JPRS L/9047

21 April 1980

West Europe Report

SCIENCE AND TECHNOLOGY

(FOUO 5/80)

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

For further information on report content call (703) 351-2811 or 351-2501 (Greece, Cyprus, Turkey).

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000200070040-8

JPRS L/9047

21 April 1980

WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

(FOUO 5/80)

CONTENTS

INTERNATIONAL AFFAIRS

EUROPEAN DATA BANKS LINKED IN EURONET

Paris LE NOUVEL OBSERVATEUR in French 11-17 Feb 80 p 46

[Article by Fabien Gruhier]

[Text] This next Wednesday, 13 February, should be a great day. Roy Jenkins, chairman of the European Communities Commission, Simone Veil, and all the veritable European "Who's Who" assembled at Strasbourg are going to play, ceremoniously, with cathode ray screens and terminals. All for the purpose of marking a birth: that of European telemation. Computers of all countries! Unite; by virtue of the brilliant new network designated EURONET--"the living memory for Europeans," "the most important progressive step since Gutenberg," "the instrument which places data at one's fingertips"--the "intellectual resources" of the Old Continent are finally going to be available, accessible at any instant in any place by means of a simple telephone call.

The project goes back to 1971. It consisted of linking, to potential uses, the principal "data banks" by a special network--these data files which are sprouting like mushrooms on the surface of the industrial world. The properties of new pharmaceutical products, the status of cancer research, the standards imposed by Denmark upon imported toys, the list of delinquent debtors in Italy, the effects of nuclear radiation upon some organic substance, the results of the last Irish elections.... Henceforth it is only necessary to bend down and punch some code numbers on the first terminal one encounters in order to have instant access to this manna of data.

The banks which contain these data are bursting forth at the stupefying rate of one every other day in the EEC alone. It was truly urgent to design a method of consultation. The European Communities Commission has already succeeded in assembling a group of 30 services--public or private institutions which have connected their data banks to the EURONET Network. The ensemble constitutes DIANE--Direct Information Access Network for Europe--a sort of telemation galaxy which has been operating as an experiment free of charge since last autumn.

Godsend for Research Workers

Those were the good times; as of this Wednesday payment will have to be made for use of the EURONET-DIANE. The files of the OECD, the rulings of the Italian Audit Office, the catalogue of the toxic effects of chemical substances, the worldwide index of patents, and so forth--all the data is going to be sold. But the rates will remain very moderate. Moreover, such is essential to the operation, for, although the experimental EURONET did not charge for its services, consultation of the European data banks by means of the standard telephone networks, on the other hand, up to the present has been very expensive. So expensive that in some countries it was attractive to consult American files.

With EURONET the cost of access to a European file will become "from a third to a fifth as high," is the assurance of an expert. "And independent of distance." Thus EURONET-DIANE will be a genuine godsend for all who are eager for data--enterprises, research workers, officials--as well as for the compilers and sellers of those data. "The fund of European documentation at last will become profitable." A true miracle; to organize EURONET there was even no need to install new telephone lines. It was simply a matter of assigning lines to the "package transmissions" required by the data processing. Lines all along which the messages, "packages" of figures properly labeled by the computers are entered in bulk, like bottles in the sea, which will with absolute certainty reach their destinations by virtue of sophisticated localization. "Several inquirers can be stacked up on the same line, "explains Phillipe Collier, editor-in-chief of the first French specialized data bank publication.* "From which result the lower costs."

From which also arises the difficulty in succeeding. "There are people who have divergent interests," said one of the officials responsible for marketing the EURONET. "The various Posts and Telecommunications administrations of the EEC countries receive comfortable revenues when they connect their subscribers to American data banks. It is difficult to interest them in EURONET." Some of these European Posts and Telecommunications administrations, it is said, have had to have their ears tweaked in order to agree to assign, to those requesting it, the indispensable "open sesame"; an access number to the EURONET system. The Belgians, it seems, have proved to be especially unwilling. Moreover, all problems have not been resolved. The system's promoters, for example, have not succeeded in establishing how many customers there are. "Perhaps 200 at present? The various Posts and Telecommunications administrations have neglected to keep us up to date," said Garth Davis, the European Commission's project head.

*INFOTECTURE; 11, rue du Marche-Saint-Honore, 75001 Paris

Everything leads it to be believed, nevertheless, that the success will be considerable--in fact, blazing. "In comparison with the United States the market in Europe for "on-line data" is woefully underdeveloped. It is going to increase this year. And that will cause a snowball effect. EURONET constitutes an environment favorable to the creation of new data banks, which will in turn attract new customers, and so on. We are going to see a great explosion of telemation data," Everybody will profit from it.

A Data-Processing Esperanto

Including the Posts and Telecommunications administrations, which fear losing the benefits of the (small) present traffic with the United States: "They are going to profit from the prodigious growth of the market which will occur in Europe, with rates comparable to domestic American rates, which is to say, very low, but quantity will make up for that," explains a Luxembourg official. "Moreover, when the network is finally operational, the European Commission will withdraw from it completely. But without us, the nine Posts and Telecommunications administrations would never get together around a table to tune their violins...."

Nor to make their networks and computers compatible. Because even for electronic language Europe is a Tower of Babel. The elements of rate structure, the technologies, the standards for signal modulation--all are different, EURONET is therefore a network of frightening complexity. With a multiplicity of "interfaces," of decoder-transcoders untiringly handling the signal packages.

However, the European Commission has had to develop a universal command language, a sort of data processing Esperanto which enables all computers to be interrogated in the same manner. But, here too, at the price of complexity; to have access, at Turin, to a German data bank it is necessary to compose upon the keyboard a combination of 60 figures! All the while this must be done very rapidly without the slightest error under pain of losing the line and having to start over again.

But in this curious game of numbers and letters the problem of the letters remains the thorniest. "It is not enough to have easy access to a data bank. Further, one must be able to understand the data gained from it," said Loll Rolling, in charge of automated translation within the European Commission. "Already, in the nine countries of the EEC we must speak six languages, and the community organizations employ a regiment of 4,000 translators. We look forward with some trepidation to the entry of Portugal, Spain, and Greece...."

