29.7
-311.0	123.1	-211.0	-86.8	-141.0	46.4	191.0	-29.9
-312.0	124.2	-212.0	-88.7	-142.0	47.5	192.0	-30.1
-313.0	125.3	-213.0	-90.5	-143.0	48.5	193.0	-30.3
-314.0	126.4	-214.0	-92.4	-144.0	49.6	194.0	-30.5
-315.0	127.5	-215.0	-94.3	-145.0	50.7	195.0	-30.7
-316.0	128.6	-216.0	-96.2	-146.0	51.7	196.0	-30.9
-317.0	129.7	-217.0	-98.1	-147.0	52.8	197.0	-31.0
-318.0	130.8	-218.0	-100.0	-148.0	53.8	198.0	-31.2
-319.0	131.9	-219.0	-101.9	-149.0	54.9	199.0	-31.4
-320.0	133.0	-220.0	-103.8	-150.0	55.9	200.0	-31.6
-321.0	134.1	-221.0	-105.7	-151.0	57.0	201.0	-31.8
-322.0	135.3	-222.0	-107.7	-152.0	58.1	202.0	-32.0
-323.0	136.4	-223.0	-109.6	-153.0	59.1	203.0	-32.2

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RDOT	X1	Z1	X2	Z2	X3	Z3	CDH BACKUP TABLE NOMINAL ASCENT
-50.0	67.3	254.8	-17.2	-193.9	-50.2	-60.7	
-51.0	67.6	253.9	-17.5	-191.8	-50.3	-62.0	
-52.0	68.0	253.0	-17.8	-189.6	-50.3	-63.2	
-53.0	68.3	252.0	-18.2	-187.5	-50.3	-64.4	
-54.0	68.7	251.1	-18.5	-185.4	-50.3	-65.6	
-55.0	69.0	250.2	-18.9	-183.2	-50.3	-66.8	
-56.0	69.4	249.3	-19.2	-181.1	-50.3	-68.0	
-57.0	69.7	248.3	-19.5	-179.0	-50.3	-69.2	
-58.0	70.1	247.4	-19.9	-176.8	-50.3	-70.5	
-59.0	70.4	246.5	-20.2	-174.7	-50.3	-71.7	
-60.0	70.8	245.6	-20.5	-172.5	-50.4	-72.9	
-61.0	71.1	244.6	-20.9	-170.4	-50.4	-74.1	
-62.0	71.5	243.7	-21.2	-168.3	-50.4	-75.3	
-63.0	71.8	242.8	-21.6	-166.1	-50.4	-76.5	
-64.0	72.2	241.9	-21.9	-164.0	-50.4	-77.7	
-65.0	72.5	240.9	-22.2	-161.8	-50.4	-78.9	
-66.0	72.9	240.0	-22.6	-159.7	-50.4	-80.2	
-67.0	73.2	239.1	-22.9	-157.5	-50.5	-81.4	
-68.0	73.6	238.1	-23.2	-155.4	-50.5	-82.6	
-69.0	73.9	237.2	-23.6	-153.2	-50.5	-83.8	
-70.0	74.3	236.3	-23.9	-151.1	-50.5	-85.0	
-71.0	74.6	235.3	-24.3	-149.0	-50.5	-86.2	
-72.0	75.0	234.4	-24.6	-146.8	-50.5	-87.4	
-73.0	75.3	233.5	-24.9	-144.7	-50.6	-88.6	
-74.0	75.7	232.5	-25.3	-142.5	-50.6	-89.8	
-75.0	76.0	231.6	-25.6	-140.4	-50.6	-91.1	
-76.0	76.4	230.6	-25.9	-138.2	-50.6	-92.3	
-77.0	76.7	229.7	-26.3	-136.1	-50.6	-93.5	
-78.0	77.1	228.8	-26.6	-133.9	-50.6	-94.7	
-79.0	77.4	227.8	-26.9	-131.8	-50.7	-95.9	
-80.0	77.8	226.9	-27.3	-129.6	-50.7	-97.1	
-81.0	78.1	225.9	-27.6	-127.5	-50.7	-98.3	
-82.0	78.5	225.0	-27.9	-125.3	-50.7	-99.5	
-83.0	78.8	224.1	-28.3	-123.2	-50.7	-100.7	
-84.0	79.2	223.1	-28.6	-121.0	-50.8	-102.0	
-85.0	79.5	222.2	-28.9	-118.9	-50.8	-103.2	
-86.0	79.9	221.2	-29.3	-116.7	-50.8	-104.4	
-87.0	80.2	220.3	-29.6	-114.6	-50.8	-105.6	
-88.0	80.6	219.3	-29.9	-112.4	-50.8	-106.8	
-89.0	80.9	218.4	-30.3	-110.2	-50.9	-108.0	
-90.0	81.3	217.4	-30.6	-108.1	-50.9	-109.2	
-91.0	81.6	216.5	-30.9	-105.9	-50.9	-110.4	
-92.0	82.0	215.5	-31.3	-103.8	-50.9	-111.6	
-93.0	82.3	214.6	-31.6	-101.6	-50.9	-112.9	

