Hermes. If adopted, Maia would fly in 1988/98, after the Hermes preliminary design review in October 1987. The final 10 per cent of Hermes design work there-after will centre on local aerothermal problems, says Cnes.

Hermes is designed around three main Cnes mission models: autonomous flights for Earth observation and microgravity research; in-orbit servicing of low-orbiting satellites and space platforms; and access to the US Space Station and particularly to Europe's Columbus module. Later Hermes' would participate in the assembly and servicing of an independent European space station, says Cnes.
Autonomous missions with a crew of two pilots and one or two payload special-ists would last from one week to one month in orbits up to 800km. In-orbit servicing missions, most probably in Sun-synchronous orbits up to 500km, would last up to two weeks and require a crew of four. Space Station access missions with up to four passengers would range in duration from a one-week trip there and back to a 90-day stay when docked to the Station.
Based on these models, Cnes sees a need for roughly two Hermes missions a year, rising to four or perhaps six a year after the establishment of a European space station. The plan is to build two space-planes as a first step, each with a 30-flight, 15-year life. Two missions a year with two spaceplanes is a 12-month operational cycle, but Cnes plans to have each Hermes ready to fly again within three months of completing a mission.
Hermes will be refurbished after each mission at a European spaceplane work-shop. Then, 40 days before lift-off, Hermes will be flown by A300 carrier aircraft to Kourou, French Guiana, and a second spaceplane workshop. Here the payload will be integrated and installed and Hermes placed atop its Ariane 5 for transfer to the ELA-3 launch pad. Mission control will be located at Toulouse, in France, with launch control at Kourou. The proposed communications and tracking network includes Europe's planned data relay satellite (DRS) system, similar to Nasa's TDRSS. DRS, if approved, will increase coverage of a Hermes mission in 400km, 28-5° orbit from 30 per cent to 75 per cent, says Cnes. A normal mission will end with Hermes gliding in to land on the Istres runway in France. If the launch is aborted up to 84sec after ignition, Hermes will return to a landing strip at the Kourou launch site: up to 360sec after launch and Hermes will have to splash down in the Atlantic, where a recovery ship will be waiting. In addition to the European and Kourou landing strips, additional emergency runways around the world will be designated for each mission.
At the baseline two missions a year, Cnes estimates that Hermes will cost 220MAU* a year to operate. A third mission could be accommodated at an extra cost of 80MAU. Any additional missions will entail an increase in fixed costs, says Cnes.
The Europeanisation of Hermes has already begun. Industrial discussions are

under way to identify subsystem con-tractors, and letters of intent committing countries to the project are expected before Christmas. This gives ESA members the opportunity to participate in Hermes definition and the development of critical technologies, says Cnes.
At the end of 1986 ESA will finally decide on the programmes it will fund, principal among them Hermes, Ariane 5, Columbus, and DRS. Key issues remain to be resolved, however. Germany is still undecided on Hermes participation, despite Cnes allocating the country "a reasonable share"—15 per cent—of the programme. Some would like to see Germany's stake doubled to 30 per cent and France's reduced to the same level. Others want the programme delayed from 1995 to 2000, believing that France's plan to fly the first Hermes on the third Ariane 5 is over-ambitious.

Germany is more interested in getting Ariane 5, in which it has a 22 per stake, and Columbus, in which it has a 38 per cent share, off the ground, and wants to delay its Hermes decision until later this year or early next year. There are also

worries about France's ability to find half the 2,000ECU Hermes cost in addition to its 55 per cent share in the 2,600ECU Ariane 5 programme.
At their meeting in Rome in January, ESA ministers voted a budget of 1,700MAU annually. Funding Hermes would require this to be raised. Germany believes that ESA should stay within this limit, otherwise in the critical years 1990 to 1993, funding Ariane 5, Columbus, and Hermes might force Europe to cut back on its Earth resources and tele-communications programmes.

Germany also disagrees with France's Hermes mission model, inverting the priority to put access to the Space Station and Columbus first, above in-orbit servi-cing and autonomous missions. Germany is not convinced that autonomous missions justify Hermes. Given these mission priorities, and news that the US Space Station might not be operational
before 1996, Germany's desire to delay
Hermes is understandable. If Hermes is to
proceed smoothly towards a European
programme, France must address the
doubts of its potential partners. D

Hermes has a maximum weight of around 17 tonnes, a payload capability of 4,500km, and carries
a crew of up to six

FLIGHT INTERNATIONAL, 30 November 1985 27