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## GIOTTO EXTENDED MISSION (GEM)

(Cooperative)

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NOPE: R. Rose

Project Mgr: M. Grensemann (ESTEC)  
MOM: D. E. B. Wilkins (ESOC)  
LV/Range: Ariane/CSG

Launch Date: July 15, 1985

Projected SC Life/DSN Support:

Project Responsibility: European Space Agency (ESA)

Source: SIRD December 1990  
Sponsor: ESA  
Program Manager: G. Strobel

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### A. MISSION DESCRIPTION

The primary objectives of the Giotto Extended Mission (GEM), are to determine the composition and physical state of the Grigg Skjellerup comet's nucleus; to determine the processes that govern the composition and distribution of neutral and ionized species in the cometary atmosphere.

Prior objectives of Giotto were the same as those for Halley's comet in March, 1986.

## B. FLIGHT PROFILE

Giotto consists of a single European Space Agency (ESA) spacecraft that was launched in 1985 from Centre Spatial Guyanis in French Guiana on an Ariane launch vehicle. After a successful launch into geostationary orbit and a heliocentric transfer trajectory, the spacecraft successfully encountered Halley's comet in 1986.

One month after encountering Halley's comet, March 1986, the spacecraft was placed in hibernation in a heliocentric orbit slightly less than 1 A.U. Between February 1990 and July 1990 the spacecraft was successfully reactivated, checked out, placed on a trajectory course to intercept comet Grigg Skjellerup in July 1992. The spacecraft has been in hibernation since July 1990.

## C. COVERAGE

### 1. Coverage Goals

The telecommunication link threshold is influenced by the distance of the spacecraft from the Sun and the aspect angle of the spacecraft with respect to the Sun and Earth. Additional coverage is being provided by the DLR Weilheim, Germany, and ESA Perth, Australia, tracking stations. Stage I and Stage II of the Giotto Extended Mission have been completed. The DSN is committed to supporting the Stage III SIRD, whose requirements are listed below.

The DSN expects to meet these coverage goals even though requirements are in excess for the 70-m and 34-m standard subnets. View periods and other user requirements are not in direct conflict with Giotto during the Stage III support.

<u>Mission Phase</u>	<u>Period</u>	(30 days) <u>Passes/Month</u>	<u>Antennas</u>
Stage I			
Reactivation Phase	2/90 - 3/90	30	70-m
Scientific Payload Check Out Phase	4/90	15	34 STD
Near Earth Phase	5/90	28	34 STD
Stage II			
Earth Flyby and Hibernation III	7/90	None	None

<u>Mission Phase</u>	<u>Period</u>	(30 days) <u>Passes/Month</u>	<u>Antennas</u>
Stage III			
Reactivation Phase	5/92	21	70-m
Cruise Operations	6/92	16	70-m/34 STD
Rehearsals and Encounter	6/92 - 7/92	12	70-m/34 STD

## 2. Network Support

The support provided by the DSN is indicated in the following table:

<u>System</u>	<u>Goldstone</u>				<u>Canberra</u>				<u>Madrid</u>			
	12	14	15	16	42	43	45	46	61	63	65	66
S-band TLM	P	P			P	P			P	P		
X-band TLM	P	P			P	P			P	P		
S-band CMD	P	P			P	P			P	P		
S-band TRK	P	P			P	P			P	P		
X-band TRK	P	P			P	P			P	P		

## D. FREQUENCY ASSIGNMENTS

Frequencies are allocated according to the following table:

<u>System</u>	<u>Uplink (MHz)</u>	<u>Downlink (MHz)</u>	<u>Polarization</u>
S-band TLM	--	2298.703704	RCP
X-band TLM	--	8428.580248	RCP
S-band CMD	2116.72	-	RCP
S-band TRK	2116.72	-	RCP
X-band TRK	--	8428.580248	RCP

## E. SUPPORT PARAMETERS

The support parameters for the Telemetry, Command, and Support Systems are listed below:

## (1) Telemetry

Data Streams	1 (S- or X-band)
Format	PCM/PSK (uncoded/coded)
Subcarrier Frequency	46.080 kHz for 360 b/s 276.480 kHz for 5760, 23040 and 46080 b/s
Record	DODR Required

## (2) Command

Format	PCM/PSK
Bit Rate	125/8 b/s (15.625 b/s)
Subcarrier Frequency	16 kHz
Subcarrier Waveform	Sine

## (3) Support

Uplink Power	Up to 20 kW (34-m), 100 kW (70-m)
Antenna Rate	Sidereal
Antenna Angle Data	Not Required
Doppler Rate	Moderate to High
Range Format	Standard DSN
Recording	
. Analog	Not Required
. Digital	Required

## F. TRACKING SUPPORT RESPONSIBILITY

The allocation of responsibilities for tracking support is listed in the following table:

<u>Mission Phase</u>	<u>Support Responsibility</u>
Stage I	DSN/ESA-Perth/DLR-Weilheim
Stage II	DSN/ESA
Stage III	DSN/ESA-Perth/DLR-Weilheim