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CDH B/U
NOMINAL ASCENT

RDOT	X1	Z1	X2	Z2	X3	Z3
-93.0	82.3	214.6	-31.6	-101.6	-50.9	-112.9
-94.0	82.7	213.6	-31.9	-99.5	-51.0	-114.1
-95.0	83.0	212.7	-32.3	-97.3	-51.0	-115.3
-96.0	83.4	211.7	-32.6	-95.1	-51.0	-116.5
-97.0	83.7	210.8	-32.9	-93.0	-51.0	-117.7
-98.0	84.1	209.8	-33.3	-90.8	-51.0	-118.9
-99.0	84.5	208.9	-33.6	-88.7	-51.1	-120.1
-100.0	84.8	207.9	-33.9	-86.5	-51.1	-121.3
-101.0	85.2	207.0	-34.2	-84.3	-51.1	-122.5
-102.0	85.5	206.0	-34.6	-82.2	-51.1	-123.7
-103.0	85.9	205.1	-34.9	-80.0	-51.2	-125.0
-104.0	86.2	204.1	-35.2	-77.8	-51.2	-126.2
-105.0	86.6	203.1	-35.6	-75.7	-51.2	-127.4
-106.0	86.9	202.2	-35.9	-73.5	-51.2	-128.6
-107.0	87.3	201.2	-36.2	-71.4	-51.3	-129.8
-108.0	87.6	200.3	-36.6	-69.2	-51.3	-131.0
-109.0	88.0	199.3	-36.9	-67.0	-51.3	-132.2
-110.0	88.3	198.3	-37.2	-64.9	-51.3	-133.4
-111.0	88.7	197.4	-37.5	-62.7	-51.4	-134.6
-112.0	89.1	196.4	-37.9	-60.5	-51.4	-135.8
-113.0	89.4	195.5	-38.2	-58.4	-51.4	-137.0
-114.0	89.8	194.5	-38.5	-56.2	-51.4	-138.3
-115.0	90.1	193.5	-38.9	-54.0	-51.5	-139.5
-116.0	90.5	192.6	-39.2	-51.8	-51.5	-140.7
-117.0	90.8	191.6	-39.5	-49.7	-51.5	-141.9
-118.0	91.2	190.6	-39.8	-47.5	-51.6	-143.1
-119.0	91.5	189.7	-40.2	-45.3	-51.6	-144.3
-120.0	91.9	188.7	-40.5	-43.2	-51.6	-145.5
-121.0	92.2	187.7	-40.8	-41.0	-51.6	-146.7
-122.0	92.6	186.8	-41.2	-38.8	-51.7	-147.9
-123.0	93.0	185.8	-41.5	-36.6	-51.7	-149.1
-124.0	93.3	184.8	-41.8	-34.5	-51.7	-150.3
-125.0	93.7	183.8	-42.1	-32.3	-51.7	-151.5
-126.0	94.0	182.9	-42.5	-30.1	-51.8	-152.8
-127.0	94.4	181.9	-42.8	-27.9	-51.8	-154.0
-128.0	94.7	180.9	-43.1	-25.8	-51.8	-155.2
-129.0	95.1	180.0	-43.4	-23.6	-51.9	-156.4
-130.0	95.4	179.0	-43.8	-21.4	-51.9	-157.6
-131.0	95.8	178.0	-44.1	-19.2	-51.9	-158.8
-132.0	96.2	177.0	-44.4	-17.1	-52.0	-160.0
-133.0	96.5	176.0	-44.7	-14.9	-52.0	-161.2
-134.0	96.9	175.1	-45.1	-12.7	-52.0	-162.4
-135.0	97.2	174.1	-45.4	-10.5	-52.1	-163.6
-136.0	97.6	173.1	-45.7	-8.3	-52.1	-164.8

CDH BACKUP TABLE
NOMINAL ASCENT

TIME (MIN)	NOMINAL	DSKY>TM
-36 R1	_____ (-118.0)	-.6
-23 R2	_____ (-118.0)	-.6
-10 R3	_____ (-118.0)	-.6
ΔVX: X1	_____ (91.2)	
+X2	_____ (- 39.8)	
	_____ (51.4)	
+X3	_____ (- 51.6)	
ΔVX(LV)	_____ (- 0.2)	
ΔVZ: Z1	_____ (190.6)	
+Z2	_____ (- 47.5)	
	_____ (143.1)	
+Z3	_____ (-143.1)	
ΔVZ(LV)	_____ (0.0)	