11,706
CSO: 3102

INTERNATIONAL AFFAIRS

PRESENT STATUS, PROSPECTS OF SPACELAB PROGRAM

European Space Cooperation

Paris AIR & COSMOS in French 26 Jan 80 pp 32-33

[Article by Pierre Langereux: "Spacelab: The European Contribution to the Shuttle"]

[Text] The cooperation agreement signed on 24 September 1973 between NASA, representing the United States, and the European Space Agency (ESA) for the development and building of Spacelab enables Europe to participate in the largest American space program of the 70's and 80's: construction of the Space Transportation System, with the possibility of entering the reserved domain of manned space flights and sending the first European astronauts into space!

Spacelab is actually one of the main reusable elements of the Space Transport System (STS), which is destined to replace the traditional American rockets in the 1980's and thereafter. NASA expects that one-third of the 400 Shuttle missions planned for this decade will use Spacelab.

The Space Shuttle, the main element of the STS, is entirely built in the United States, along with the upper stages (SSUS and IUS) needed to launch payloads into high terrestrial orbits (in particular, geostationary orbit) or toward the planets.

On the other hand, Spacelab, which is put to work by the Shuttle for low-orbit missions (with or without a crew), is made completely in Europe for NASA.

This major program of European space cooperation, along with the Ariane rocket, which was aimed at ensuring Europe's independence for the launching of commercial satellites, is the precise counterpart of the American Space Shuttle.

2,000 Persons in Ten Countries

Ten European countries are participating in the Spacelab program, including nine out of the eleven members of ESA: Germany, Italy, France, the United

Kingdom, Spain, Belgium, the Netherlands, Denmark and Switzerland, along with one of the observer countries: Austria.

This is an optional program in which the European nations are free to participate financially, depending on their own interest. Germany, the promoter of the operation, finances over half (53 percent), Italy pays 18 percent and the other countries finance the balance. The building of Spacelab is headed at ESA by a program committee made up of representatives of all participating nations.

Some 2,000 persons from 50 firms in the ten countries involved participate in the Spacelab program.

The building of Spacelab began in June 1974 with the drawing up of the development contract with the German firm Erno in Bremen.

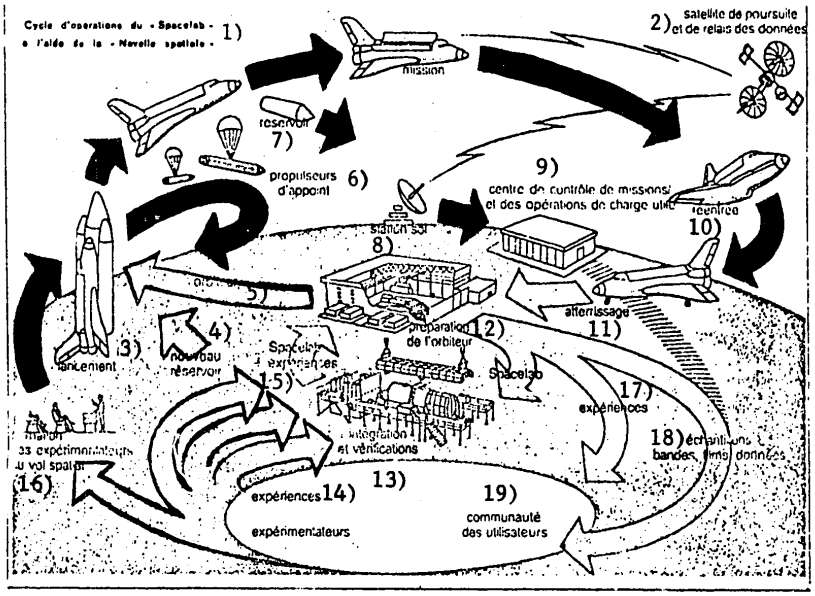
The industrial organization includes ten main contractors: AEG [German Electric Company]-Telefunken and Dornier in Germany, Aeritalia in Italy, Bell Telephone and SABCA [expansion unknown] in Belgium, Fokker-VFW in the Netherlands, British Aerospace in Great Britain, MATRA [expansion unknown] in France, Kampsax in Denmark and Sener in Spain. These companies work with some 40 subcontractors in the ten participating countries. Several American firms, including TRW [expansion unknown], Martin Marietta, and so on, also lend their aid and experience in manned space systems to European builders for whom Spacelab is a new and difficult problem.

Delays and substantial cost overruns also occurred very quickly in completing the Spacelab program as the result of technical difficulties, particularly regarding software, problems further aggravated by a certain laxity in program management. Numerous personnel transfers also occurred among program officials. Five persons succeeded one another as head of the program at ESA, until the arrival of Michel Bignier in November 1976. The project heads were also replaced, both at ESA (Pfeiffer has been there since 1977) and Erno (A. Kutzer since September 1979).

Program Costing 4 Billion Francs

The estimated cost of completing the Spacelab program exceeded initial estimates (308 million accounting units at 1973 prices) by 20 percent and then by 40 percent. The current estimated cost of completion has leveled off since the end of 1979 at 140 percent the initial package, or 704 million accounting units (1979 prices), which represents some 4 billion francs.

This new cost of completion of 704 million accounting units includes the study costs (16 million accounting units), the Spacelab development contract with Erno and certain work after delivery (578 million accounting units), the contract to develop the IPS space plotting instruments at Dornier (35 million accounting units), and the internal expenses of ESA (75 million accounting units), which are not as high as expected (savings of some 36 million accounting units).



Key:

1. Cycle of Spacelab operations with help of Space Shuttle
2. Tracking and data relay satellite
3. Launching
4. New tank
5. Orbiter
6. Makeup propellants
7. Tank
8. Solar station
9. Mission Control and Payload Operations Center
10. Re-entry
11. Landing
12. Preparation of orbiter
13. Integration and verifications
14. Experiments and research workers
15. Spacelab and experiments
16. Training of space flight research workers
17. Experiments
18. Samples, films, tapes, data
19. Compound

Only recently -- last week -- ESA confirmed that the Spacelab development program can be finished within the limit of 140 percent of the initial package.

Currently, expenditures amount to 103 percent and commitments made to manufacturers total about 120 percent of the package, Michel Bignier said.

But ESA also recognizes that keeping the cost of the program within the limit of 120 percent depends to a very large extent on Erno's completion of its task without exceeding the 525.5 million accounting units provided. Moreover, Erno has just reorganized its team last year, mainly in order to second the central nucleus of 100 to 150 engineers working exclusively on the program.

