



# PSYCHOLOGICAL ASPECTS OF THE MOON BASE



V. Gushin, O. Kozerenko,  
A. Nechaev, V. Myasnikov,  
and V. Salnitsky

STATE SCIENTIFIC CENTER - INSTITUTE FOR  
BIOMEDICAL PROBLEMS, Russia, Moscow



# POTENTIAL PSYCHOLOGICAL PROBLEMS ON MOON BASE



1. Problem of **professional performance** on Moon surface
2. **In-crew cooperation** problems
3. Problem of interaction **among the groups**  
Problem of interaction **with MC**
4. Problem of the **serious illness**
5. Problem of the **free time**
7. Problem of **station design**



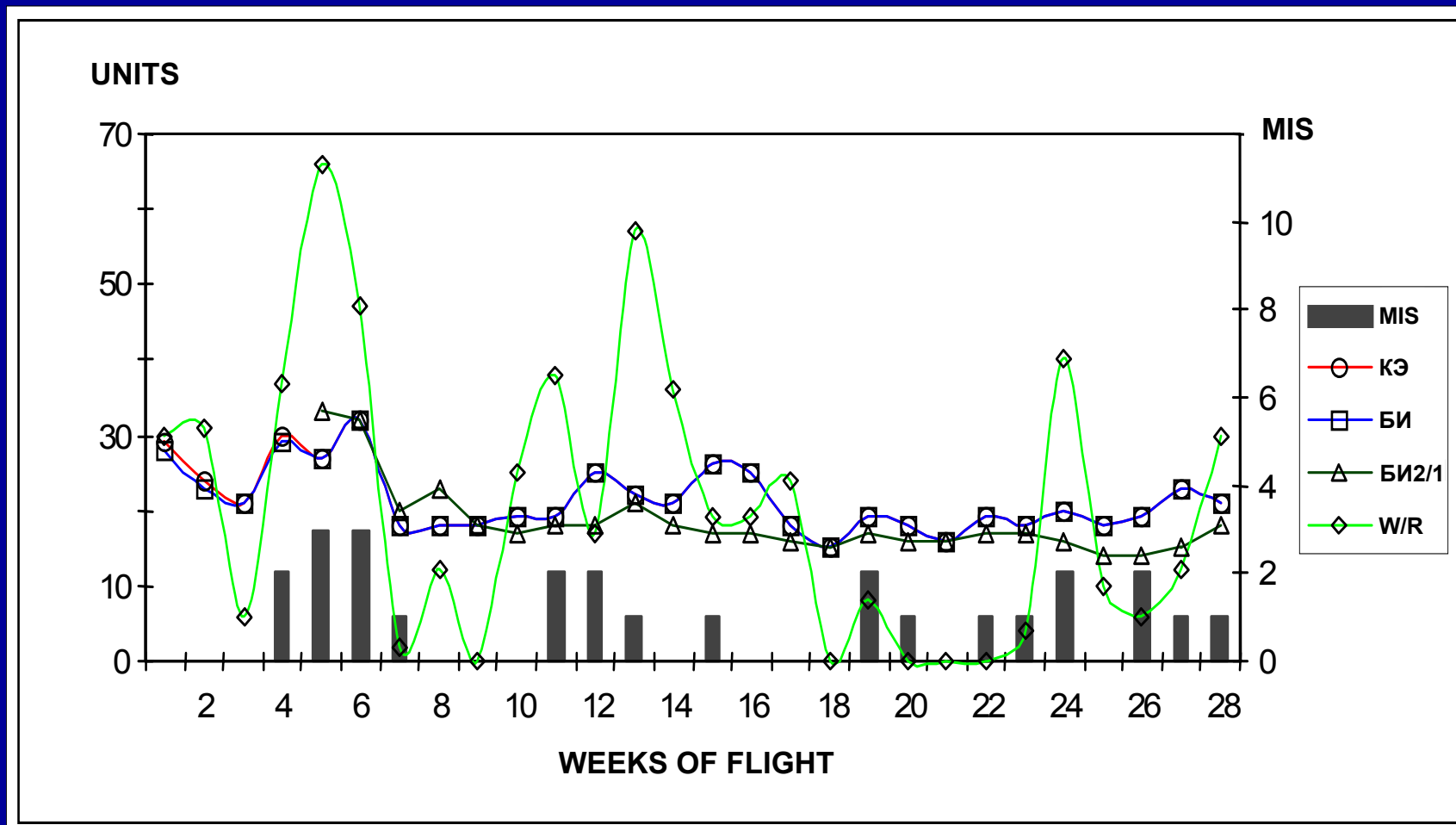
# MOON BASE. INFLUENCE OF SPACE FLIGHT ON THE INDIVIDUAL PERFORMANCE



- 1. On the 3-9th days of space flight (Salnitsky et al):**
  - **accuracy** of control operations **decreased** in 2.35;
  - **time** for the operator's task fulfillment **increased** in 1.9 times;
  - **heart rate** during task fulfillment **increased** in 1.14 times;
  - frequency of voice's main tone increased in 1.2 times
- 2. Skills decrement – crew member needs 4-5 training sessions for the restoration of pilot skills**
- 3. Correlation of the increase of crew mistakes with the intensity of work/rest cycle**
- 4. Increase of the reaction's latency period**

