

CSIS WORKING GROUP

*“FILLING THE GAP” THE MID TERM AND LONG TERM OF
US HUMAN SPACE FLIGHT*

SESSION 1 – DEFINING THE GAP (A EUROPEAN POINT OF VIEW)

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MANNED SPACE FLIGHT IS FOR EUROPE (ESA MEMBER STATES)

:

A SYMBOL FOR INTERNATIONAL COOPERATION IN SPACE

A LABORATORY FOR SCIENCE, APPLICATIONS AND TECHNOLOGICAL INNOVATION

A PREREQUISITE (STEPPING STONE) FOR HUMAN EXPLORATION

HUMAN SPACE FLIGHT (HSF) IS THE WAY TO CONDUCT 0 GRAVITY EXPERIMENTS

ISS = IS THE 0 GRAVITY LABORATORY FOR EUROPE HSF

EUROPE HSF IS ITS CONTRIBUTION TO ISS

CSIS WORKING GROUP

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ISS INTERNATIONAL PARTNERSHIP

1 - 1998 ISS PROGRAM AMBITIONS :

A MAJOR CHALLENGE FOR
INTERNATIONAL COOPERATION
(POLITIC – TECHNIC – SCIENTIFIC – HUMAN)

POLITICAL AND PHILOSOPHICAL CONTEXT FOR ISS 1998 IGA

- 1998 = A PRE 9/11 WORLD NO WAR ON TERROR
- EMERGING CLIMATE ISSUES, ABUNDANCE OF ENERGY
- POST COLD WAR WORLD, HIGH ECONOMY (CAPITALISM GLOBALISATION AND SUCCESS NEW TECH BOOM)
- WESTERN WORLD WAS RICH (US, EUROPE, JAPAN) AND STILL DOMINATING THE WORLD
- RUSSIA WAS IN A TRANSITIONAL MODE AND STILL MANAGING POST SOVIET TRANSITION
- CHINA AND INDIA DID NOT EMERGE COMPLETELY AS SPACE POWERS
- “THE END OF HISTORY” BY FRANCIS FUKUYAMA - THE 1990’S WERE SUPPOSED TO BE THE BEGINNING OF AN HEGELIAN WORLD
- 1998 = OPTIMISM

A CLEAR INTERNATIONAL INVOLVEMENT

INTERGOVERNEMENTAL AGREEMENT SIGNED 29 JANUARY 1998 IN WASHINGTON DC

15 PARTNER STATES : BELGIUM, DENMARK, FRANCE, GERMANY, ITALY, NETHERLANDS, NORWAY, SPAIN, SWEDEN, SWITZERLAND, UNITED KINGDOM, CANADA, JAPAN, RUSSIAN FEDERATION, UNITED STATES

SIGNATORIES :

Belgium: Mr Yvan Ylieff, Minister of Science Policy; Denmark: Mr K. Erik Tygesen, Ambassador of Denmark to the United States; France: Mr Claude Allègre, Minister of Education, Research and Technology; Germany: Mr Jürgen Rütgers, Federal Minister of Education, Science, Research and Technology; and Mr Jürgen Chrobog, Ambassador of the Federal Republic of Germany to the United States; Italy: Mr Luigi Berlinguer, Minister for Education, and Scientific and Technological Research; Netherlands: Mr J. Vos, Ambassador of the Netherlands to the United States; Norway: Mr Tom Eric Vraalsen, Ambassador of Norway to the United States; Spain: Mr Antonio de Oyarzabal, Ambassador of Spain to the United States; Sweden: Mr Rolf Ekéus, Ambassador of Sweden to the United States; Switzerland: Mr Charles Kleiber, State Secretary for Science; United Kingdom: Mr Christopher Whaley, Ambassador of Great Britain to the United States. Canada: Mr Ronald Duhamel, Secretary of State for Science, Research and Development; Japan: Mr Kunihiko Saito, Ambassador of Japan to the United States; Russian Federation: Mr Yuri Vorontsov, Ambassador of the Russian Federation to the United States; United States: Mr Strobe Talbott, Deputy Secretary of State (in its capacity of acting Secretary of State);