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RDOT	X1	Z1	X2	Z2	X3	Z3
-136.0	97.6	173.1	-45.7	-8.3	-52.1	-164.8
-137.0	97.9	172.1	-46.0	-6.2	-52.1	-166.0
-138.0	98.3	171.2	-46.4	-4.0	-52.2	-167.2
-139.0	98.7	170.2	-46.7	-1.8	-52.2	-168.4
-140.0	99.0	169.2	-47.0	.4	-52.2	-169.7
-141.0	99.4	168.2	-47.3	2.6	-52.2	-170.9
-142.0	99.7	167.2	-47.7	4.8	-52.3	-172.1
-143.0	100.1	166.2	-48.0	6.9	-52.3	-173.3
-144.0	100.4	165.3	-48.3	9.1	-52.4	-174.5
-145.0	100.8	164.3	-48.6	11.3	-52.4	-175.7
-146.0	101.2	163.3	-49.0	13.5	-52.4	-176.9
-147.0	101.5	162.3	-49.3	15.7	-52.5	-178.1
-148.0	101.9	161.3	-49.6	17.9	-52.5	-179.3
-149.0	102.2	160.3	-49.9	20.1	-52.5	-180.5
-150.0	102.6	159.3	-50.3	22.2	-52.6	-181.7
-151.0	103.0	158.4	-50.6	24.4	-52.6	-182.9
-152.0	103.3	157.4	-50.9	26.6	-52.6	-184.1
-153.0	103.7	156.4	-51.2	28.8	-52.7	-185.3
-154.0	104.0	155.4	-51.5	31.0	-52.7	-186.5
-155.0	104.4	154.4	-51.9	33.2	-52.7	-187.7
-156.0	104.7	153.4	-52.2	35.4	-52.8	-189.0
-157.0	105.1	152.4	-52.5	37.6	-52.8	-190.2
-158.0	105.5	151.4	-52.8	39.8	-52.8	-191.4
-159.0	105.8	150.4	-53.1	42.0	-52.9	-192.6
-160.0	106.2	149.4	-53.5	44.2	-52.9	-193.8
-161.0	106.5	148.4	-53.8	46.3	-53.0	-195.0
-162.0	106.9	147.4	-54.1	48.5	-53.0	-196.2
-163.0	107.3	146.4	-54.4	50.7	-53.0	-197.4
-164.0	107.6	145.4	-54.8	52.9	-53.1	-198.6
-165.0	108.0	144.4	-55.1	55.1	-53.1	-199.8
-166.0	108.3	143.4	-55.4	57.3	-53.2	-201.0
-167.0	108.7	142.4	-55.7	59.5	-53.2	-202.2
-168.0	109.1	141.4	-56.0	61.7	-53.2	-203.4
-169.0	109.4	140.4	-56.4	63.9	-53.3	-204.6
-170.0	109.8	139.4	-56.7	66.1	-53.3	-205.8
-171.0	110.1	138.4	-57.0	68.3	-53.4	-207.0
-172.0	110.5	137.4	-57.3	70.5	-53.4	-208.2
-173.0	110.9	136.4	-57.6	72.7	-53.4	-209.4
-174.0	111.2	135.4	-57.9	74.9	-53.5	-210.6
-175.0	111.6	134.4	-58.3	77.1	-53.5	-211.9
-176.0	111.9	133.4	-58.6	79.3	-53.6	-213.1
-177.0	112.3	132.4	-58.9	81.5	-53.6	-214.3
-178.0	112.7	131.4	-59.2	83.7	-53.6	-215.5
-179.0	113.0	130.4	-59.5	85.9	-53.7	-216.7