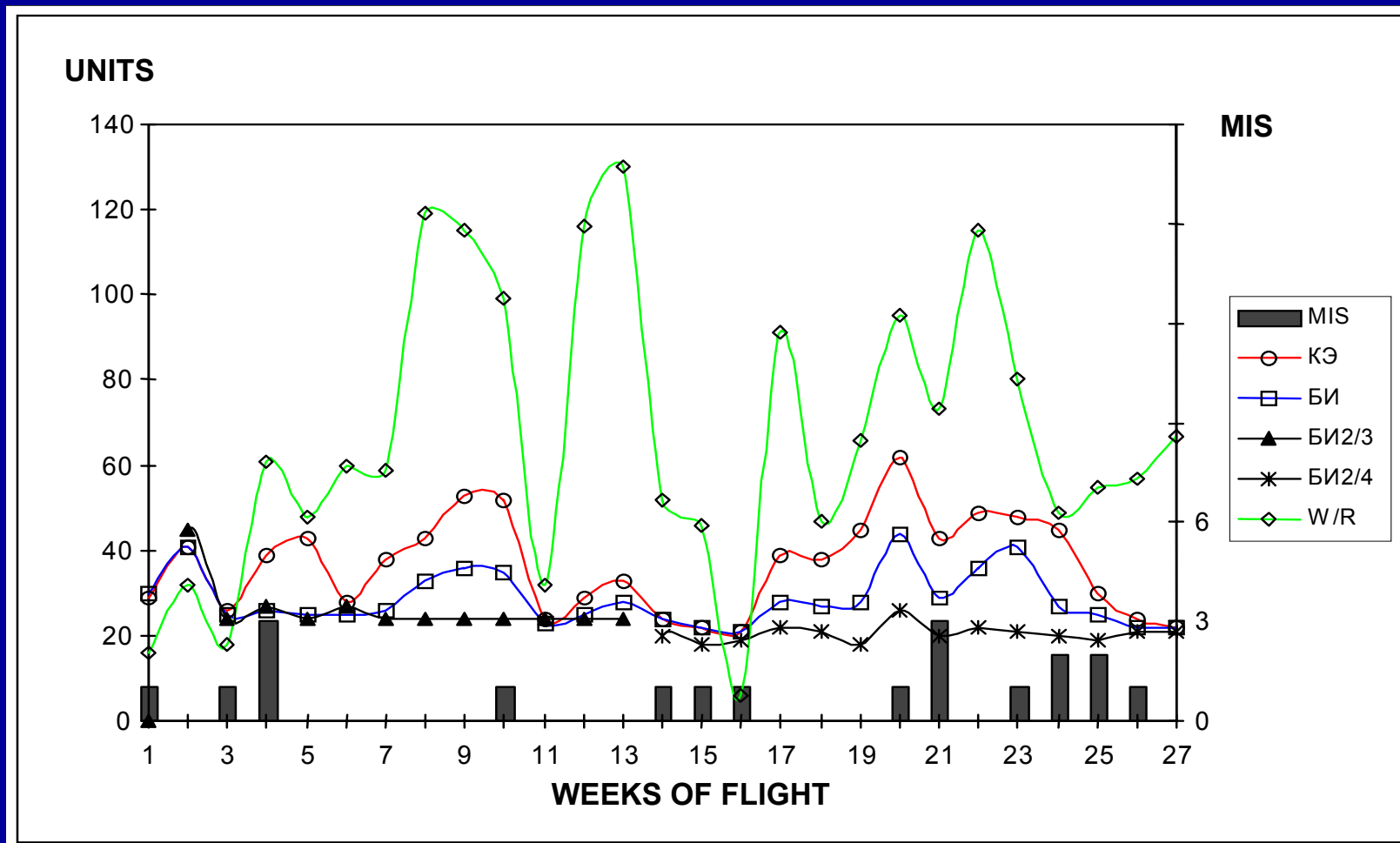


# CORRELATION BETWEEN CREW MISTAKES (MIS) DISTRIBUTION, PSYCHO-PHYSIOLOGICAL STATE INTEGRAL PARAMETER AND WORK/REST CYCLE INTENSITY (W/R) IN 30-21 FLIGHT





# CORRELATION BETWEEN CREW MISTAKES (MIS) DISTRIBUTION, PSYCHO-PHYSIOLOGICAL STATE INTEGRAL PARAMETER AND WORK/REST CYCLE INTENSITY (W/R) IN 30-23 FLIGHT





## CONFLICT IN SPACE CREW, POSSIBLE IMPACTS



(V.Myasnikov, I.Zamaletdinov, 1991, R.Shonholtz, B.Bosley , 1988)

**Conflict** in a crew during the flight could cause:

- losses of **time and energy** for finding arguments in problem situations;
- inadequate **data exchange**;
- problems with mutual **understanding**;
- **refusals** from flight operations;
- **avoidance** of joint activity.



# PSYCHOLOGICAL PROBLEMS OF INTERNATIONAL CREWS DURING MIR-SHUTTLE FLIGHTS

(Kozerenko O., Gushin V. et al, 2000)\*



1. Different **hierarchy of values** (my goals and crew goals), causing “alienation” phenomenon
2. Different understanding of role distribution in the crew, “**host/guest**” position
3. Stable preference of “**my own stuff**” (flight program, equipment, food, external communicants, etc.)
4. Different **communication styles**
5. **Language problem**, creating emotional barriers during recreational time



# PSYCHOLOGICAL PROBLEMS OF INTERNATIONAL CREWS MIR-SHUTTLE FLIGHTS



(N. Kanas, V Salnitskiy, E. Grund, V. Gushin et al, 2001) \*

In Mir-Shuttle flights **astronauts**:

1. perceived the **decrease of support** from Russian commander in the course of the Mission;
2. were **less satisfied** with their **interpersonal environment** than Russians;
3. acknowledged a **lack of support for independent action** in their work environment





# MOON BASE: INCREW INTERACTION PROBLEM



## ALIENATION

In the process of cohesive group formation, crewmembers *begin to regard each other as very “similar”, psychologically “close”*. This similarity can be expressed in **values and beliefs**, style of behavior, approaches to problems, habits, etc.

Crew members *who do not perceive themselves (and aren't perceived by their partners) as “close” and “similar”* to the others, have a good possibility to become a **“stranger”** or **“alien”** in the group.

**“Aliens”** demonstrates **incapacity or lack of motivation to transform their own system of attitudes during the mission.**



