

101
Latimer

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James H. Latimer

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James H. Latimer

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Smithsonian Institution
Astrophysical Observatory
Cambridge, Massachusetts 02138

OBSERVATION OF GEMINI 6 - GEMINI 7 RENDEZVOUS¹

James H. Latimer²

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Abstract. --On December 16, 1965, the Smithsonian Astrophysical Observing Station at Villa Dolores, Argentina, successfully photographed the Gemini 6 and Gemini 7 manned spacecraft together. This report contains the observational data.

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INTRODUCTION

The Gemini 7 manned spacecraft (COSPAR designation 65-100A) was launched from Cape Kennedy, Florida, on December 4, 1965, at 13^h30^m03^s U. T. On December 15, 1965, at 13^h37^m26^s U. T., the Gemini 6 manned spacecraft (COSPAR 65-104A) was launched, also from Cape Kennedy.

At 00^h54^m U. T. on December 16, 1965, or 11 hours and 17 minutes after the launch of Gemini 6, the two spacecraft were photographed together from the Smithsonian Astrophysical Observing Station at Villa Dolores (Cordoba Province), Argentina.

INSTRUMENTATION AND RESULTS

The 20-inch, f/1 Baker-Nunn Satellite Tracking Camera was used. The film was 56 mm Kodak No. 2475 Royal X Extended Red Pan Recording developed in DK-60a to an equivalent ASA rating of 2500. Timing was by an EECo Precision Timing System crystal controlled to an accuracy of better than 1 millisec.

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²Operations Officer, Optical Tracking Division, Smithsonian Astrophysical Observatory.

Observers Alberto Caravaca and Tadeusz Muszynski used an 0.4-sec exposure time at a rate of 1 frame/2 sec.

The observation consists of three separate frames yielding for each spacecraft three time and three angular position measurements (see Figures 1 through 3).

The reductions of the data appear in Table 1. The coordinates used in the table are for 1950.0. The times are WWV as emitted. The errors in position are due to the nonoptimal image size of the spacecraft. The geodetic coordinates of the Villa Dolores Observing Station in the Argentine Datum are:

Longitude East:	294° 53'39!"82
Latitude South:	31° 56'36!"53
Elevation:	598.4 m.

Table 1. Reductions of spacecraft time and position measurements.

Time (December 16, 1965)	(Right ascension)	(Declination)
	α	δ
1) $00^{\text{h}}54^{\text{m}}43.028 \pm 0.001$		
Leading Spacecraft	$23^{\text{h}}51^{\text{m}}57^{\text{s}} \pm 1^{\text{s}}$	$+14^{\circ}43'27'' \pm 15''$
Trailing Spacecraft	$23^{\text{h}}51^{\text{m}}46^{\text{s}} \pm 1^{\text{s}}$	$+14^{\circ}43'26'' \pm 15''$
2) $00^{\text{h}}54^{\text{m}}45.028 \pm 0.001$		
Leading Spacecraft	$23^{\text{h}}57^{\text{m}}32^{\text{s}} \pm 1^{\text{s}}$	$+14^{\circ}53'53'' \pm 15''$
Trailing Spacecraft	$23^{\text{h}}57^{\text{m}}22^{\text{s}} \pm 1^{\text{s}}$	$+14^{\circ}53'55'' \pm 15''$
3) $00^{\text{h}}54^{\text{m}}47.028 \pm 0.001$		
Leading Spacecraft	$00^{\text{h}}03^{\text{m}}18^{\text{s}} \pm 1^{\text{s}}$	$+15^{\circ}04'14'' \pm 15''$
Trailing Spacecraft	$00^{\text{h}}03^{\text{m}}06^{\text{s}} \pm 1^{\text{s}}$	$+15^{\circ}04'18'' \pm 15''$



Figure 1. Photograph of Gemini 6 and 7 taken December 16, 1965, at $00^{\text{h}}54^{\text{m}}43^{\text{s}}$ U. T. The two diagonal broken lines are trailed images of the spacecraft. The direction of the spacecraft motion is to the right. The horizontal streak to the right of the spacecraft is the star BD $+14^{\circ}$ zone no. 5074, 7.2 mag, $\alpha = 23^{\text{h}}48^{\text{m}}29^{\text{s}}.6$, $\delta = +14^{\circ}25'.5$ (1855.0 coordinates).