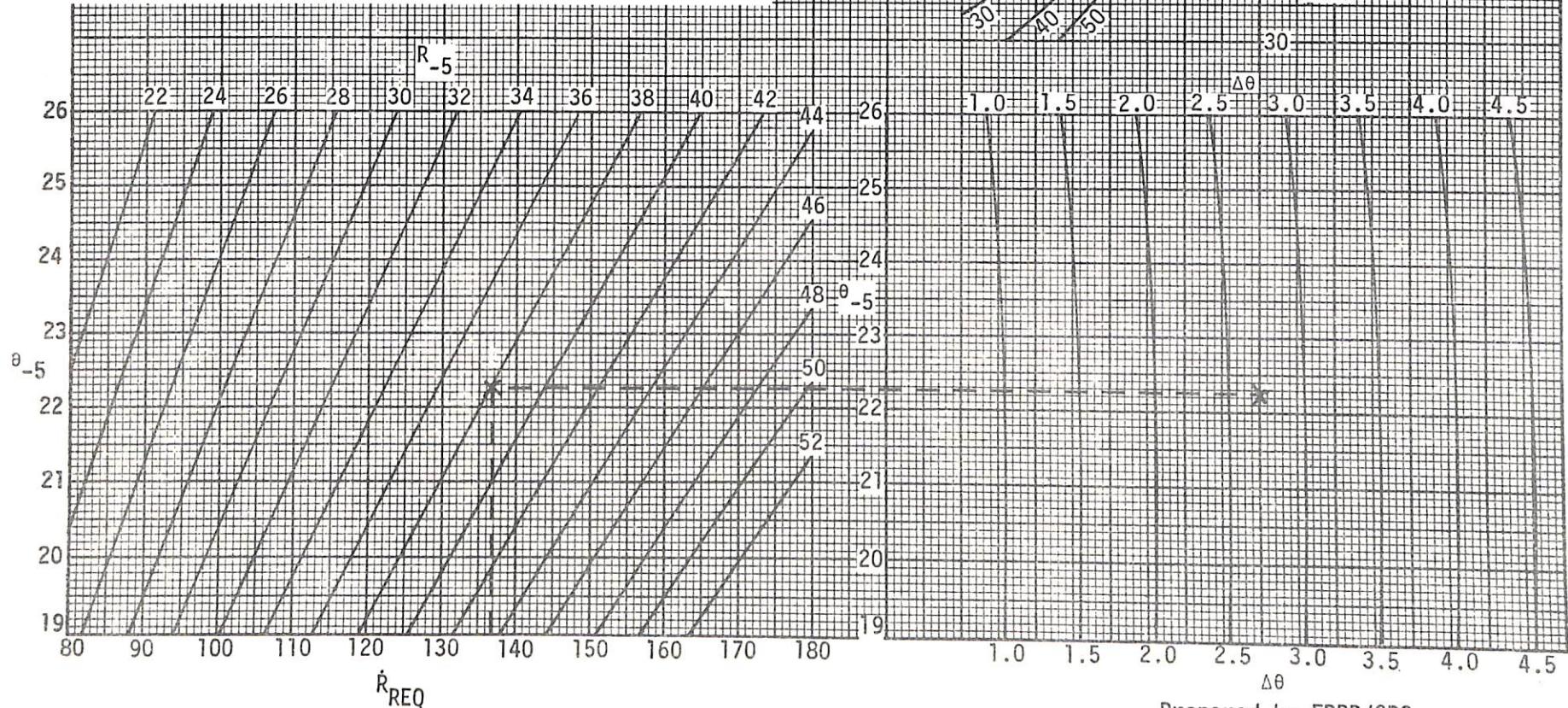
CDH BACKUP TABLE
NOMINAL ASCENTPrepared by FPRB/OPS
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TERMINAL PHASE
INITIATION

H-2 MISSION TERMINAL PHASE INITIATION

θ_{-5} _____ 22.24 R_{-5} _____ 38.18 \dot{R}_{REQ} _____ 136.9
 θ_{-9} _____ 19.54 R_{-5} _____ 112.3 ΔR _____ 24.6
 $\Delta\theta$ _____ 2.70

PNGS (N59)	CSM (N59)	CHARTS	ΔT
\dot{F}/A	_____	_____	_____
\dot{R}/L	_____	_____	_____
\dot{D}/U	_____	_____	_____