A GREAT AMBITION

ISS IGA ARTICLE 1 OBJECT AND SCOPE

- 1 – **“IS TO ESTABLISH A LONG TERM INTERNATIONAL COOPERATIVE FRAMEWORK AMONG THE PARTNERS ON THE BASIS OF GENUINE PARTNERSHIP FOR THE DETAILED DESIGN, DEVELOPMENT, OPERATION, AND UTILIZATION OF A PERMANENTLY INHABITED CIVIL INTERNATIONAL SPACE STATION FOR PEACEFUL PURPOSES.....THIS CIVIL INTERNATIONAL SPACE STATION WILL ENHANCE THE SCIENTIFIC, TECHNOLOGICAL, AND COMMERCIAL USE OF OUTER SPACE”**
- 2 – **THE PARTNERS WILL JOIN THEIR EFFORTS UNDER THE LEAD ROLE OF THE UNITED STATES** FOR OVERALL MANAGEMENT AND COORDINATION TO CREATE AND INTEGRATED INTERNATIONAL SPACE STATION
- 3 – THE PERMANENTLY **INHABITED CIVIL ISS WILL BE A MULTI-USE FACILITY** LOW EARTH ORBIT...
- 4 – **THE SPACE STATION IS CONCEIVED AS HAVING AN EVOLUTIONARY CHARACTER...**
(SEE ARTICLE 14) THE PARTNERS INTEND THAT THE SPACE STATION SHALL STRIVE TO MAXIMIZE THE LIKELIHOOD THAT SUCH EVOLUTION WILL BE EFFECTED THROUGH CONTRIBUTIONS FROM ALL THE PARTNERS

THE MOST COSTLY LONG TERM INTERNATIONAL INFRASTRUCTURE

PROJECT	COST (IN BILLIONS USD)	INVESTMENT DURATION (YEARS)	INTERNATIONAL PARTNERS
ISS	130 (10.5 Europe)	20	USA, CANADA, EUROPE, JAPON, RUSSIE
ITER	13	30	USA, UE, RUSSIA, JAPAN, CHINA, INDIA, SOUTH KOREA
CERN SYNCHROTON	7	10	20 EUROPEAN COUNTRIES
GALILEO (TECH and INDUSTRY)	4.5	10	27 EUROPEAN COUNTRIES (UE)
A 380 (TECH and INDUST)	30	15	6 EUROPEAN COUNTRIES
JOINT STRIKE FIGHTER	350	35	UNITED KINGDOM, ITALY, THE NETHERLANDS, CANADA, NORWAY, DENMARK, AUSTRALIA AND TURKEY

A CLEAR AND AMBITIOUS ROAD MAP

MEMORANDUM OF UNDERSTANDING BETWEEN ESA AND NASA ON THE INTERNATIONAL SPACE STATION

SIGNED IN WASHINGTON DC ON 29 JANUARY 1998

ARTICLE 2 - GENERAL DESCRIPTION OF THE ISS :

