

Part 11

No. 1



# S·P·A·C·E TOURISM™

Lecture Series given by Dr.-Ing. Robert Alexander Goehlich

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Part 11

No. 2



# S·P·A·C·E TOURISM™

Lecture Series given by Dr.-Ing. Robert Alexander Goehlich

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## Content

No. 3



- **General**
- **Questions and Answers from last Lecture**
- **Typical Orbital Rocket for Space Tourists**
  - Vehicle Design
  - Mass Characteristics
  - Flight Profile
  - Economic Performance
  - Benefit Performance
- **Requests from Audience for Future Lectures**
- **Space Tourism Market Simulation Discussion**

## 内容

No. 4



- **はじめに**
- **前回の講義に関する質疑応答**
- **典型的なオービタルロケットの一例**
  - 機体設計
  - 質量特性
  - 飛行計画
  - 経済性
  - 利潤特性
- **次回以降の講義に関する要望**
- **スペース ツーリズム マーケットシミュレーション**

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## General

### Goal of Today's Lecture

No. 7



*„You will learn about details, pros and cons of a typical orbital rocket for space tourists.“*

## はじめに

### 本講義の目的

No. 8

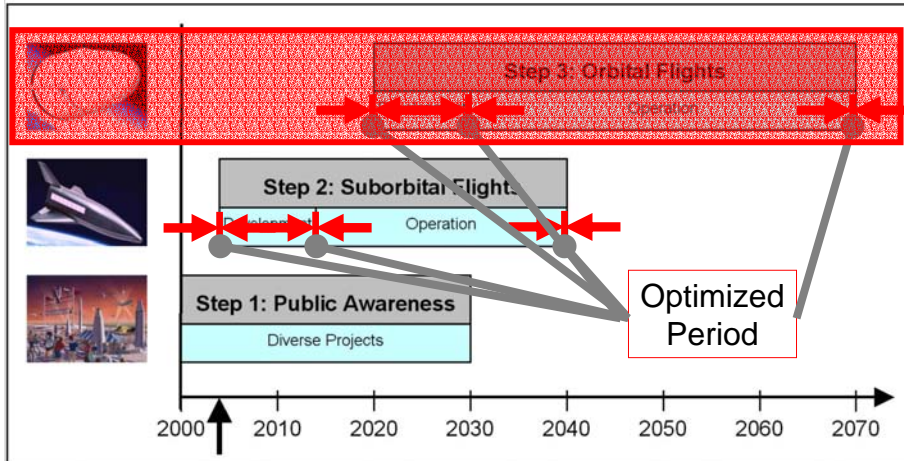


*„典型的なオービタルロケットについての、良い面と好ましくない面について学んでいただきます。“*

# Introduction

## Scenario with representative RLVs

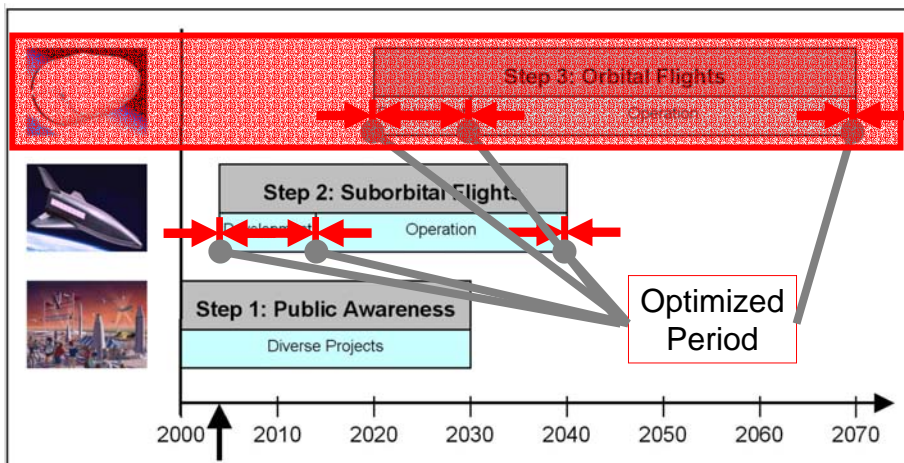
No. 9



# 導入

## 代表的な再使用宇宙輸送機の計画

No. 10



# Kankoh Maru Plus Concept

The Reason of this Name...