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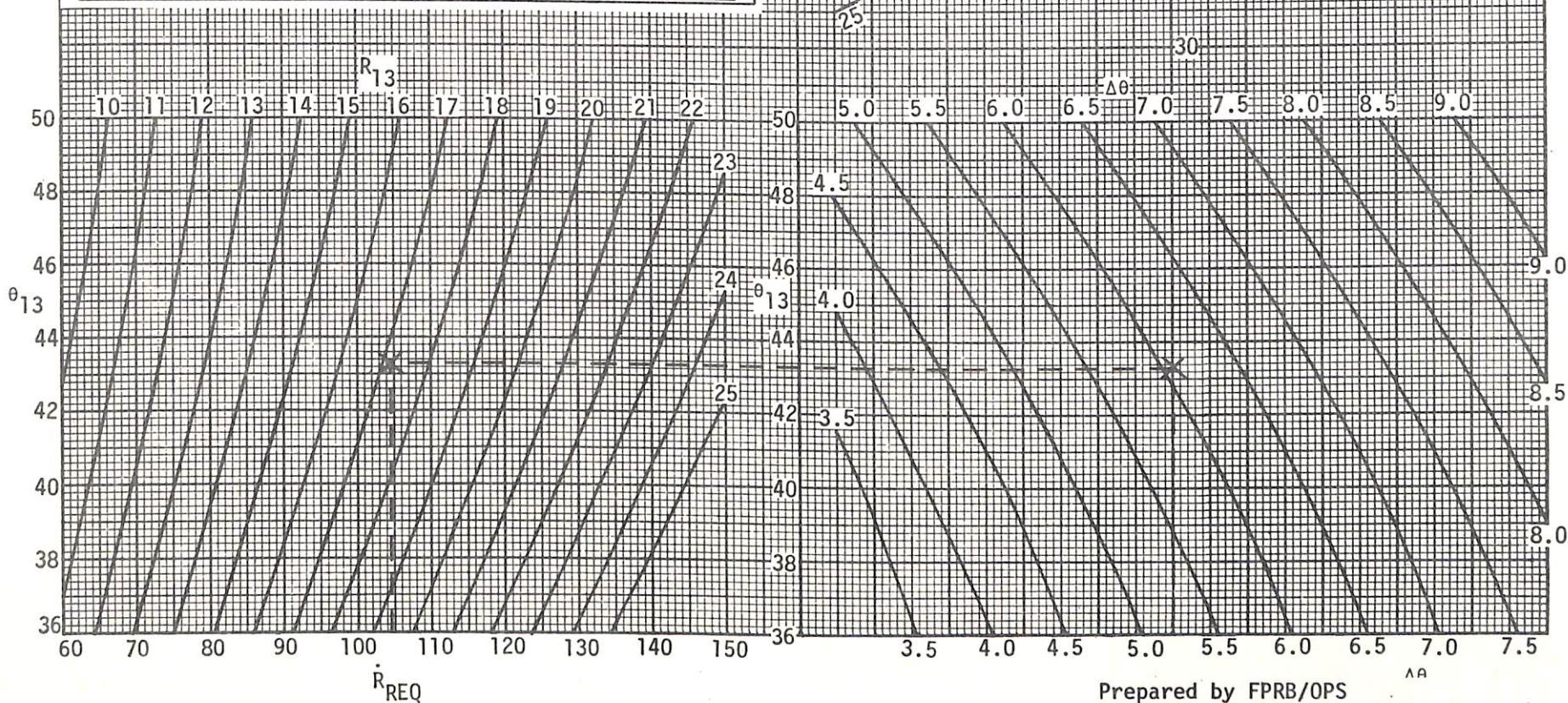
DATE March 9, 1970

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H-2 MISSION FIRST MIDCOURSE CORRECTION

\dot{R}_{REQ} _____ 104.5
 θ_{13} _____ 43.28 R_{13} _____ 17.23 \dot{R}_{13} _____ 104.5
 θ_9 _____ 37.24 ΔR _____ 0.0
 $\Delta \theta$ _____ 6.04

PNGS (N59)	CSM (N59)	CHARTS	ΔT
\ddot{F}/A _____	_____	_____	_____
\ddot{R}/L _____	_____	_____	_____
\ddot{D}/U _____	_____	_____	_____