# ATTITUDES OF "ALIEN"

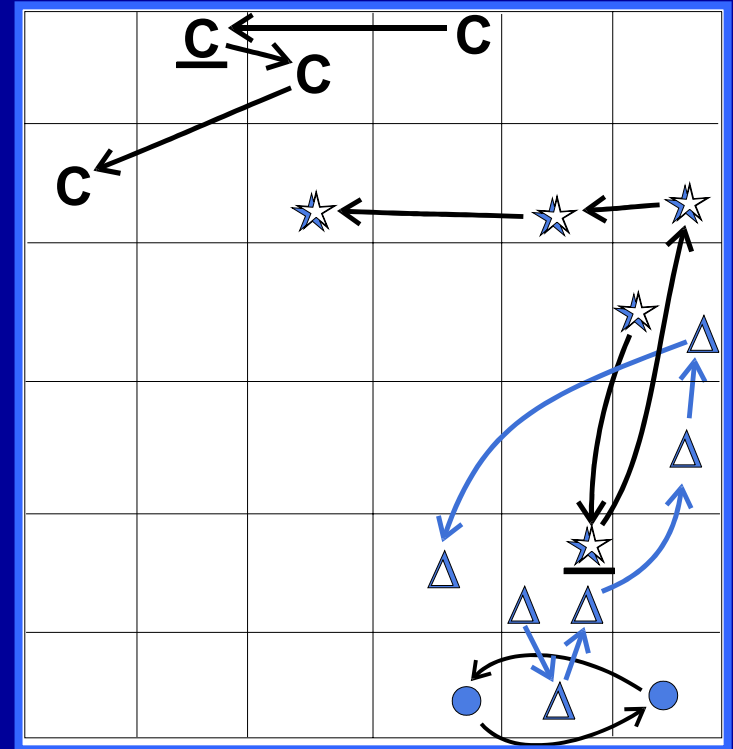
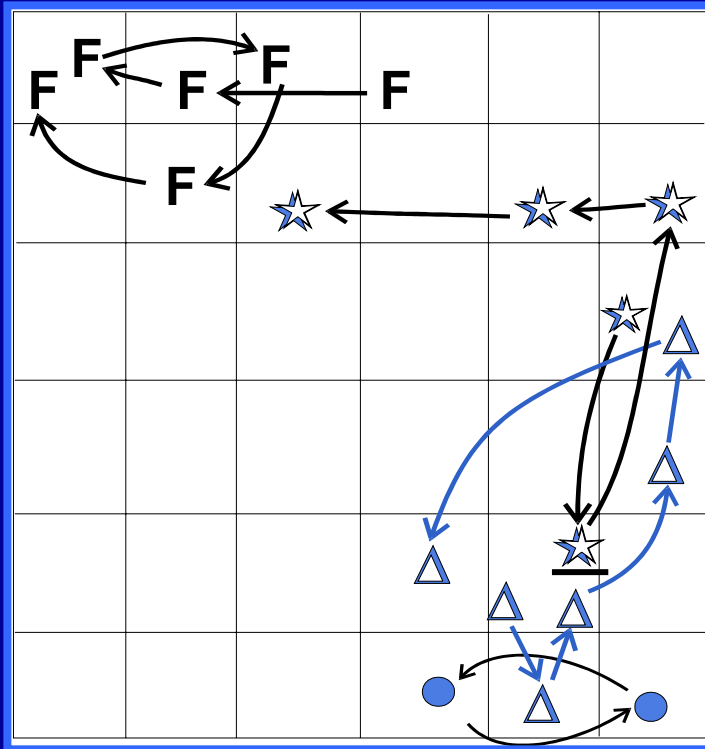


## ATTITUDES TO SUBJECT F

## ATTITUDES TO SUBJECT C

Purposeful

Purposeful



Incoherent

Incoherent

- image of "present Ego";
- image of "future Ego";
- image of "past Ego";

- crew members;
- position did not change.

Sly

Frank

Sly

Frank



# MOON BASE: GROUP INTERACTION PROBLEM



## SUBGROUPING

Members of Russian and international groups considered people from their group as **psychologically close** (“we”), and their “neighbours” as different people, **aliens** (“they”).

Relations between the groups became increasingly negative during the mission, attitudes changing from neutral to poor, resulted in **withdrawal** and **territorial behavior**.

