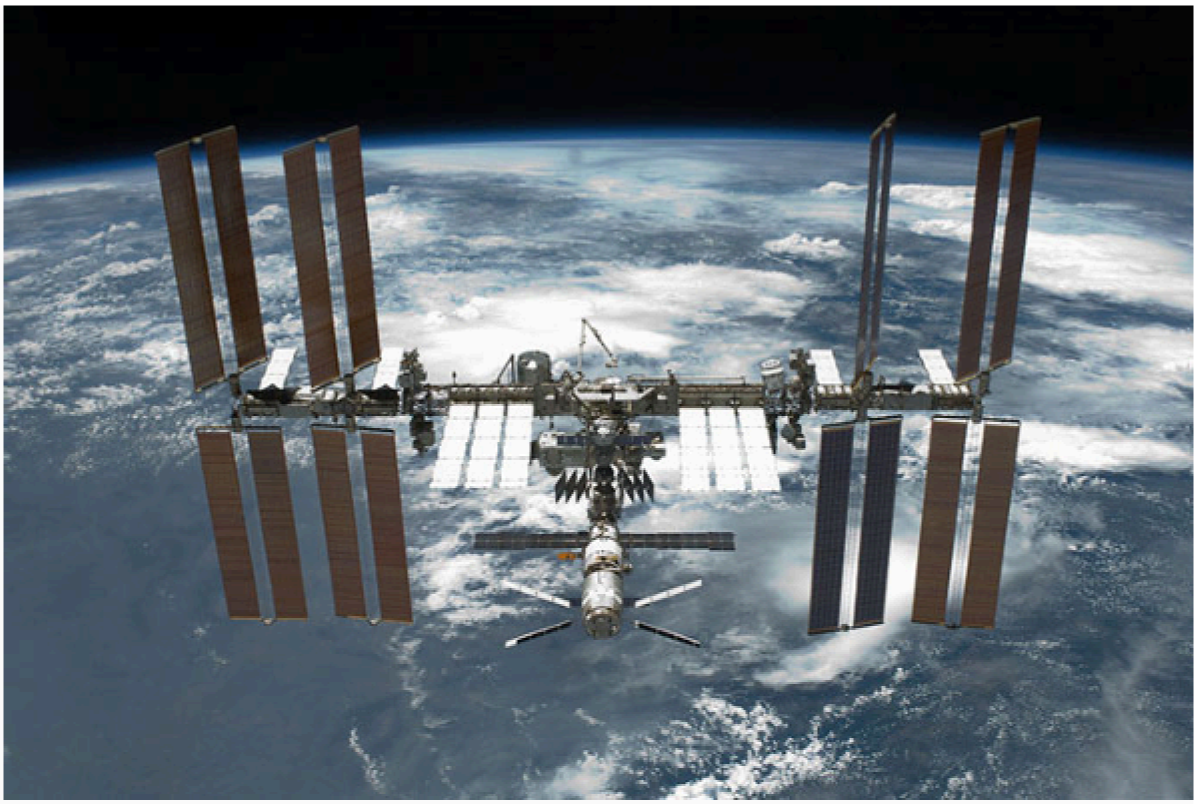
Ref:  expandable modules and structures is the fact that they are launched in a packed configuration, which transfers a significant payload volume benefit (Fig. 5.7). Inflatable structures offer the ability to launch and deploy habitats that greatly exceed the internal volume offered by hard-shell modules. Some systems have already been demonstrated in space, and some others are in various stages of design and testing. Pressure walls are invariably composed of specialized pliable layers, each of them providing an essential feature for a pressurized environment. Earlier concepts of inflatable structures for space (Fig. 5.8) were developed by Goodyear Aerospace Corporation (GAC)8 under contract with the NASA Langley Research Center during the 1960s (cf. Häuplik-Meusburger and Özdemir 2012).



inflatable and conventional elements include:

• Soft inflatable sections provide relatively large internal volumes to optimize habitability features.

• Hard sections enable pre-integration of utility and equipment systems and can readily accommodate integral viewports, docking interfaces, and other structures.

• Conventional hard modules provide an initial operational capability with pre-integrated utilities and equipment.

• Inflatable laboratories and habitats can be added as required throughout growth stages.

Example: TransHab and Bigelow Aerospace Bigelow Aerospace is working with NASA and a variety of contracting organizations. The company holds two license agreements with NASA:

• an exclusive license for two TransHab patents;

• a license for radiation shielding with exclusive and non-exclusive contracts.

**Berthing and docking port:** Connects two modules or allows the rover to temporarily connect to the pressurized habitat.

**Airlock:** Transfers between the habitat and a pressurized rover. It can be a separate pressure vessel (usual vertical rigid cylinder with elliptical end domes and opposing hatches) or inflatable type constructions.
**Suitlock or suitport:** Integrated into the habitat or vehicle structure. The spacesuit remains in the airlock but can be repaired and serviced there (dust control).
**Sample airlock:** Used to pass samples collected by the astronauts into an interior glove box for examination. The size is determined by the items to be passed and the allowable air input to the glove box.

**Trash airlock:** Used to discard waste, similar to Skylab Trash Airlock.

**Scientific airlock:** A versatile, self-contained unit with venting and pressurization capabilities. It features a sliding experiment table for payloads that can be extended into space or into the module. All mechanisms are manually operated.

**Windows:** Allow viewing of the outside and managing payloads. Types include flat windows within a module, node wall, or cupola (as seen in space station windows), and hemispheric windows (as seen in rovers). They need to be placed considering the natural body position.