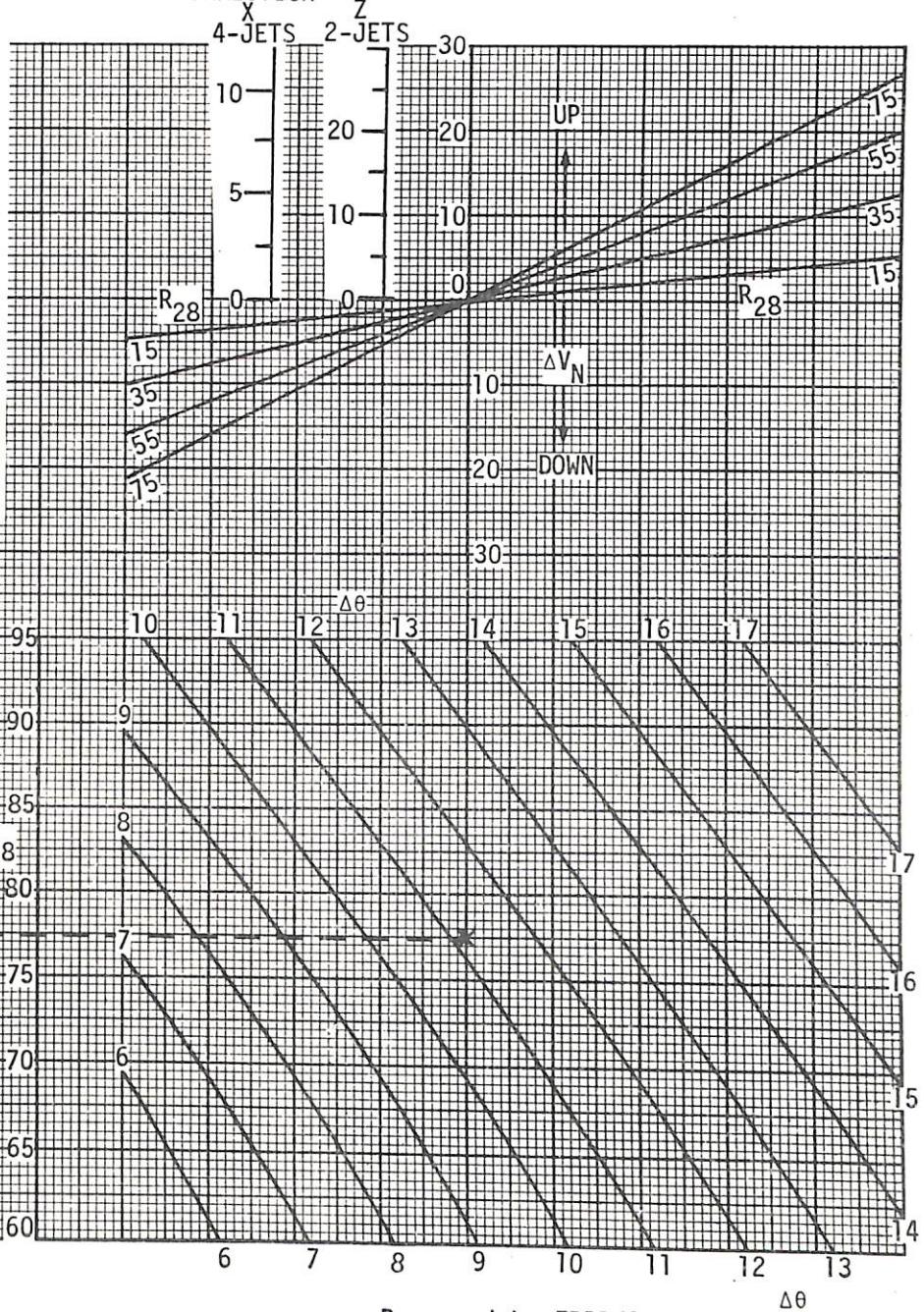
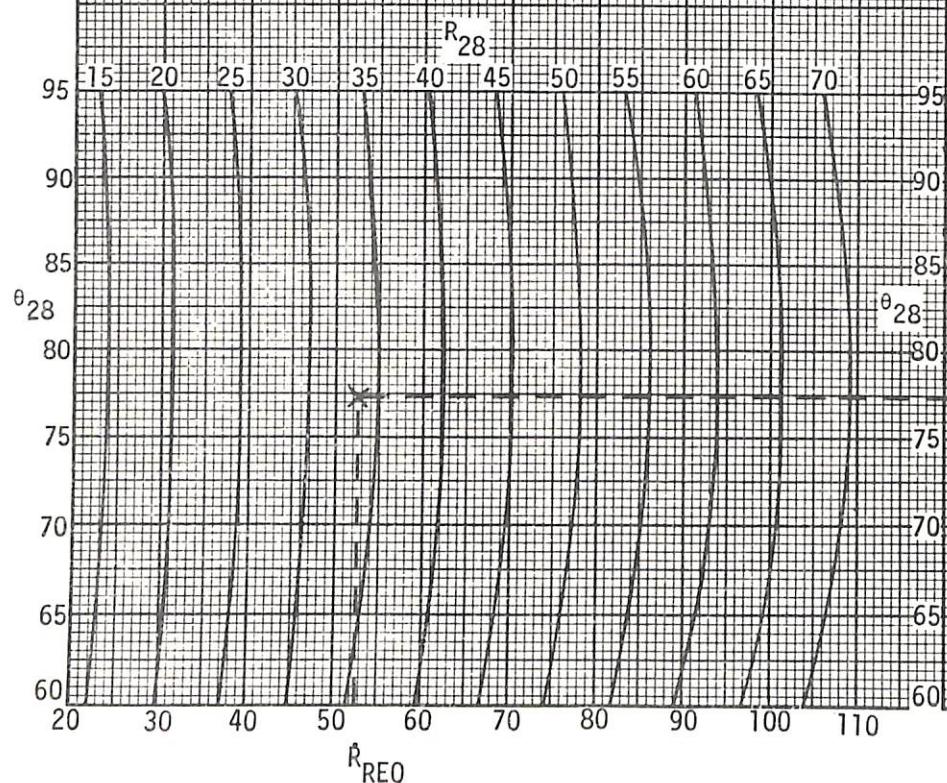
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SECOND
MCC

H-2 MISSION SECOND MIDCOURSE CORRECTION

θ_{28} _____ 77.41 R_{28} _____ 34.3 \dot{R}_{REQ} _____ 52.4
 θ_{24} _____ 66.22 R_{28} _____ 52.4 $\Delta\dot{R}$ _____ 0.0
 $\Delta\theta$ _____ 11.19