- **A LABORATORY IN SPACE** FOR THE CONDUCT OF SCIENCE AND APPLICATIONS AND DEVELOPMENT OF NEW TECHNOLOGIES;
- **A PERMANENT OBSERVATORY** IN HIGH INCLINATION ORBIT FROM WHICH TO OBSERVE EARTH THE SOLAR SYSTEM AND THE REST OF THE UNIVERSE
- **A TRANSPORTATION NODE** WHERE PAYLOADS AND VEHICLES ARE STATIONED, ASSEMBLED, PROCESSED AND DEPLOYED TO THEIR DESTINATION
- **A SERVICING CAPABILITY** FROM WHICH LARGE SPACE STRUCTURES AND SYSTEMS ARE ASSEMBLED AND VERIFIED
- **A RESEARCH AND TECHNOLOGY CAPABILITY** IN SPACE, WHERE THE UNIQUE SPACE ENVIRONMENT ENHANCES COMMERCIAL OPPORTUNITIES AND ENCOURAGES COMMERCIAL INVESTMENT IN SPACE
- **A STORAGE DEPOT** FOR CONSUMABLES, PAYLOADS AND SPARES
- **A STAGING BASE** FOR POSSIBLE MISSIONS, SUCH AS A PERMANENT LUNAR BASE, A HUMAN MISSION TO MARS, ROBOTIC PLANETARY PROBES, A HUMAN MISSION TO SURVEY THE ASTEROIDS AND A SCIENTIFIC AND COMMUNICATIONS FACILITY IN GEOSYNCHRONOUS ORBIT

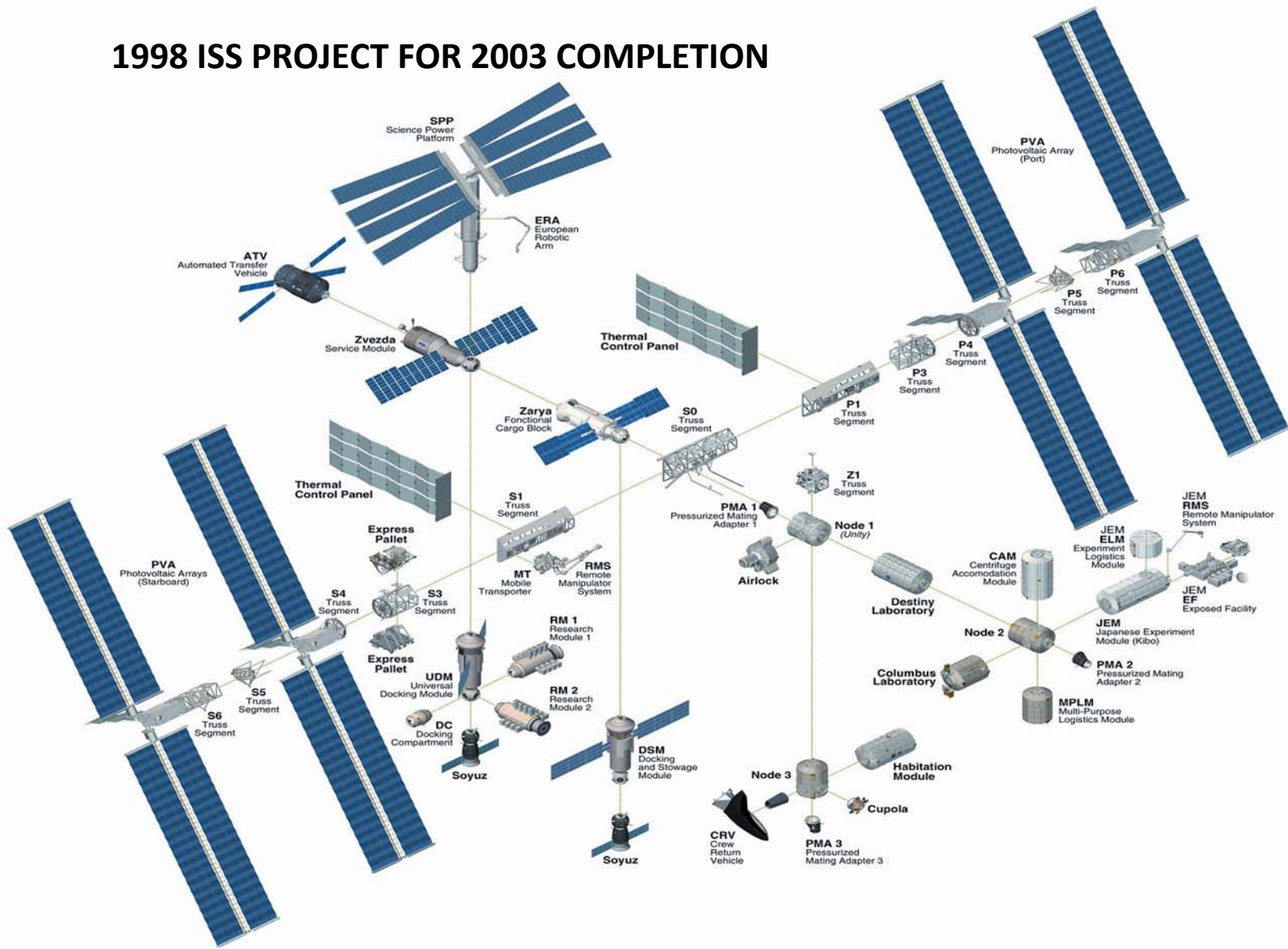
AN AMBITIOUS AGENDA (MoU)