NASA Mission Model of First Spacelab Flights (15 November 1979)

Spacelab Flight	Shuttle Flight	Flight Date	Orbit NM	Orbit °	Spacelab	Missions	Participants
SL1 (FSLP)	Sh. 9	16 Apr 82	135	57	1 LM + 1P	Multidisc.	NASA, ESA
SL2	Sh. 13	14 Sep 82	202	50	3P	Astrophysics	NASA
SL3	Sh. 16	7 Dec 82	200	57	1 LM + 1P	Microgravity	NASA
SL4	Sh. 21	7 Apr 83	160	46	1 LM	Life Sciences	NASA, ESA
SL5	Sh. 25	22 Jul 83	216	57	4P	Astro.-Phys.	NASA
SL6 (D1)	Sh. 29	13 Dec 83	160	28.5	1 LM	Microgravity	Germany
SL7	Sh. 37	3 May 84	210	57	1 CM + 3P	Astro.-Phys.	NASA
SL8	Sh. 40	27 Jun 84			1 LM + 1P	Applications	NASA

ESA will once again evaluate cost estimates upon completion of the Spacelab program in March 1980.

Italy Angry

The new 140-percent package has not been formally accepted by the member states, but there are very good chances that it will be at the next ESA Board meeting to be held this week, on 23-24 January, Bignier said.

The member nations have in fact all stated that they wanted to remain in the program and in principle, have accepted the new schedule of contributions to the overrun as proposed in September-October 1979. This distribution should not therefore be questioned, although four member countries have not yet been able to approve the credits, for reasons removed from the Spacelab program, it is stated.

However, Italy has decided to reduce its contribution to the overrun in a spectacular fashion, from 18 percent to only 1 percent in order to manifest its discontent with the inadequate return obtained to date by Italian manufacturers in the Spacelab program, which in fact dropped from 18 to 12 percent of all contracts between 1974 and 1978.

The deficit caused by the Italian position was therefore divided up among the other participating nations, with the exception of Switzerland and Austria, which are also protesting their unsatisfactory industrial return.

Planned Capabilities

Paris AIR & COSMOS in French 26 Jan 80 pp 34-35

[Article by Pierre Langereux: "The Space Erector Set"]

[Text] Spacelab is a space laboratory designed to be recovered and reused for 10 years or 50 flights. It may be used directly by astronauts or operated by remote control from the Shuttle attitude control station.

This "satellite in a kit" can be used in eight different configurations, uniting pressurized modules (short or long) and/or instrument-carrying pallets directly exposed to space.

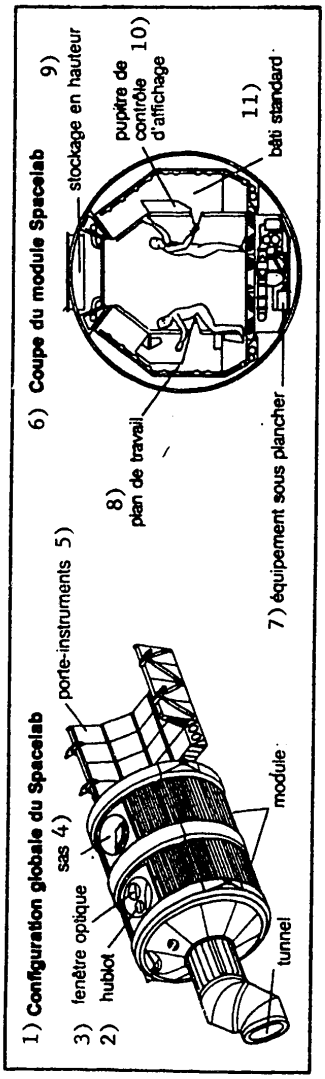
The pressurized module, manufactured by Aeritalia, is an aluminum alloy cylinder made up of one or two segments 4.1 meters in diameter and 2.7 meters long, closed by cones. One of the segments houses auxiliary equipment and part of the scientific instruments, while the other is exclusively reserved for mission equipment, arranged in standard racks, each able to hold a payload weighing 290 pounds (simple rack) or 580 kilograms (double rack). A linking tunnel 1 meter in diameter provides the connection with the Shuttle and interior access (no exit into space) for the astronauts. The Spacelab module can carry a maximum of 4.6 tons payload and it provides a useful volume of 22 cubic meters for the crew, which can work there without spacesuits. The (air-conditioned) atmosphere is at a pressure of 1 kilogram per square centimeter with 70-percent humidity.

The pallets, made by British Aerospace, are all 4 meters wide and 2.9 meters long and can carry a useful load of 3 tons. Each one has 25 anchoring points and 18 panels supporting a mass of 50 kilograms per square meter. The pallets also have thermal control, an energy supply and a data transfer system.

An igloo made by Fokker-VFW contains the sensitive electronic equipment in an air-conditioned enclosure pressurized with nitrogen.

Throughout flight, from launching until return, Spacelab remains in the Shuttle's compartment, whose dimensions (18 by 4.6 meters) surpass those of all payloads, including Spacelab. Likewise, the maximum mass of Spacelab is determined by the 14.5-ton limit imposed by the Shuttle's payload mass upon landing.

Under these conditions, Spacelab can put a payload weighing from 4 to 9 tons into orbit around the Earth, depending on the configurations chosen. By way of comparison, a Spacelab made up of one long module and two pallets



Key:

1. Overall configuration of Spacelab
2. Porthole
3. Optical window
4. SAS [Solar Array System]
5. Instrument carrier
6. Profile of Spacelab module
7. Equipment under floor
8. Work area
9. Overhead storage
10. Control panel, display lights
11. Standard frame

is 13.8 meters long and weighs 11.4 tons, about half the weight of a Soviet Salyut orbital station.

Seven to Twelve Days in Flight

Spacelab also depends on the Shuttle for all its auxiliary equipment: energy, atmosphere, thermal control, stabilization, telecommunications, habitat for the crew, and so on.

The Shuttle's power, which is now limited to 7 kilowatts, allows Spacelab to remain in orbit only 7 to 12 days, with four astronauts who are payload specialists on board, in addition to the Shuttle crew.