	PNGS (N59)	CSM (N59)	CHARTS	ΔT
\ddot{F}/A	_____	_____	_____	_____
\ddot{R}/L	_____	_____	_____	_____
\ddot{D}/U	_____	_____	_____	_____



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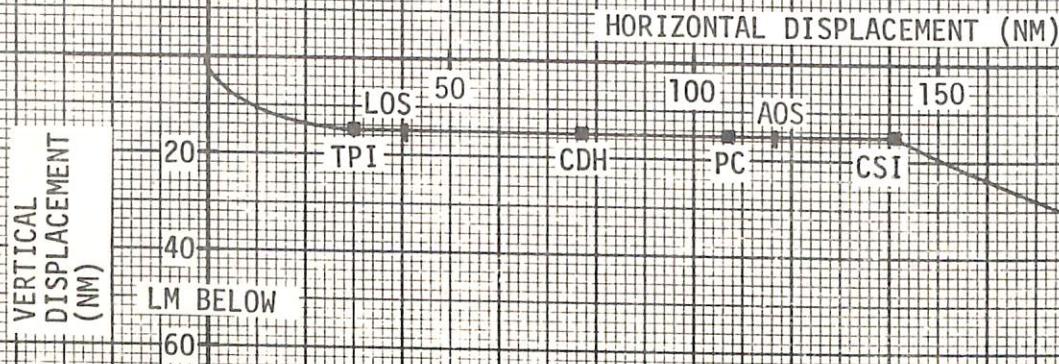
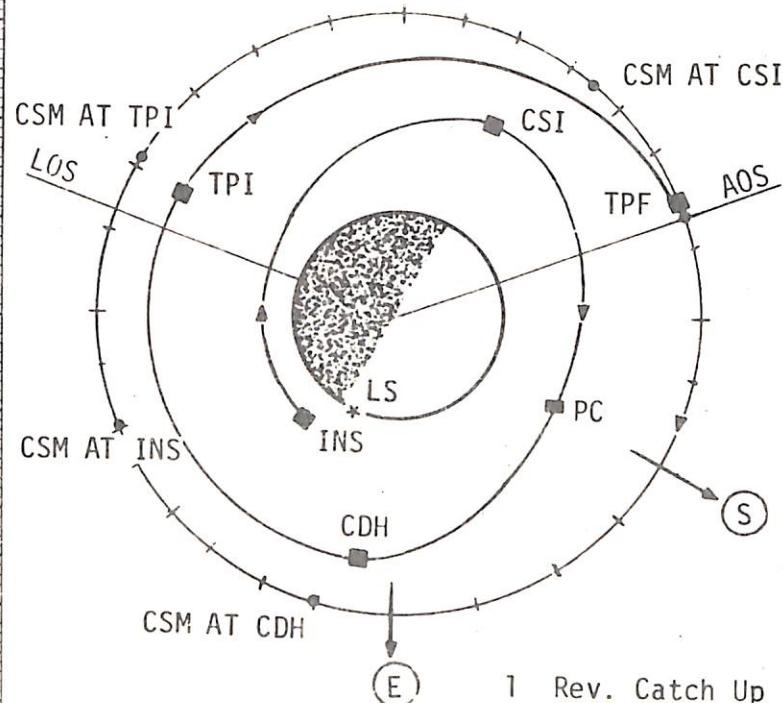
DATE March 9, 1970

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DATE March 9, 1970

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EVENT	GET TIG
INS	
CSI	
PC	
CDH	
TPI	