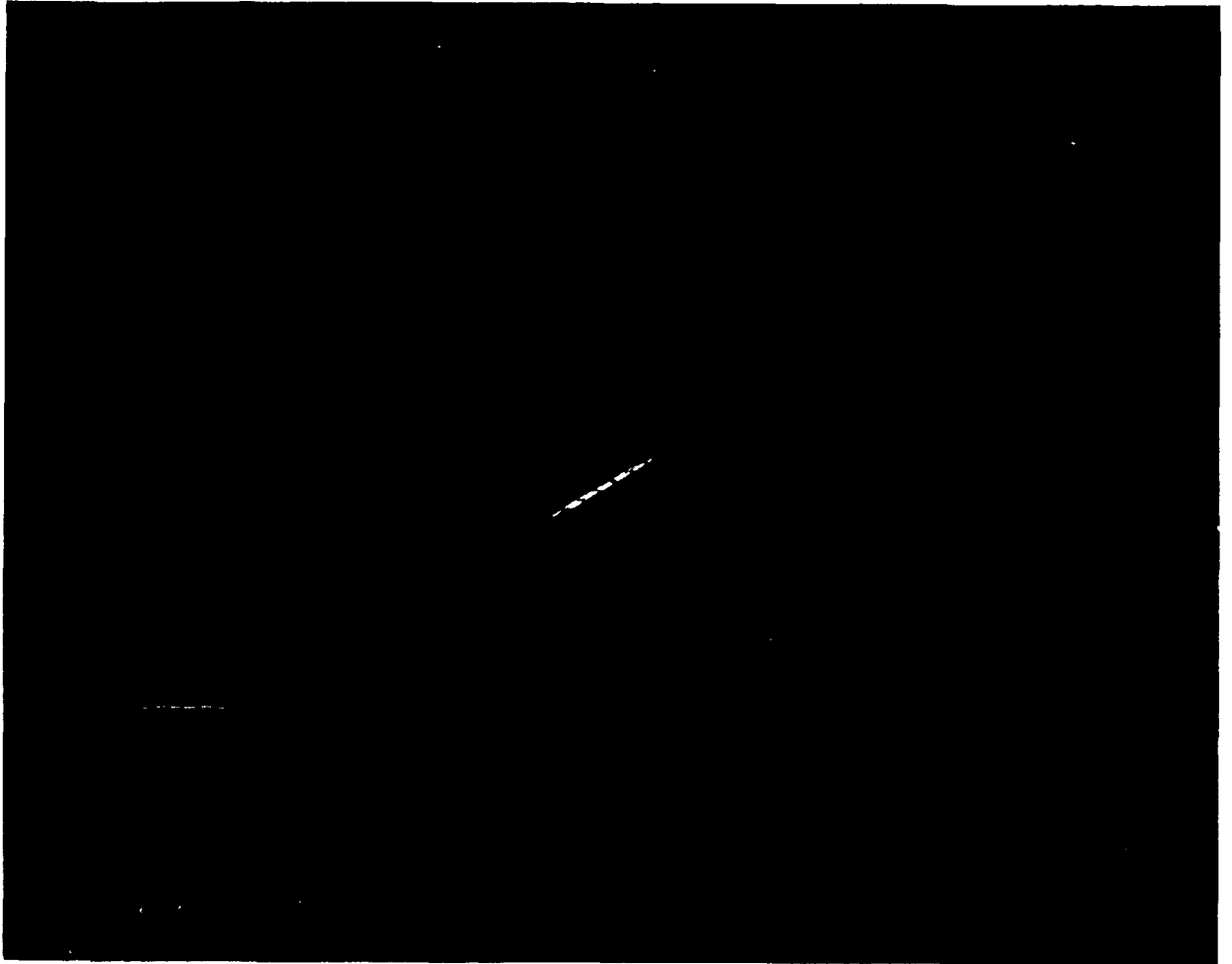


Figure 2. Photograph of Gemini 6 and 7 taken December 16, 1965, at $00^{\text{h}}54^{\text{m}}45^{\text{s}}$ U. T. Here, BD +14° zone no. 5074 is the brighter star to the left and below the spacecraft.



Figure 3. Photograph of Gemini 6 and 7 taken December 16, 1965, at $00^{\text{h}}54^{\text{m}}47^{\text{s}}$ U. T. The star above and to the left of the spacecraft is BD + 14° zone no. 5094, 7.3 mag, $\alpha = 23^{\text{h}}57^{\text{m}}16^{\text{s}}.4$, $\delta = +14^{\circ}9'.0$ (1855.0 coordinates).

NOTICE

This series of Special Reports was instituted under the supervision of Dr. F. L. Whipple, Director of the Astrophysical Observatory of the Smithsonian Institution, shortly after the launching of the first artificial earth satellite on October 4, 1957. Contributions usually come from the Staff of the Observatory. First issued to ensure the immediate dissemination of data for satellite tracking, the Reports have continued to provide a rapid distribution of catalogs of satellite observations, orbital information, and preliminary results of data analyses prior to formal publication in the appropriate journals.

The Reports are also used extensively for the rapid publication of preliminary or special results in other fields of astrophysics.

The Reports are indexed by the Science and Technology Division of the Library of Congress, and are regularly distributed to all institutions participating in the U. S. space research program and to individual scientists who request them from the Administrative Officer, Technical Information, Smithsonian Astrophysical Observatory, Cambridge, Massachusetts 02138.