The Shuttle's crew normally includes three astronauts, including two pilots (one is the ship commander) and one mission specialist exclusively in charge of the payload. All are professional astronauts chosen from among NASA's corps. For the first time, NASA has extended recruiting to blacks and women (six women have already been selected).

On the contrary, the Spacelab crew is made up of amateur astronauts recruited from among scientists or engineers specially trained to handle Spacelab experiments and oversee operation of the laboratory. Spacelab's crew can in this way be made up of from one to four payload specialists, whether men or women.

But all the astronauts, those on the Shuttle and those on Spacelab, have their quarters in the compartment located under the Shuttle's attitude control station, where they eat, sleep, wash and dress or do exercise to ward off the discomforts inherent in prolonged space flight.

Laboratory in Space

The environment (cosmic vacuum, microgravity, and so on) and the features of Spacelab (human operators, and so on) make it an ideal platform for many operations.

Spacelab can be used for scientific missions involving high energy astrophysics, solar or stellar astronomy, physics of the atmosphere, the ionosphere or the magnetosphere, life sciences (study of space behavior, biology and medicine) and so on.

But it can also be used as a test bench for space applications: telecommunications, navigation, observation of the Earth, meteorology, climatology, production of materials in microgravity, and so on.

Training of Astronauts

Paris AIR & COSMOS in French 26 Jan 80 pp 40-41

[Article by Pierre Langereux: "The First European Astronauts"]

[Text] For the first Spacelab 1 mission in which Europe is participating, in May 1978 ESA chose three astronauts who were payload specialists from among the 2,000 candidates presented by all the member nations in the competition that began in April 1977.

The three are: Ulf Merboid, 39, German, physician; Wubbo Ockels, 34, Dutch, also a physician; and Claude Nicollier, 36, Swiss, astronomer and airline pilot.

For its part, NASA also chose two astronauts who were payload specialists but who have never been in space: Michael Lampton, 39, a physician; and Byron K. Ichtenberg, 32, a research worker from MIT.

Difficult Selection

The conditions set by ESA for the selection of the first European astronauts were the following:

The candidate had to: be a native (male or female) of a member nation or country with the status of observer participating in the Spacelab program; be no more than 47 years of age, which means a maximum 51 at the time of the mission; be between 1.53 and 1.90 meters in height; and hold a university diploma (or the equivalent) in natural sciences or technology, accompanied by a minimum of 5 years experience in at least one of the experimental fields in which the Spacelab 1 mission is involved.

Candidates also had to be in good health and ready to submit to intensive medical and psychological testing. A predisposition to vertigo or air sickness meant disqualification. The purpose of the psychological tests was to see that those in charge of experiments would be able to handle the work load and cope with the Spacelab environment, which involves high levels of tension. The general qualities required were a good memory, a logical mind, good ability to concentrate, an aptitude for orientation in space and good manual dexterity. In addition, candidates chosen had to show strong motivation, a flexible personality, good emotional stability and a lack of aggressiveness.

Intensive Training

The training of the European astronauts destined to be payload specialists is less rigorous than and different from that imposed by NASA on the Shuttle crew. However, the criteria imposed by ESA for its payload specialists are of the same level as those used by NASA in selecting the mission specialists,

who are professional astronauts. The first European astronauts are therefore of a very high level.

Their training mainly consists of becoming familiar with European experiments and the operation of Spacelab 1, as well as preparing for life and work under conditions of weightlessness. They will in fact have to work 10 hours a day during the Spacelab 1 flight.

Training enables astronauts to become familiar with the purpose of experiments by studying works on the subject and reports by scientists. They will also be trained in the laboratories in the handling of the scientific instruments involved and participate in simulated operations applying the man-machine systems and the integration of equipment to be used in the first flight.

To this end, European astronauts take training for Spacelab and in the use of its equipment at the DFVLR [expansion unknown] facilities in Porz-Wahn (Germany), where the ESA European team in charge of integrating and coordinating the payload (SPICE) is set up, as well as at the ESA Technical Center (ESTEC) in Noordwijk (Netherlands) and at the German project foreman, Erno, in Bremen, where Spacelab is assembled and integrated.

One of the European astronauts, Claude Nicollier, also participated in a simulated flight of a Spacelab mission on board the NASA laboratory plane, the Convair 900 Coronado, within the framework of the Assess program. These flights amounted to a practical simulation of the conditions of a Spacelab mission (except for weightlessness).

It therefore became apparent that like their astronaut colleagues who have already made flights, the Spacelab crew would experience a disruption of their circadian rhythm and substantial stress, which should be prepared for by appropriate pre-flight training.

Plans for First Mission

Paris AIR & COSMOS in French 26 Jan 80 pp 39-40

[Article by Pierre Langereux: "First Flight of Spacelab in April 1982"]

[Text] NASA has now scheduled the first Spacelab flight for April 1982. It will be completed through the cooperation of NASA and ESA, which will share the weight, energy and operating time of the crew equally.

The flight is aimed at verifying the general operation of Spacelab and at carrying out various experiments whose purpose is to show the possibilities of the manned orbital laboratory for space research.

The first payload of this Spacelab 1, whose preparation has now gone on for two and one-half years, includes a total of 76 scientific and

technological experiments: 61 European and 15 American, including one Japanese. An Indian experiment is being shared by ESA and NASA.

Through these 76 experiments, 219 scientists from 16 countries participate in the first Spacelab mission. Some 130 of them are from 12 European nations (Germany, Austria, Belgium, Denmark, Spain, France, Italy, Norway, the Netherlands, the United Kingdom, Sweden and Switzerland) and 80 are from the United States. The others are from Canada, India and Japan.

The 61 European experiments are mainly devoted to materials science (40 experiments) and bioastronautics (10). The rest are divided among physics of the atmosphere (3), plasma physics (3) and solar physics (2), astronomy (2), and observation of the Earth (2).

The American experiments mainly concern space biomedicine (7 experiments). The United States has no space processing experiment on the first Spacelab.

Participants share the use of certain instruments such as the vestibular sled, ovens, the fluid physics module, the microwave radar, the photogrammetric chamber, and so on.