No. 11



modified specifications

# 観光丸 プラス

この名前の所以は...

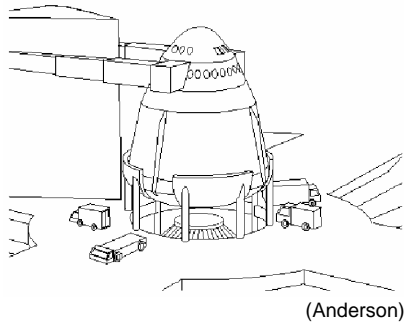
No. 12



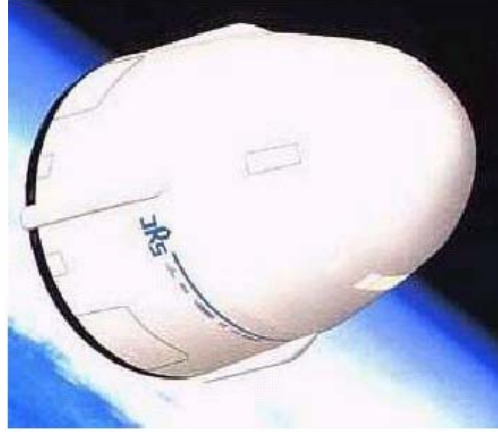
仕様変更

# Kankoh Maru Plus Concept Vehicle

No. 13



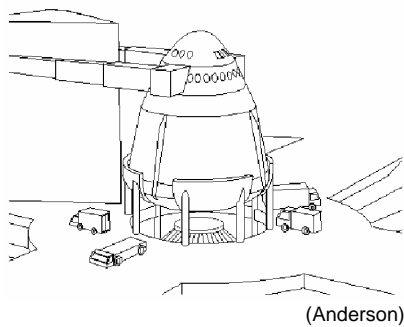
(Anderson)



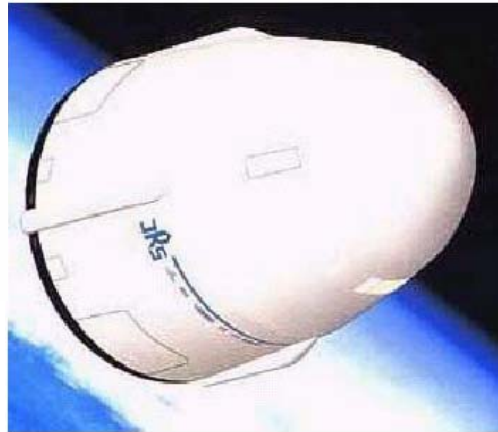
(Kawasaki)

# 観光丸プラス 概観

No. 14



(Anderson)

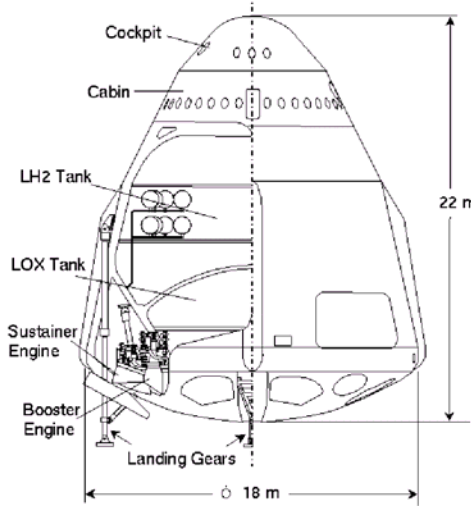


(Kawasaki)

# Kankoh Maru Plus Concept

## Design and Mass

No. 15



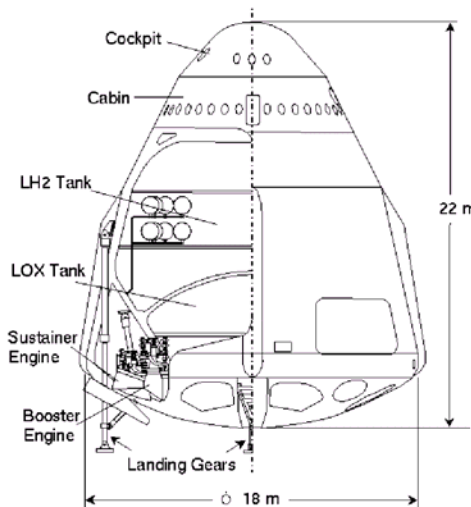
(Isozaki et al.)