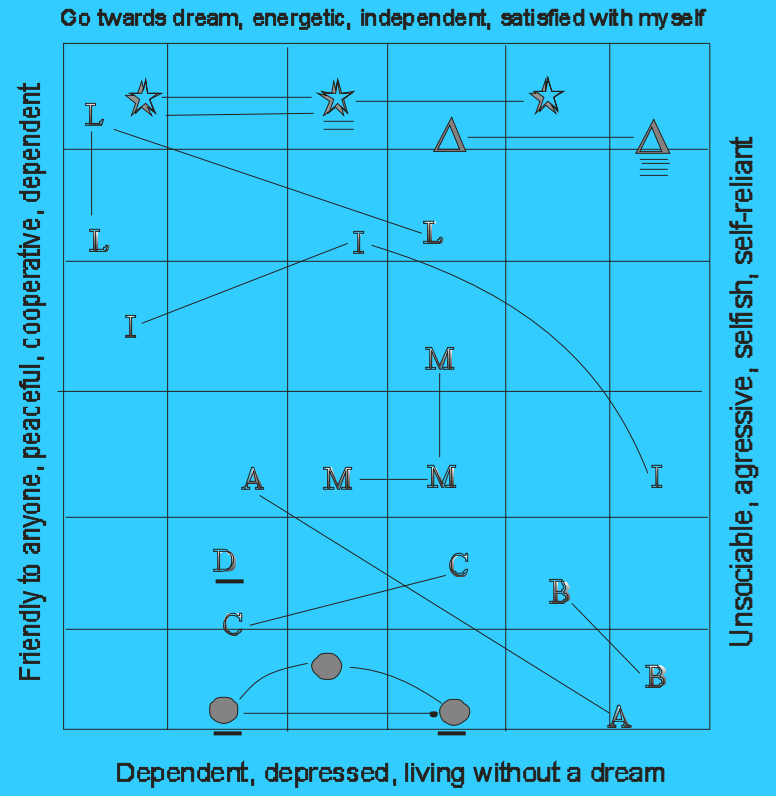
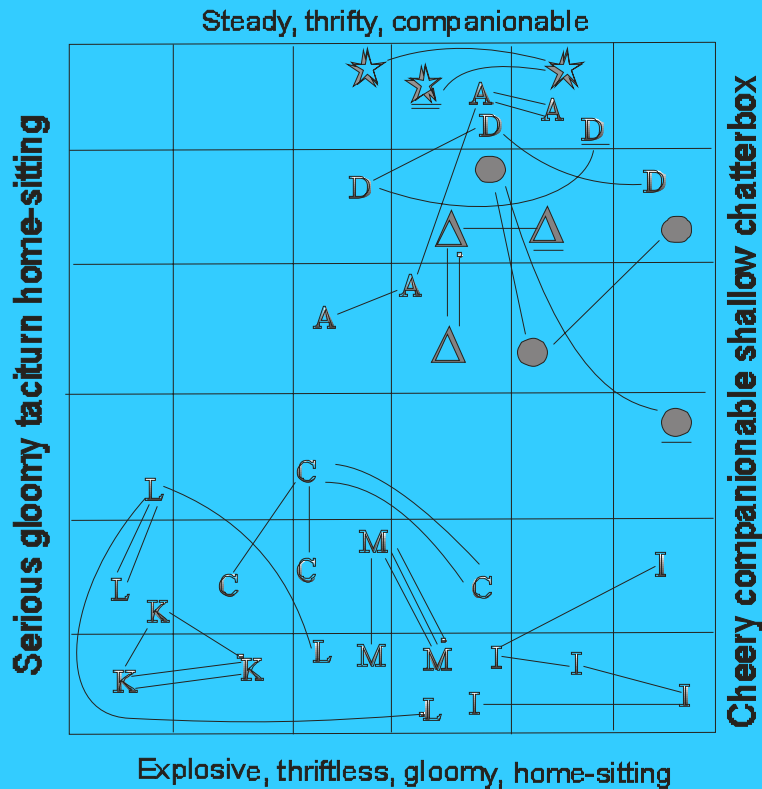
Differences in perceiving one’s interpersonal environment, **group goals, beliefs, values and expectations**, cultural and language barriers hindered the formation of a joint cohesive crew from national and international groups



# MOON BASE: GROUP INTERACTION PROBLEM

Subject B

Subject K



△ - real Ego   ★ - Ideal Ego   ● - past Ego   \_ - position of the personage doesn't change  
 A, B, C, D - members of Group 1   I, K, L, M - members of Group 3

Fig. 1: Mutual perception of the subjects from Groups 1 and 3, exemplified by subjects B and K



# MOON BASE: PROBLEM OF INTERACTION WITH MC



## Preferences in contacts

MC demonstrated strong tendency of **addressing the main volume** of information towards a crew **Commander**.