European Experiments

Discipline	Countries	Instruments	Site
Life Sciences (10)	Germany, France, Great Britain, Italy, Sweden, Switzerland	Vest. sled, cell implants, etc.	Pressurized module
Physics of the atmosphere (3)	Germany, Belgium, France	Telescope, spectrometer	Instrument carrier, pressurized module
Solar physics (2)	Belgium (and ESA research workers)	" "	" "
Plasma physics (3)	Germany, Austria, France, Norway (and ESA research workers)	" "	" "
Astronomy (2)	Germany, France, Great Britain, Italy (and ESA res. workers)	Infrared telescope	Instrument carrier
Earth observation (2) (Instruments)	Germany (data to be supplied to res. workers everywhere	Photogrammetric chamber	Instrument carrier

(cont.)

Materials science (40)	Germany, Austria, Belgium, Denmark, Spain, France, Great Britain, Italy, Netherlands, Sweden	Isothermic ovens with gradient and mirrors Pressurized mod. Fluid physics module

Larger Crew

Spacelab 1 will be placed in a circular orbit around the Earth at an altitude of 250 kilometers with a pitch of 57° over the Equator. The length of the flight is planned for 7 days, in the course of which Spacelab astronauts will do 160 hours of work. On an exceptional basis, NASA expanded the crew for this first flight by naming two mission specialists (Owen Garriott and Robert Parker) instead of one, in addition to the two Shuttle pilots and the payload specialist astronaut who will be named later. The action was taken because of the large density of experiments for the first flight.

For this first mission, Spacelab will be made up of one long module and an instrument-b earing pallet to carry a total 2.8 tons of payload that will be shared equally by Europe and the United States. At the present time, ESA and NASA have a problem remaining within the weight of their share of the payload (1,392 kilograms each). In particular, the European payload is about 10 percent too heavy -- 140 to 150 kilograms -- and ESA is probably going to have to drop some Spacelab 1 experiments in order to remain within the mass limit imposed.

The payload will first of all be integrated in Europe at Erno in Bremen (Germany), under the responsibility of the ESA SPICE group, before being shipped to Cape Canaveral (Florida), where the successive integrations of the payloads are to be completed, then with Spacelab and finally, with the Shuttle.

Integration of the European payload will cost some 25 million UC [accounting units] (1978 prices) and will be financed by ESA. Research workers therefore have free access to the first Spacelab with respect to flight expenses, but financing of scientific equipment must still be their responsibility.

Improvements, Future Missions

Paris AIR & COSMOS in French 26 Jan 80 pp 41-43

[Article by Pierre Langereux: "Production and Improvement of Spacelab"]

[Text] The Spacelab program is now made up of four phases for ESA: development (phase C/D), including the manufacture and delivery of a first flight

model of Spacelab to NASA; production (FOP) of a second flight model of Spacelab, ordered separately by NASA; use of Spacelab by Europe (ESA and member nations individually); and improvements (FOD) in the current Spacelab by ESA and NASA in cooperation.

The cooperation agreement signed in 1973 between ESA and NASA covers the first three phases of the Spacelab program. The fourth phase (improvements) has already been the subject of preliminary studies, both by NASA and ESA, but to date, the European member nations have made no decision concerning their participation in this new phase.

The development phase of Spacelab will be completed in 15 to 18 months, according to Michel Bignier, director of the program at ESA. Erno will complete integration of the prototype (engineering model) of Spacelab in September 1980 in Bremen and integration of the first flight model has already begun.

Delivery of First Spacelab in 1981

Delivery to NASA of the different models of Spacelab will begin this year.

The prototype is to be delivered in under a year, in November 1980 (instead of June 1979).

The first flight model of Spacelab, which is made up of one long module and five equipped pallets, will be delivered in two lots. The first lot (FU 1), including the long module and two pallets, will be delivered in February 1981 (instead of September 1979), and the other (FU 2), made up of three equipped pallets (with igloo) will be sent to NASA in May 1981 (instead of January 1980).

The first plotting instrument to be used on the pallet missions will be delivered in September 1981.

NASA has planned to use this first Spacelab for two initial flights that are respectively scheduled for April 1982 (Spacelab 1) for the joint NASA-ESA mission with a long-module and pallet configuration, and in September 1982 (Spacelab 2) for the second mission with three equipped pallets and the instrument plotting system (IPS).

For the time being, this schedule is confirmed by NASA despite the recent report on the first flight of the Shuttle for October 1980 (instead of March 1980).

Order for Second Spacelab

The order for the second Spacelab by NASA (provided for in the 1973 agreement) is to be signed, in principle, tomorrow, 27 January. ESA has already signed the contract, on 20 December 1979, after the three parties: NASA,

ESA and Erno, finally agreed on the amount of the supplier's contract for the second Spacelab. This contract will total 117.1 million accounting units (1979 prices), or about 660 million francs. NASA actually rejected the first European offer, which amounted to 148 million accounting units.

Principal European Contractors

Germany: AEG-Telefunken; Dornier System, Draeger, Erno, MBB [expansion unknown], Nord Micro, SEL [expansion unknown], VFW-Fokker

Austria: OKG [expansion unknown]

Belgium: Bell Telephone Mfg., ETCA [expansion unknown], SABCA

Denmark: Christian Rovsing, Kampsax, TERMA [expansion unknown]

Spain: INTA [National Institute for Aerospace Research], SENER [expansion unknown]

France: SEMS [expansion unknown], Matra, Thomson-CSF [General Radio Company]

Italy: Aeritalia, Microtecnica

Netherlands: Fokker-VFW

United Kingdom: British Aerospace, Dynamics Group

Switzerland: Industrial Company, Radioelectric

It is a fixed price contract (with revision to correct for inflation), except in the case of the American manufacturers and their European subcontractors, which involves around $6.3 million.

The contract does not include the internal expenditures of ESA, however (estimated to total 33 million florins and paid in that currency), or the supplying of the second IPS2 plotting instrument, whose order by NASA was postponed until April-May 1980 due to delays in developing the instrument. NASA is awaiting the project review of the IPS before making its order. The cost of the operation, estimated at some 13 million accounting units, was deemed acceptable by NASA.

Delivery of the second Spacelab to NASA is scheduled in 14 shipments of material spread out from October 1981 to April 1984. This second Spacelab will include one short module and five equipped pallets.

Delivery of the second IPS will not take place until the end of 1983 or the beginning of 1984.