Subsystem	Total	Unit
Cold Structure	10,4	Mg
Hot Structure	3,9	Mg
LH2 Tanks	8,9	Mg
LO2 Tanks	4,1	Mg
Equipment	8,0	Mg
Engines	13,5	Mg
Recovery	1,4	Mg
<b>DRY MASS</b>	<b>50,2</b>	<b>Mg</b>
Payload	5,0	Mg
Propellants	494,9	Mg
<b>TAKE-OFF MASS</b>	<b>550,1</b>	<b>Mg</b>

# 観光丸プラス

## 構造、質量

No. 16



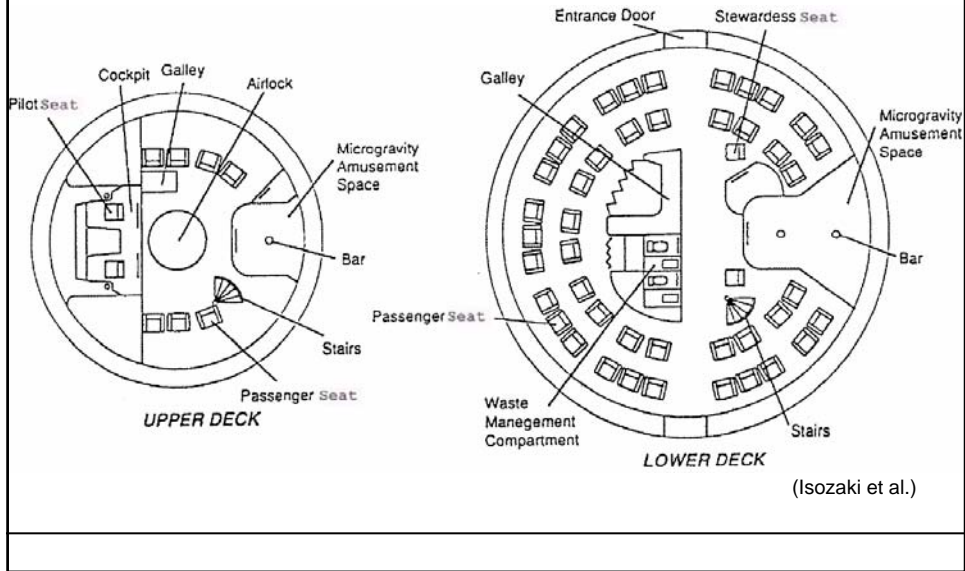
(Isozaki et al.)

Subsystem	Total	Unit
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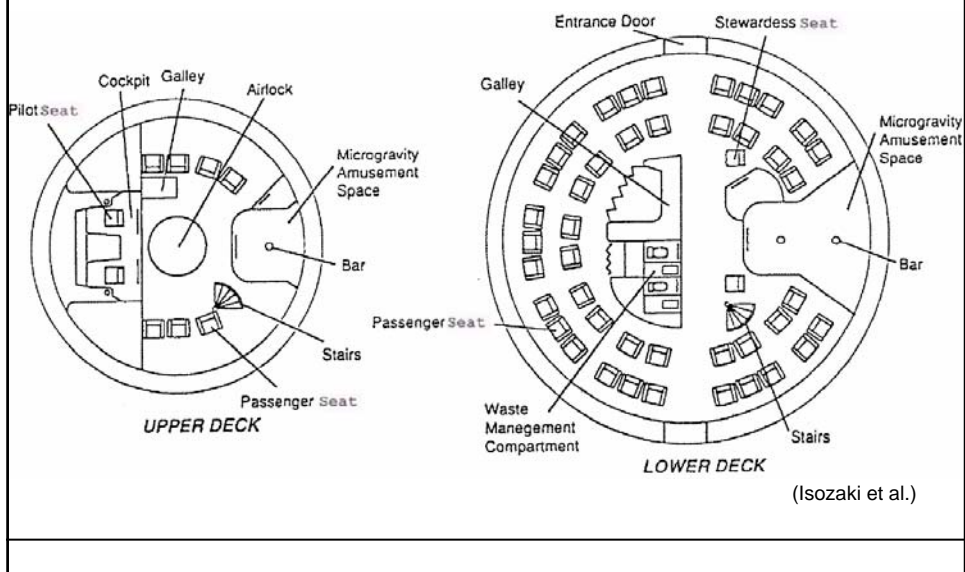
# Kankoh Maru Plus Concept Passenger Compartment Design

