

15th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)Systems and Infrastructures to Implement Future Building Blocks in Space Exploration and Development
(2)Author: Prof. Alexey Kondyurin
The University of Sydney, AustraliaCONCEPTS OF LARGE SIZE SPACE CONSTRUCTION ON A WAY OF DIRECT CURING IN
SPACE ORBIT**Abstract**

Next step of space exploitation requires large construction in orbits. We need to make sufficient large volume of pressurized protecting frames for crew, passengers, space processing equipment, etc. We have to be unlimited in space. Now the size and mass of space constructions are limited by possibility of a launch vehicle. It limits our future in exploitation of space and in development of space industry. Large-size space construction can be made with using of the chemical curing technology of a fibres-filled composite impregnated with a liquid polymer matrix applied directly in free space. For curing the fabric impregnated with a liquid matrix (prepreg) is prepared in terrestrial conditions and shipped in a container to orbit. In due time the prepreg is unfolded by inflating. After the chemical curing reaction is completed, the durable construction can be fitted out with air, apparatus and life support systems. Our experimental studies of the curing reactions in the free space environment showed that the composite could be cured in space orbit. The large-size construction can be created in free space. However, the curing process changes dramatically a whole technology of space constructions. New concepts of space station, Moon base, Mars base, mining station, interplanet space ship, telecommunication station, space observatory, space factory, antenna dish, radiation shield, solar sail based on the curing in space technology are considered.