Participation in the SSS

ESA is then to supply NASA with spare parts as they are needed as soon as the Spacelab flights begin. It is quite likely that NASA will entrust the American firm of McDonnell Douglas -- in charge of Spacelab in the United States -- with the task of ordering spare parts directly from European industries, either from the project foreman or from the main contractors involved.

If NASA should need a third Spacelab, ESA believes that the same procedure should be followed as for the second (ordered by ESA).

However, it does not appear that this possibility should be considered before 1985, Bignier says. The first two Spacelabs should in fact meet NASA's anticipated needs until 1987!

For the first two years of Spacelab's operations -- 1982-1983 -- NASA only plans six to eight flights a year (one-third of them military), which can very well be accomplished with two models. The equipment can in fact be used in eight different configurations.

Industrial Returns (Contracts) Compared With Contributions

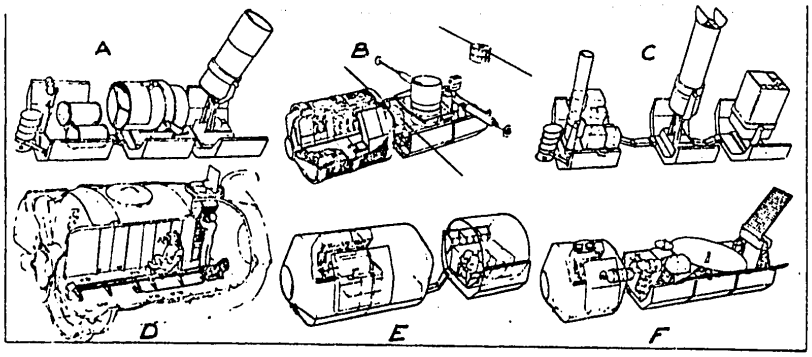
Participants in Spacelab	Contributions in Percent	Industrial Return in % 1974	1978
Austria	0.76		0.40
Belgium	4.20	4.20	5.10
Denmark	1.50	1.50	2.20
France	10.00	10.00	12.50
Germany	53.34	54.10	52.60
Italy	18.00	18.00	12.30
Netherlands	2.10	2.10	2.10
Spain	2.80	2.80	3.60
Switzerland	1.00	1.00	1.20
United Kingdom	6.30	6.30	8.00

On the other hand, European industry should be consulted for the supplying of the special Space Sortie Support (SSS) pallets from the U.S. Air Force for scientific experiments with the Shuttle beginning in 1983.

Actually, the U.S. Air Force plans to use the pressurized modules of the Spacelab belonging to NASA for its military needs. It does plan to have pallets built comparable to those of the Spacelab, but without the igloo.

The call for bids for the supplying of the SSS was in principle to be sent at the end of January 1980, but the U.S. Air Force has announced that it will be postponed until around March 1980.

The project foreman of the SSS must be an American firm given the military nature of the system. The manufacturer will in fact have to set the SSS up on the launching base. Four American manufacturers are now interested: Rockwell International, TRW Systems, Martin Marietta Corporation and General Electric. The SSS contract is estimated at about $50 million for two sets of pallets making it possible to have an average of one flight a year for 10 years.



[Above] Spacelab can be used for highly different missions: astronomy (A), atmospheric physics (B), solar physics (C), bioastronautics (D), the production of materials under conditions of weightlessness (E), and observation of the Earth (F).

The current Spacelab can be considered as the precursor of a new family of space capsules destined to become autonomous and thereby prepare the way for future permanent orbital stations, which were originally part of the American Space Transportation System (STS) program.

For several years, NASA and ESA have been preparing for the following phase -- beyond the current Spacelab -- through the planning of various projects.

The two space agencies recently set up a specialized work group: FOCO (Follow-on Committee), to study together the possibilities of future improvements and developments -- in short- and medium-range terms -- of Spacelab, mainly through the conversion of existing elements and the addition of new specialized modules (power, and so on). FOCO is to submit a report on its work at the end of March 1980.

European Objectives

European objectives regarding future development of Spacelab have been set forth by ESA and fit into three categories: political, operational and industrial.

The political objectives are to pursue cooperation with NASA in working on orbital stations, preserve European progress in manned space systems in order to prevent the scattering of European teams, ensure participation in the use of future manned systems in order to strengthen ESA's position and to maintain Europe's capability in the future production of Spacelab and the operational support of missions.

Operational objectives include opening up Spacelab to new uses (space metallurgy and other fields that might provide commercial outlets), improving the profitability of Spacelab missions for users and preserving European users' access to technological know-how obtained through Spacelab.

Industrial objectives include ensuring the competitiveness of European industry, particularly in the fields of logistics and operational support and increasing the use of European equipment and technologies in future space programs, in agreement with NASA.

ESA has provided for development in two phases -- short and long-term -- the first of which has been awaiting a favorable decision from the ESA Council for over a year. Unfortunately, member nations are not able to take a position on Spacelab improvements as long as the financing problem for the development phase has not been solved once and for all.

Improvements which ESA has in mind are essentially aimed at the "search for a certain independence of Spacelab with regard to the Shuttle," Bignier explains. This autonomy would be gained by placing Spacelab in orbit with a Shuttle and bringing it back to Earth later by another Shuttle flight, inasmuch as the Shuttle's arm operated by remote control can be used for these transfers from (and in) the Shuttle compartment. At the present time, Bignier states, the same Shuttle takes the same Spacelab into space and brings it back, which immobilizes the Shuttle throughout the entire mission of the orbital laboratory. This is a waste. With 7-day flights, such a thing can still be accepted, but when the Spacelab flights last a month or longer, this procedure would immobilize 15 percent of the Shuttle flight's capacity!

ESA therefore proposes to free Spacelab from its dependency on the Shuttle -- or vice-versa, which does not pose insurmountable technical problems. The only crucial problem is supplying energy for an autonomous Spacelab which would no longer have the Shuttle's support, as is now the case.

This means that an autonomous power module (also launched by the Shuttle) must be designed. It would be joined with Spacelab for every mission.

FRANCE

TRENDS IN CIVIL AVIATION POLICY DISCUSSED

Paris AIR & COSMOS in French 23 Feb 80 p 36

[Article: "M Le Theule Traces the Limits of the Policy of Liberalization"; passages enclosed in slantlines published in boldface]

[Text] The latest edition of the newsletter from the Minister of Transportation contains an editorial on the theme: freedom to transport and passenger safety. Referring to air transportation problems, the minister notes that his ministry's activity takes place in an area which, in international matters, is characterized by deregulation and by the rise in fuel costs.