ARTICLE 5 – ISS MAJOR PROGRAM MILESTONES	DATES OF ACHEIVEMENTS	
FIRST NASA-PROVIDED SPACE STATION ELEMENT	JUNE 1998	
PERMANENT HUMAN PRESENCE CAPABILITY (HABITATION AND CREW RESCUE FOR THREE CREW)	JAN 1999	
LAUNCH OF THE NASA PROVIDED LABORATORY MODULE	MAY 1999	
LAUNCH OF THE ESA PROVIDED EUROPEAN PRESSURIZED LAB	OCT 2002	
FIRST ESA-PROVIDED LOGISTICS/REBOOST OPERATIONAL MISSION	MARCH 2003	
ASSEMBLY COMPLETE (ASSEMBLY OF ALL PERMANENTLY ATTACHED ELEMENTS LISTED IN ARTICLE 3, INCLUDING CRV FOR MINIMUM 4 PEOPLE)*	DECEMBER 2003	
INITIATION OF MATURE OPERATION AND UTILIZATION *	DECEMBER 2004	



Minimum number of astronauts for verification and maintenance = 3
 Number of Astronauts for mature operation and utilization = 7
 + Crew Rescue Vehicle provided by NASA (see article 8.3.c.1 'Management of the Space Station Program Primary Related to Operations and utilization')

1998 ISS PROJECT FOR 2003 COMPLETION



ISS

=

**HIGH AMBITIONS
HIGH EXPECTATIONS**

2 – IMPLEMENTING THE SPACE STATION (SOURCES OF THE GAP)

ISS CRITICAL PATHS (Potential gaps)

ISS CRITICAL PATHS (1)

1) AGENDA MANAGEMENT

- Completion by 2003 for reasonable time mature operation and utilization during 15 years min

2) POLITICAL MANAGEMENT AND ISS GOVERNANCE

- High level political survey of the IGA and MoU
- The agenda respect
- Transition to each administration
- Robust and longevity partnership commitment between the International partners

3) BUDGET AND ECONOMIC FORECAST

- Ensure the stability of the ISS economical model in an evolving situation
- Ensure the budgetary resources for the program

ISS CRITICAL PATHS (2)

4) SPACE TRANSPORTATION SYSTEM

- Ensuring the transportation and rescue capability for 7 crew by 2003
- Shuttle and CRV issues