## General view(space-mission)

**Monitoring and control of vehicle rendezvous/docking procedures.**

• Operation of tele-robotic devices through direct eye contact.

• Discovery and photographic documentation of natural events and spacecraft hazards/damage.

• Crew recreation and morale to offset boredom and psychological confinement/isolation.

External conditions for spatial objects & extreme radiation

**Stellar wind:**

The example of the exoplanet HD 189733b an influence of stellar activity on the efficiency of the plasma mechanism of radio emission generation of the exoplanet and the properties of this emission are considered. The plasma generation mechanism can be effectively implemented in the plasmasphere of exoplanets with a weak magnetic field and a relatively high electron plasma density, when the electron cyclotron maser is not efficient.

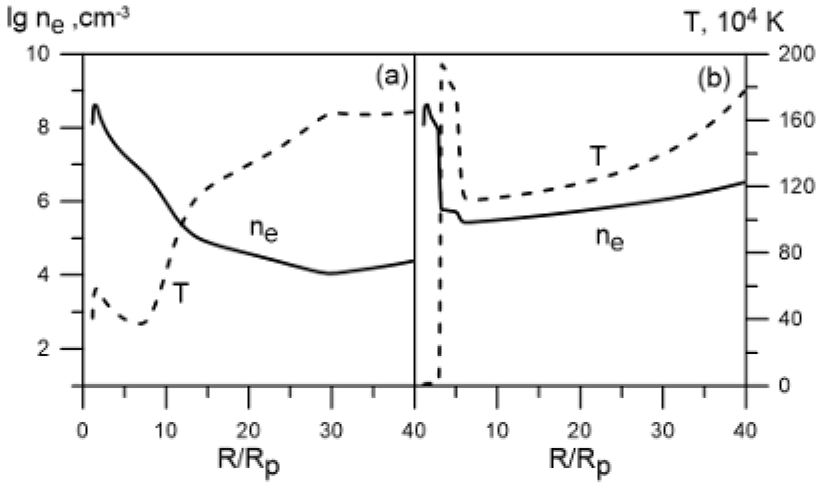



**Figure 1.** Distributions of plasma density $n_e$ and temperature $T$ for a three-dimensional model of the interaction of the exoplanet HD 189733b with the stellar wind of the parent star at a) moderate wind intensity (the star mass carried away is $10^{11}$ g s$^{-1}$) and b) at an intense wind (the star mass carried away is $2 \times 10^{13}$ g s$^{-1}$).

Parameters of an exoplanet-radiation:

The core parameters of the exoplanet HD 189733b the distance to the Earth $R_{so} \approx 63$ light years, the radius of the planet $R_p \approx 1.14 R_J$ and its mass $M_p \approx 1.13 M_J$. These parameters are close to the corresponding values of $R_J$ and $M_J$ for Jupiter, as well as estimates of the effective temperature, $T_{eff} \approx 1200$ K, and magnetic field near the planet's surface, $B \approx 1.8$ G (Grießmeier et al. 2007b). The parent star, around which the exoplanet orbits at a distance of three hundredths of an astronomical unit, is a yellow dwarf located in the constellation of Vulpecula. It has a size and temperature close to those of the Sun.

The radio emission fluxes from exoplanets with a weak magnetic field. In this paper, we study the influence of stellar activity, expressed in terms of the intensity of the stellar wind, on the properties of plasma radio source at the exoplanet HD 189733b.

Theplas Model assumes that radio emission is generated in a region of the planet's plasmasphere filled with an equilibrium weakly anisotropic plasma,$\omega_c \ll \omega_L$,with density and temperatureT and with a small admixture of nonequilibriumenergetic electronswithadensity$n_s \ll n$ andtemperature$T_s \gg T$.Duetothenonequilibriumelec trons,plasma(Langmuir)waves excited with frequency $\omega_p^2=\omega_L^2+3k^2v_T^2$,

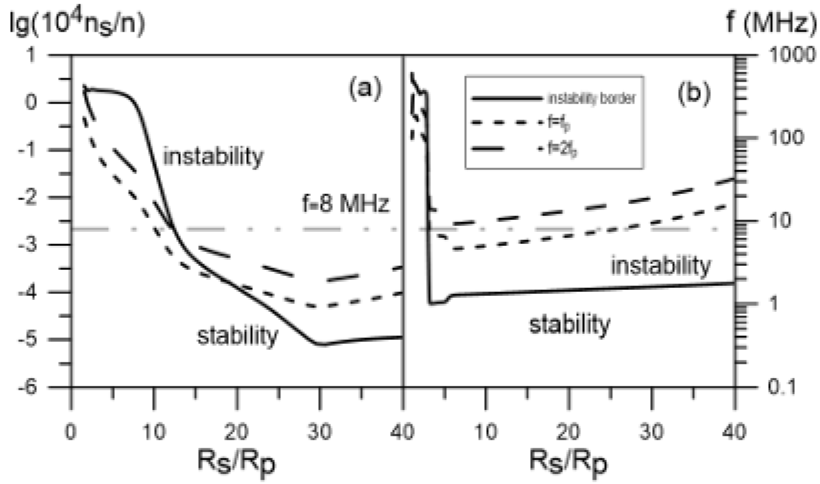



**Figure 2.** Changes with height of threshold value of energetic electron density, above which the instability growth rate exceeds the effective frequency of electron-ion collisions (solid line) and of possible frequency of the generated radio emission (dashed lines) at a moderate stellar wind intensity (a) and at an intense wind (b).