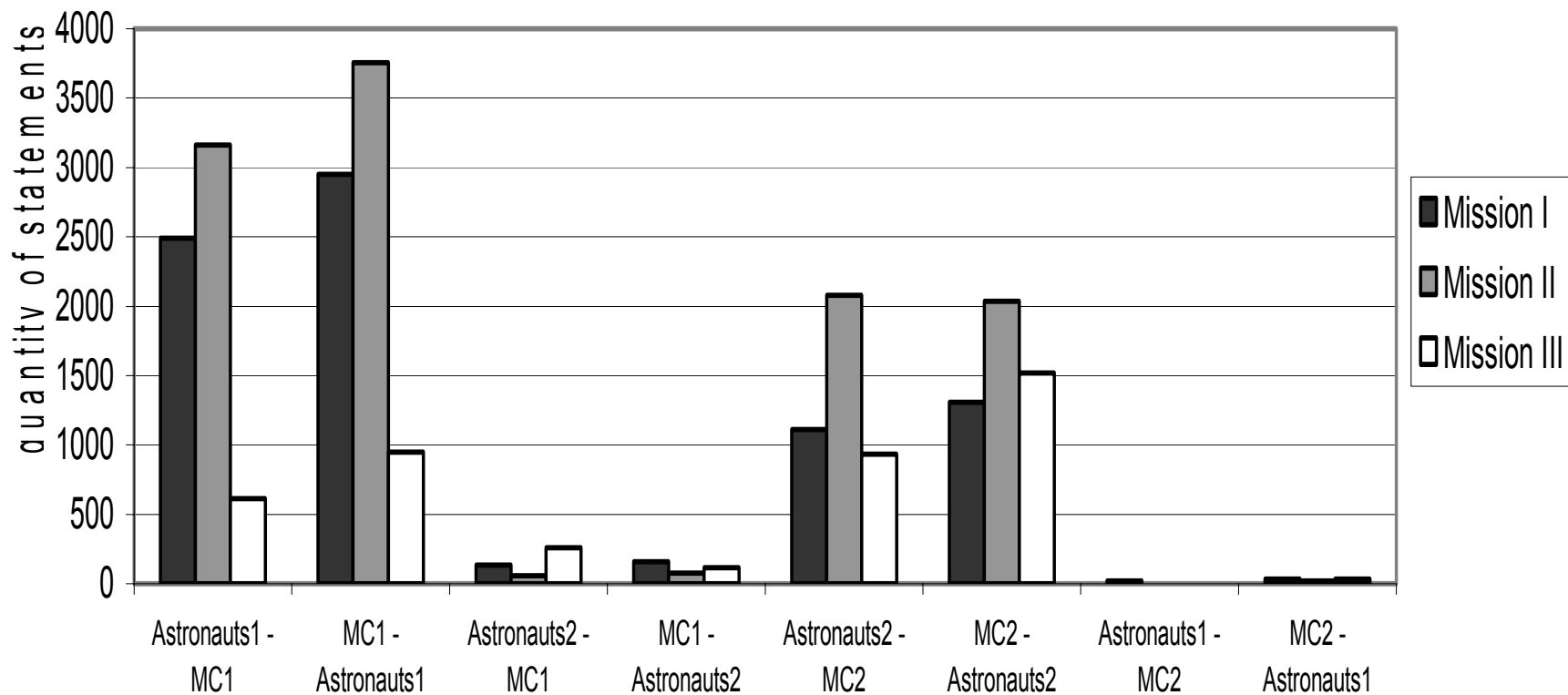
Each national MC **preferred** to communicate with **their (compatriot) astronauts**, at the same time, receiving and offering information very **rarely** with the **foreign** members of the crew

(98% of communication time for their astronauts, versus only 2% of the time with the astronauts from other national programs)

The crewmembers also preferred to communicate with **their own national** MC. Mission I commander addressed his national MC 119 times more, then with MC of different nationality



# MOON BASE: PROBLEM OF INTERACTION WITH MC



communicants - addressees