5) SCIENCE AND TECHNOLOGICAL PROGRAM

- To be in line with the IGA and MoU objectives

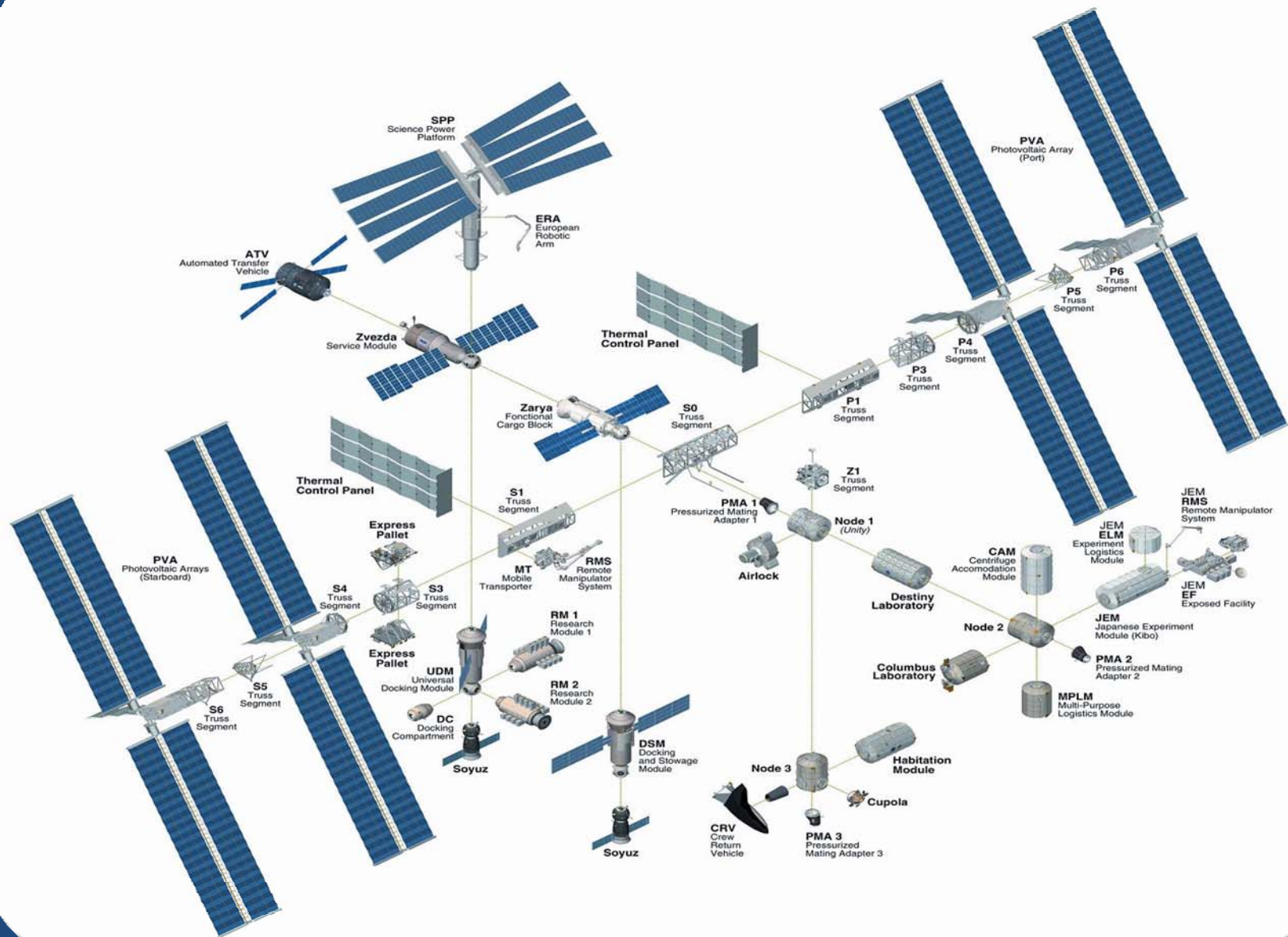
6) AN AMBITIOUS PUBLIC COMMUNICATION POLICY

- Ensuring a strong support from the public for the ISS and the Human space flight
- Addressing a strong marketing approach of the ISS image