No. 17



# 観光丸プラス 乗客室

No. 18



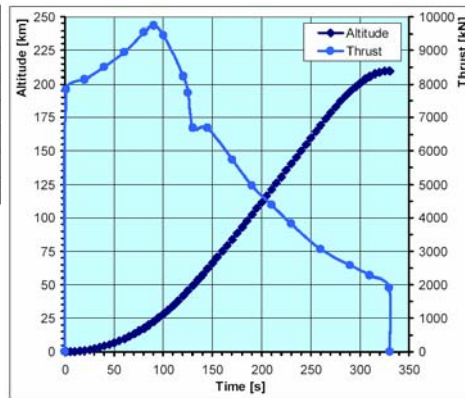
# Kankoh Maru Plus Concept

## Ascent Phase

No. 19



Phase	Description	Begin [s]	End [s]	Pitch Rate [°/s]
0	Liftoff (Begin)	0	0	-
1	Vertical ascent	0	17	-
2	Pitch rate	17	38	0.9
3	Gravity turn	38	242	-
4	Pitch rate	242	330	0.6
5	Low Earth Orbit (End)	330	86 400	-



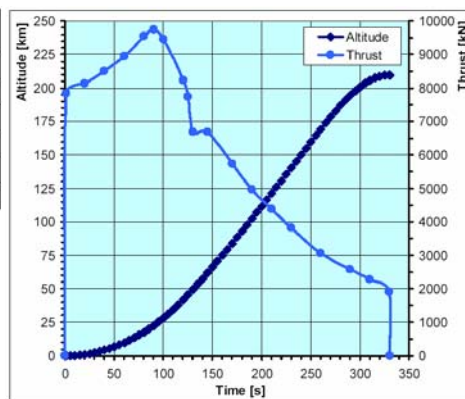
# 観光丸プラス

## 上昇軌道

No. 20



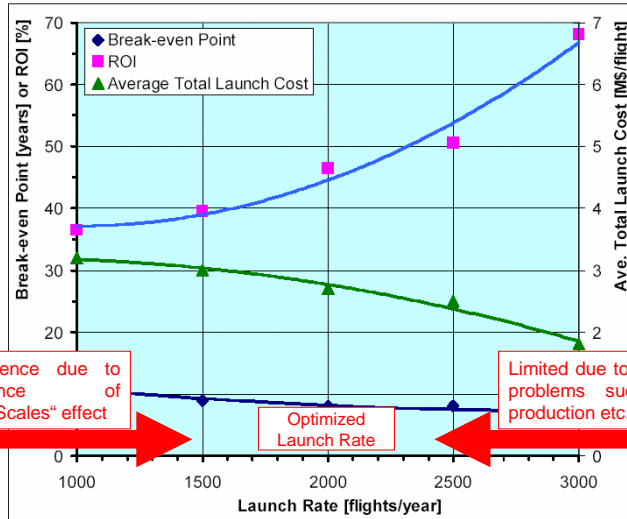
Phase	Description	Begin [s]	End [s]	Pitch Rate [°/s]
0	Liftoff (Begin)	0	0	-
1	Vertical ascent	0	17	-
2	Pitch rate	17	38	0.9
3	Gravity turn	38	242	-
4	Pitch rate	242	330	0.6
5	Low Earth Orbit (End)	330	86 400	-