RELATIVE TRAJ
NOMINAL RNDZAPOLLO 13
INERTIAL AND RELATIVE PLOTS
NOMINAL RNDZ

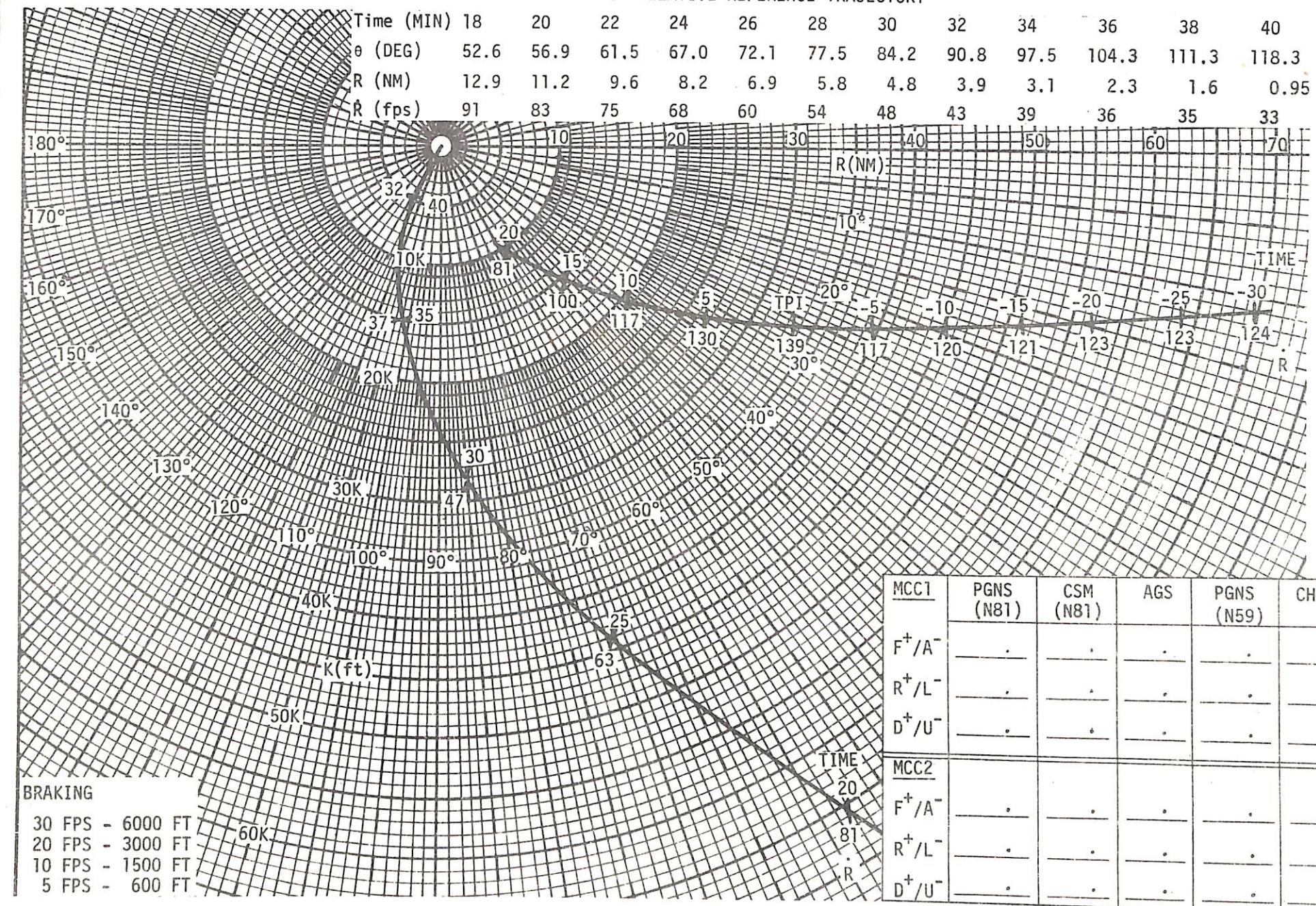
ΔT	RANGE	RDOT
INS	267.4	-448.7
-48	262.9	-444.7
-44	245.8	-423.6
-40	229.6	-394.6
-36	214.7	-359.2
-32	201.3	-318.9
-28	189.5	-275.9
-24	179.5	-232.2
-20	171.2	-190.2
-16	164.4	-152.0
-12	159.1	-119.7
-8	154.9	-94.8
-4	151.5	-78.4
CSI	148.6	-71.1
CDH	80.2	-119.3
TPI	32.4	-107.8
+4	27.2	-126.9
+8	22.4	-118.1
+12	17.9	-106.7
+16	14.0	-93.2
+20	10.6	-78.7
+24	7.7	-64.3
+28	5.5	-51.3
+32	3.6	-41.1
+36	2.2	-34.6
+40	.9	-31.8
+44	.2	-31.4

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RELATIVE
REF TRAJ

H-2 MISSION RELATIVE REFERENCE TRAJECTORY

Time (MIN)	18	20	22	24	26	28	30	32	34	36	38	40
θ (DEG)	52.6	56.9	61.5	67.0	72.1	77.5	84.2	90.8	97.5	104.3	111.3	118.3
R (NM)	12.9	11.2	9.6	8.2	6.9	5.8	4.8	3.9	3.1	2.3	1.6	0.95
\dot{R} (fps)	91	83	75	68	60	54	48	43	39	36	35	33



MCC1	PGNS (N81)	CSM (N81)	AGS	PGNS (N59)	CHART
F ⁺ /A ⁻
R ⁺ /L ⁻
D ⁺ /U ⁻

MCC2	PGNS (N81)	CSM (N81)	AGS	PGNS (N59)	CHART
F ⁺ /A ⁻
R ⁺ /L ⁻
D ⁺ /U ⁻

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