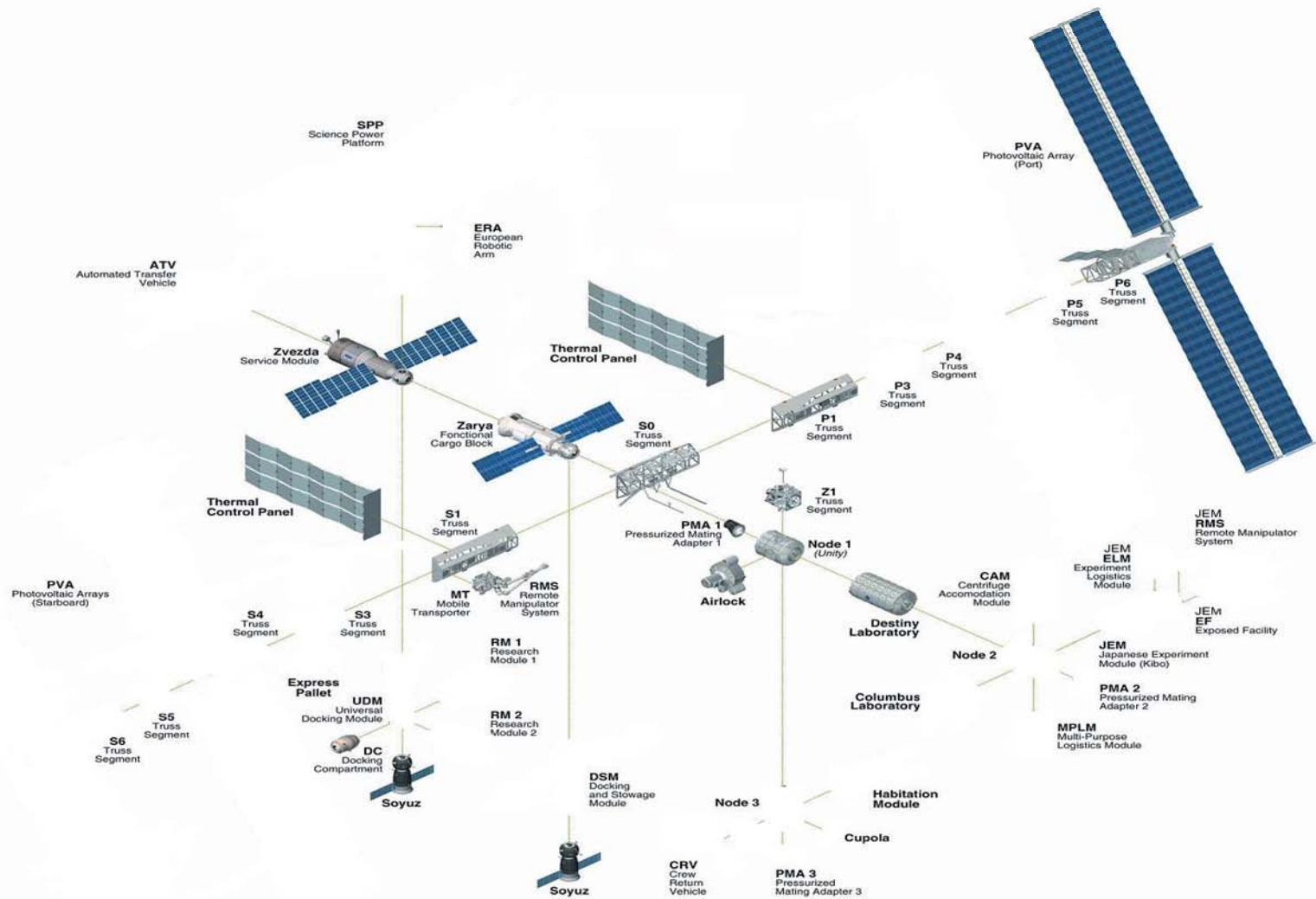
ISS = 6 CRITICAL PATHS

WAS THIS AGENDA AND THESE OBJECTIVES
REALISTICS ?