Referring to the offensive by certain countries in favor of /deregulation on international lines/, the minister declares that: "We should not, in the name of principle, however praiseworthy, favor an evolution of which we would be the first victims. The ministry's attitude has thus consisted of defending the pursuit of international traffic in an organized framework, all the while urging the national company toward a policy of low tariffs for certain flights and for certain categories of passengers. The contract with Air France permitted this attitude; the results obtained are encouraging and in 1979 do not indicate (as a matter of fact, they indicate the contrary) a deterioration of results, while at the same time the statements of many companies give reason for concern." This assessment does not exclude changes here and there. In support of this remark, the minister cited the case of Strasbourg, declared an "open city" in the area of traffic dues.

"But it is in the area of /unscheduled flights/ that the development has probably been felt most strongly. The governmental attitude toward intermediate-distance carriers has gradually been fully liberalized: several companies have been or are to be authorized to equip themselves to suit the development of tourism and permit a reconquest of a market too largely abandoned to foreign competition. For the long-distance carriers the development has to be more gradual: following total liberalization of flights to the Antilles, similar measures have been initiated for the Pacific zone. Great attention is paid to the consequences on the economy of regular carriers, who must not be put out of business; this would be contrary to the sought-after result. The development thus engendered is nevertheless irreversible and it will be extended to other areas each time that the market structure permits."

The minister notes further that for /domestic traffic/ the restraints of the international sphere do not exist. The government has canceled the convention with Air Inter in order to be free to define the applicable rules from 1981 on. "I declare, although the definitive decision has not yet been made, that I am not convinced of the necessity of continuing a necessarily restrictive conventional framework. The object, for Air Inter as for Air France, must be full administrative responsibility: the development of Air France within the framework of its contract--we are dealing with a contract and not a convention--has proved the justifiability of such a policy. The same principles hold for third-level transport, over which I refuse to exercise any special governmental controls; the government's role should, in the matter, be limited to verifying that safety conditions are correctly fulfilled. The problem of /unscheduled flights/ finally presents itself in terms comparable to those of international transport: the object should be to favor the development of tourism and the seasonal demand, while limiting damage to regular lines. In this spirit, domestic charters have been liberalized during vacation periods."

The minister observes that "in conclusion, we can note that our air transport has for the past several months been initiating /a more profound development than it would appear/. The regulatory framework has not had to be reformed here. The civil aviation code furnished an elastic framework. The practices, rather than the regulations as written, were modified. Simultaneously, efforts for safety have again been increased. The air navigation services are being progressively endowed with additional means. Supervision of operation is increased by developing toward control of the objectives and organization of safety in the companies, rather than toward controlling the execution of the tasks. The will to improve existing conditions cannot be doubted by anyone."

5586
CSO: 3102

ITALY

NEW NATIONAL, INTERNATIONAL RESEARCH CENTER AT TRIESTE

Milan CORRIERE DELLA SERA in Italian 5 Jan 80 p 9

[Article by F. Cianf.: "Scientific Center at Trieste for Solar and Wind Energy"]

[Text] The exploitation of solar and wind energy and applied technological and scientific research in many sectors make up the work programs of the new consortium being established in Trieste. The initiative is being undertaken by the county, the province, the region, the university and the Miramare Center for Physical Theory in addition to the industries present in that regional territory.

The long-range plan is to develop, in the territory of Trieste, a scientific research capability able to satisfy the region's industrial needs and at the same time capable of having an impact at an international level.

At Banne, on 170 hectares located on a plateau 10 kilometers from downtown, a scientific and technological research center will be build which will affect the collective community.

"This is not a new institute which devises research projects on its own," explained Prof Giampaolo De Fera, dean of the University of Trieste who, together with the Nobel laureate Prof Salam of the Miramare Theoretical Physics Center, has created the statute for the new organization.

"The idea" continued the dean, "is not new. In 1967, 13 years ago, a group of professors in the science department worked on a project for a scientific research zone. This project was amended and modified several times and following necessary bureaucratic steps to set up the financial-administrative section, the center for technological and scientific research was approved by legislation with a decree which calls for the instituting of a nonoptional consortium to manage it.

The drawn out starting-up activities will begin soon, with the institution of a center for advanced calculus thus providing an archive for answers to many questions. The main preoccupation of the organizers is to avoid useless and costly duplication while developing original trends. The task of

the "advanced data base" will be that of allowing access to the state of the art of researches on any given topic anywhere in the world.

The calculus center is already, in effect, an embryo. It will involve the transfer to Banne of a nucleus which has been functioning for several years at the local engineering department, which will mean strengthening it and transforming it.

"It is our intent" stated professor Mario Policastro, who is in charge of automatic controls, "to undertake collaboration efforts in order to support computer assisted instruction because nowadays in that field it is possible to turn out new methods able to provide highly specialized learning techniques. This is the case for the Plato, a sophisticated system of assisted instruction which could easily serve to further develop technicians involved in research."

While waiting to be definitely "on the map," the research department of the University of Trieste encourages links abroad, which are very active. Because of its favorable geographical position, Trieste could be viewed as Mitteleuropa's natural outlet to the sea. For that reason, perhaps, cultural exchanges with Eastern Europe are particularly well developed. Third World countries also look to Trieste and, following a collaboration agreement with the University of Ife (Nigeria), a consulting contract is being negotiated with the University of Lagos.

The Nigerians' problem consists in creating a managerial group. With this in mind, the University of Ife requested a collaboration with the University of Trieste in those matters dealing with management of the environment and architecture. Specific programs to teach the Nigerians these subjects have been organized, and in exchange the University of Trieste will receive a modest sum of hard earned foreign currency.

This sort of cooperation with developing countries can be effectively pursued in the soon-to-be research department, as is presently the case with the Theoretical Physics Center of Miramare. In this institute, periodic seminars on new sources of alternative energy are held. These seminars are also attended by numerous students and technicians of Arab countries which possess not only oil wells but also dispose of a potential capacity for solar energy collection.

