



Apollo Soyuz mission will have to be borne in mind—the increased physical stresses observed from the telemetered medical data. The crews were, of course, old for the task, and Slayton had a history of cardiac trouble, but age does not seem the only explanation. A number of factors may well be involved—the intense political significance with which the mission was loaded and the almost embarrassingly detailed TV coverage. But these are factors which would with time, gradually fade as international flights became commonplace. It is possible, however, that the strain of operating in a bilingual situation, added to all the other in-flight stresses, may have

proved more wearing than expected. Perhaps therefore the most profitable follow-up of Apollo-Soyuz would be a detailed study of a multinational crew in a simulated long-term mission, with a similar but uninational crew as control experiment, in order to study in depth the additional stresses, if any, caused by international cooperation.

*John Gribbin adds:* If Apollo-Soyuz was anything more than a political stunt, it was an attempt to pave the way for future joint missions in space. The most glamorous manned mission of the foreseeable future (by the turn of the century) would be a visit to Mars, where the great cost would surely require a global, rather than any national, effort. But before then, and perhaps within five or six years, there is plenty of scope for significant cooperation in Earth orbit.

Curiously, the plans of Soviet and American space scientists dovetail together so well that, politics apart, they seem made for each other. In the best traditions of Tsiolkovski, the USSR is working towards a reasonably large permanent (or semi-permanent) manned space station—but they seem to be intending to build it with the aid

of what are now conventional rockets. On the other hand, the present US effort is towards a superb haulage vehicle for Earth orbit trips, the Shuttle. What could be more natural than to use the Shuttle as a means for supplying the space station of the 1980s?

NASA at least is already well aware of the needs for international collaboration on future projects, and perhaps the most significant single item to be carried by the Shuttle, the Space Laboratory, is being designed and built in Europe, as the European Space Agency's contribution to manned spaceflight. In the heady excitement of last Thursday's golden handshake, the dream of collaboration involving the US, USSR and Europe to fulfill science fiction predictions of permanent orbiting Earth stations seemed almost to be a reality; in the more down to Earth days to come, it seems more likely that any such dreams will be blighted by the attitude (on both sides) typified by a remark attributed to one of the US astronauts to the effect that "I like the Russians we've worked with. But that doesn't mean I have to like their lousy system of government." □

A cooperative research programme between the USA and Egypt in the area of remote sensing applications to a national resources survey (in geology, agriculture groundwater and so on) was initiated in 1972 by a proposal submitted by Dr M. Abdel-Hady (an Egyptian scientist who is now Professor at Oklahoma State University, OSU), to the National Science Foundation (NSF) and the Egyptian Academy of Scientific Research.

The project was approved and funded by Oklahoma State University and the NSF for a three-year period ending in 1975, and Professor Abdel-Hady was granted research leave from OSU to direct the effort from Egypt.

The programme so far has covered work in the following areas:

- A geological, structural, drainage and mineral resources survey for the northern region of the Aswan Dam reservoir basin, comprising an area of 68,000 km<sup>2</sup> on both sides of the river.

- Infrared thermal imaging from aircraft over an extensive area south-west of Cairo. From this investigation, in a typical arid climate, lithological anomalies were significant in demonstrating the role of remote sensing techniques in the discovery of important economic minerals.

- Several studies of the use of remote sensing techniques for the survey and early detection of fungus and nematode diseases in regions of Egypt where important economic crops are grown.

- Geological, water resources, potential oil, mineral resources, and structural maps of the Sinai Peninsula from ERTS-1 Satellite images (under contract with the Ministry of Reconstruction and Housing in Egypt).

- Thermal (infrared), magnetic, radiometric and multispectral photographic aircraft surveys over the entire Suez

## Remote sensing in Egypt

*from Salah Galal, Cairo*

Canal Zone, to provide basic surface and subsurface geological maps for a strip 20 km wide, along the entire length of the canal to assist the redevelopment and reconstruction projects in this area and to provide data about the subsurface to the international construction companies in charge of designing the proposed tunnels under the canal.

Several other investigations dealing with agriculture, land reclamation, mineral resources, groundwater and the environment are now proceeding, and more than 10 technical reports and research papers are being prepared from the results of these investigations. These will include studies of the Suez Canal zone (surface and subsurface geological and groundwater survey); the north-west coastal region of Egypt (geological and soil survey, groundwater survey, soil salinity, and agricultural

survey); and the Salheia Project (10,000 km<sup>2</sup> between the Nile Delta and the Suez Canal). In this project a regional and detailed geological, soil hydrological and crop survey is being carried out, with the aim of reclaiming 10,000 acres of land.

Other projects now being negotiated include a crop survey inventory and early detection of some nematode and fungus diseases in major economic crops in Egypt; a survey of iron ore deposits over large areas of the Western Desert; a regional geological soil and water resources survey for 100,000 km<sup>2</sup> west of Aswan; and a regional geological, structural and petroleum and mineral resources survey of a large area in the Western and Eastern Deserts of Egypt.

Regional groundwater investigations and mapping of groundwater reservoirs are planned for the Nubian Sandstone in Egypt, northern Sudan and Libya, and regional and general area reconnaissance will take place in the El-Sudd region in Sudan for the planning and location of the Jongoli Canalisation Project (an important water resources and water conservation project planned jointly by the governments of Egypt and Sudan). Cooperation in carrying out this investigation by satellite image interpretation and by means of aircraft is now being negotiated with representatives of Egypt and Sudan at the Higher Commission for the Upper Nile Waters, Ministry of Irrigation.