3 - 2008 ISS PROGRAM ACHIEVEMENTS (IDENTIFYING THE GAP)



View of ISS in Theory MT completed by 2003 (To be in 2010 except CRV)



View of ISS in reality on December 2003

1998 – 2008 GAP ISSUES

ISS CRITICAL PATHS RESULT/ THE 6 POINTS

CRITICAL PATHS	2008 SITUATION
AGENDA MANAGEMENT	ISS ALMOST COMPLETE – NON MATURE OPERATIONS
POLITICAL MANAGEMENT AND ISS GOVERNANCE	DIFFICULT Y TO FOLLOW THE IGA AND MoU HIGH LEVEL POLITICAL OBJECTIVES / DIFFICULT GOVERNANCE IN A CHANGING ERA/ INTERNATIONAL PARTNERSHIP STILL ROBUST DESPITE THE US EXPLORATION STRATEGY 2004
BUDGET AND ECONOMIC FORECAST	DIFFICULT ECONOMIC MODEL STABILITY – COSTS ESTIMATES HAS BEEN VERY UNDER ESTIMATED
SPACE TRANSPORTATION SYSTEM	ONLY SOYUZ STILL REMAIN FULLY OPERATIONAL
SCIENCE AND TECHNOLOGICAL PROGRAM	TO BE DEFINED STILL WAITING FOR ISS MATURE OPERATION/ NO CLEAR INDUSTRIAL AND COMMERCIAL ISSUES
AN AMBITIOUS PUBLIC COMMUNICATION POLICY	FEW PUBLIC SUPPORT/ FEW PEOPLE KNOW THE ISS/ INSUFFICIENT ISS IMAGE MARKETING

6 POTENTIAL GAPS

SPACE TRANSPORTATION SYSTEM

A KEY ISSUE IN 2008

THE ISS OPERATIONAL MODE BY 2003 WAS BASED ON A VERSATILE AND RICH RESOURCES (MoU article 12) :

- US SPACE SHUTTLE (7 PAX NON PERMANENT)
accident in 2003 and limited number of flights/years
- CRV (X38) DEVELOPPED BY NASA (UNDER NASA RESP) AND EUROPE, ADAPTABILITY TO ARIANE V AND DELTA IV (MINIMUM 4 PAX CAP/ PERMANENT)
cancelled in 2002
- PROTON, SOYUZ + PROGRESS M + SOYUZ TM (3 PAX PERMANENT)
Operational
- ARIANE 5 + ATV (MoU PROVISIONS = EVOLVING RETURN CAPABILITIES)
no return capabilities
- H – II + HTV (MoU PROVISIONS = EVOLVING RETURN CAPABILITIES)
no return capabilities

CONCLUSION 1998 – 2008 GAPS ISSUES

6 CRITICAL PATHS RESULTS

ISS mature operation and utilization not before 2010 or 2015

- ISS IGA and MoU objectives still pending, especially science
- Future beyond 2016 ?
- Space transportation future in relying only on Soyuz between 2010 and 2015
- ISS mostly unknown and Human Space Flight increasingly losing credibility toward the taxpayer
- Improving Cost control

ISSUE 1 = IS ISS PROGRAM WAS TOO AMBITIOUS ?

EXISTING RISKS OF A POSSIBLE ISS CLOSING IN 2016

- 1. HUMAN SPACE FLIGHT IS LOSING CREDIBILITY**
- 2. COULD DAMAGE OTHER LARGE INTERNATIONAL SCIENTIFIC PROGRAM (THE WHITE ELEPHANT SYNDROME)**

**ISS PROGRAM FAILURE COULD POTENTIALLY
DAMAGE SERIOUSLY THE HUMAN SPACE
EXPLORATION**

ISSUE 2 = ISS MANAGEMENT AND GOVERNANCE

COULD THE SPACE AGENCIES MANAGE THE TECHNICAL AND THE POLITICAL ASPECTS AT THE SAME TIME?

IS THE ISS MANAGEMENT AND GOVERNANCE MODEL STILL ACURATE?