It is a matter of solving problems which, because of their nature, are without boundaries. With the institution of the research department, the city of Trieste will be able to effectively give stimulus to its own cultural and intellectual life.

9209
CSO: 3102

ITALY

CENTER FOR SOLAR SYSTEMS MANUFACTURE, R&D, IN FRIULI

Milan CORRIERE DELLA SERA in Italian 13 Jan 80 p 6

[Article by Enrico Negretti: "The Sun University Is Born in Friuli"]

[Text] Cordenons (Pordenone). In this "big box" that rises amid greenery and stands out against the harsh sides of the Massiccio del Cavallo, about 50 workers will set up, in about 20 days, solar panels and will be able to wash and warm themselves thanks to the sun's energy. It will be the first plant in Europe which will be equipped with these very sophisticated units and which, above all, provide a concrete answer to the grave energy problems.

The device, which stands out, in crimson, over the black roof of the plant, made up of 324 square meters of solar panels with a 60 degree slant pointing South, says everything: "Sunlife, making use of solar energy."

They are the ones who will use it first. However, the Friuli enterprise, a leader in research in this field, has already built over 1,000 solar plants and in the new plant not only those which are commonly called "panels" are produced, but also, for example, those instruments necessary for the planning of solar manufacturing plants. Here too, as commercial director Giuseppe Bearzi explained, every three months seminars are held for planners and installers who deal with helio technology. That is to say: this is the university of the sun. Anyone who comes here will learn all there is to know about how best to exploit its energy, how to capture it, package it and redistribute it.

"A new plant," said Bearzi, "but also a new method of working. Our workers will not stand at the assembly line: they will be divided into saml1 groups of 5 or 6 persons who will produce together a unit from A to Z."

The manufacturing plant, between production sections and administrative offices, is spread over 1,360 covered square meters. Around the building, are 900 square meters of landscaping and over 2,000 of parking spaces and roads. The plant itself is futuristic, as is the large range of products it will turn out. They are anticrisis (oil, of course) products.

"Imagine that this concept," continued Bearzi, "is that which inspires the builder of a sailboat: the sails, blown by the wind, and small auxiliary motor for when the wind is down and it is still necessary to travel. There we are: with the sun, it's like this: one must use its energy with the same conditions that one uses its light: when it's there. At night we use light bulbs, right? But during the daytime we don't. We must think of doing the same thing with solar energy: when the sun is there, capture it, exploit it. At night, as the hours go by, we can no longer count on the warmth produced by the sun during the day and therefore, if necessary, we make use of an 'auxiliary motor,' namely an integration with the more traditional systems. The plant, in fact, calls for a small oil heater."

The innovation is important. The Sunlife heating system, explained in layman's terms, in addition to solar panels on the "South Wall," consists of a hothouse roof. Two thermo-ventilating exchanges with 10,000 liter accumulation systems (not of water but a sort of automobile antifreeze), pumps to channel the hot liquid through the coils, air circulating in ducts heated by the coils, hot water tanks for mess halls and showers are included in this system. A congenial and clean plant, but above all, an economic one they said. This is because it is sufficient for the solar panels to reach temperatures of 60-70 degrees, as is now the case in the middle of winter in order to attain 20 degree centigrade hot air in the plant.

"However, if the temperature does not go that high" said Bearzi, "a temporary integrative use of the heater will be sufficient: one thing is to start at 10 degrees and bring the water up to 50, and another to bring it up to this temperature starting from 20-23 degrees."

The heat developed under the hothouse roof, which is an interesting architectural structure, is exploited in the winter by fans that channel the hot air in the premises. During the summer, on the other hand, use is made of the "Trombe Michel" effect, Michael's trumpet, named for French researcher who first observed the phenomenon. Basically what occurs is that very hich temperatures are formed under the roof while in the premises below the heat reaches, let us say, 25 degrees: as in a chimney, air rises from below, creating continuous ventilation.

Solar panels, according to recent studies, are the most immediate and economic answer to low temperature heat demands. On the open market a complete unit costs about 200,000 lire per square meter: in a country like Italy, solar panels should sprout like mushrooms. It would bring about great savings and oil could be used for medium and high temperatures. To burn oil in order to obtain a temperature of 20 degrees (and this 1,000 degrees in the burner), an expert wrote, is like heating by setting great master's paintings on fire.

Forty sensors, distributed in the new plant at Cordenons continuously transmit data to a computer. "This," said the Sunlife director, "is a common patrimony, which we set aside for those who work in this sector."

Perhaps we have lost time with the sun, but judging by apartment heating bills alone, without bothering economists, it might be good to think of imitating this example from Friuli.

9209
CSO: 3102

UNITED KINGDOM

ROLLS-ROYCE RB 211-535C STATUS REPORT

Paris AIR & COSMOS in French 23 Feb 80 p 14

[Passages enclosed in slantlines published in boldface]

[Text] As of 13 February, six RB 211-535C turbojet engines developed by Rolls Royce had been tested for /more than 700 hours/. It will be recalled that the RB 211-535C is destined for the B-757 program and that the total number of firm orders and options by Eastern Airlines and British Airways for this aircraft thus equipped with engines is up to /82/. Derived from the RB 211-22B, the 535C version delivers a thrust of 37,400 pounds (16,965 kg) and, according to its builder, will permit a fuel saving of 40 percent per passenger over the Boeing 727. The first prototype of this engine went through a bench test on 16 April 1979 and the second on 12 June 1979. A total of /3,000 hours of tests/ will be required before certification, expected in mid-1981, when the first deliveries should be made to Boeing for the beginning of flight tests in the B-757. The engine will then have to undergo /7,000 hours of tests/ in the aircraft before being put in service in 1983.

Among the five development engines, one accomplished test cycles equivalent to /1,500 flights in regular use/, i.e., four flights a day for a year.

Completely disassembled, all the components of this engine were scrupulously checked; they were found to be in excellent condition and were delivered for examination by Boeing, Eastern and British Airways engineers. Two other prototypes were subjected to more special uses, one for operational tests in the NGTE [expansion not known] altitude chamber, the other for tests of take-off and behavior under artifical sub-sea-level conditions.

Photo Caption

Left, the prototype of the RB 211-535C turbojet engine, which has accomplished test cycles equivalent to 1,500 flights, is being disassembled. Right, all parts of the same engine are shown.

5586
CSO: 3102

END