POLITICAL AND PHILOSOPHICAL CONTEXT FOR ISS IN 2008

- 2008 = A POST 9/11 WORLD WAR ON TERROR – AFGHANISTAN AND IRAQ WARS
- CLIMATE CHANGE ISSUES ARE BECOMING A PRIORITY, ENERGY IS MAJOR ISSUE
- LOW ECONOMY SINCE OCTOBER 2008, LIBERAL CAPITALISM JEOPARDIZE
- WESTERN WORLD (US, EUROPE, JAPAN) FACING HIGH ECONOMIC ISSUES FUTURE LIMITED PUBLIC FUNDS
- RUSSIA IS A MAJOR CORNERSTONE OF THE ISS PROGRAM
- CHINA AND INDIA ARE NEW “POWERS”, CHINA BECAME A FULL SPACE POWER
- 2008 = CONCERNS

4 – BRIDGING THE GAPS =

A GREAT OPPORTUNITY TO REINFORCE THE ISS
INTERNATIONAL PARTNERSHIP

ISS SUCCESSFUL PARTNERSHIP THE KEY FOR THE
FUTURE

1998 - 2008

ISS LESSONS LEARNED (ESA SOURCES)

- **LARGEST MULTINATIONAL TECHNOLOGICAL PROGRAM WORLDWIDE**
- DESPITE CONSIDERABLE DELAYS ISS SHOWED ROBUSTNESS FACE TO SEVERAL CRITICAL SITUATION
- **ISS PROVIDES EXCELLENT EXAMPLE HOW DIFFERENT MANAGEMENT CULTURES COULD SUCCESSFULLY INTERACT**
- VISIBLE IN THE SKY PERMANENTLY INHABITED SINCE 2000

1998 - 2008

ISS LESSONS LEARNED (ESA SOURCES)

MAJOR CHALLENGES :

- LONG DURATION OF THE PROGRAM BEFORE ASSEMBLY COMPLETE
- SIZE DIMENSION OF THE PROGRAM
- THE SPECIFIC SET UP OF THE COOPERATION SCHEME
- INITIAL ISS CONCEPT UNDER ESTIMATED TECHNICAL CHALLENGES
- NASA COSTS INCREASE NECESSITATED ISS CAPABILITY DELETIONS
- LEADING TO PROGRAM DELAYS AND REDUCED PROGRAM AMBITION (ESPECIALLY IN US SCIENCE)
- REDUCED AMBITIONS AND PROLONGED ISS ASSEMBLY WITH LEAN UTILIZATION RESOURCES/CAP STRAINED SUPPORT FROM ISS COMMUNITY AS WELL AS GENERAL PUBLIC AND POLITICAL SUPPORT

1998 - 2008

ISS LESSONS LEARNED COULD BRING NEW IDEAS FOR BRIDGING THE GAPS

- WHAT CAN WE LEARN FROM ISS PROGRAM GOVERNANCE FOR FUTURE COOPERATIVE UNDERTAKINGS ?
- HOW CAN WE BETTER USE OUR LIMITED SPACE TRANSPORTATION RESOURCES AND FIND MORE REDUNDANCY ?
- HOW ISS COULD BE A OPPORTUNITY FOR A NEW BASE OF THE TRANSATLANTIC PARTNERSHIP ?
- TAKE THE LESSONS LEARNED (MISTAKES AND PLUS) OF THE ISS PROGRAM TO DESIGN THE BEST SCHEME OF INTERNATIONAL COOPERATION FOR EXPLORATION

**DESPITE THE DIFFICULTIES
THE ISS PROGRAM STILL RUNNING
IT IS A GREAT ACHIEVEMENT
“UNE PREMIERE” FOR THE
INTERNATIONAL COOPERATION**

**2008 SITUATION
IS NOT THE SAME AS IN 1998**

**ISS IS ESSENTIAL FOR THE
FUTURE OF HUMAN
EXPLORATION**

ISS :

YES WE CAN !!!

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