# Simulation

## Optimized Launch Rate

No. 21



Negativ influence due to non-performance of „Economy of Scales“ effect

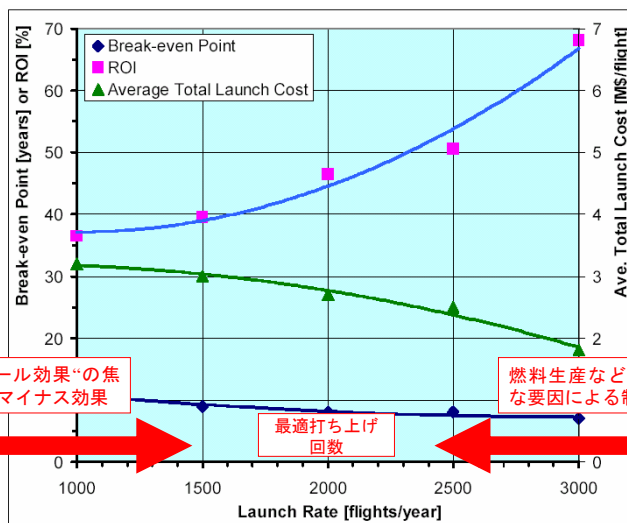
Limited due to infrastructure problems such as fuel production etc.

Optimized Launch Rate

# シミュレーション

## 最適打ち上げ回数

No. 22



„経済的スケール効果“の焦げ付きによるマイナス効果

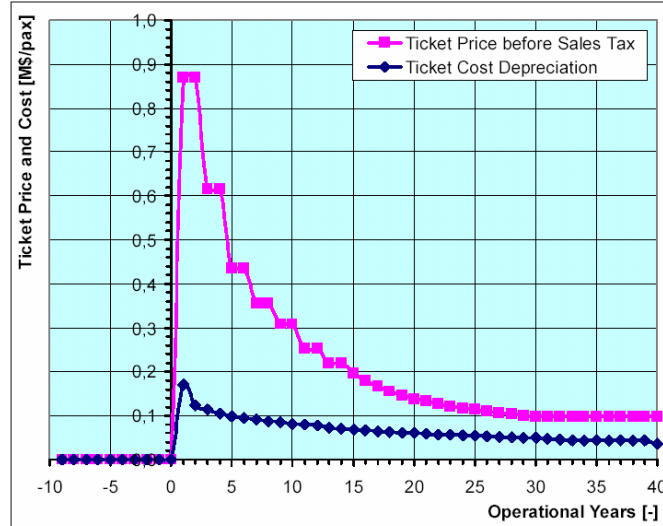
燃料生産などのインフラ的な要因による制限

最適打ち上げ回数

# Simulation

## Ticket Price

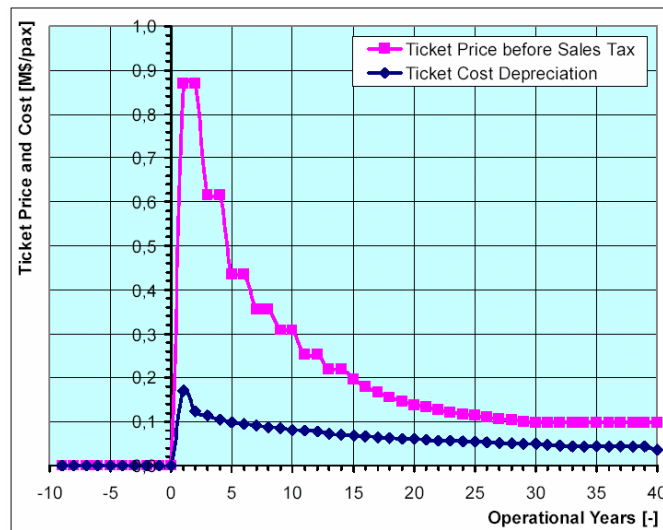
No. 23



# シミュレーション

## チケットの価格

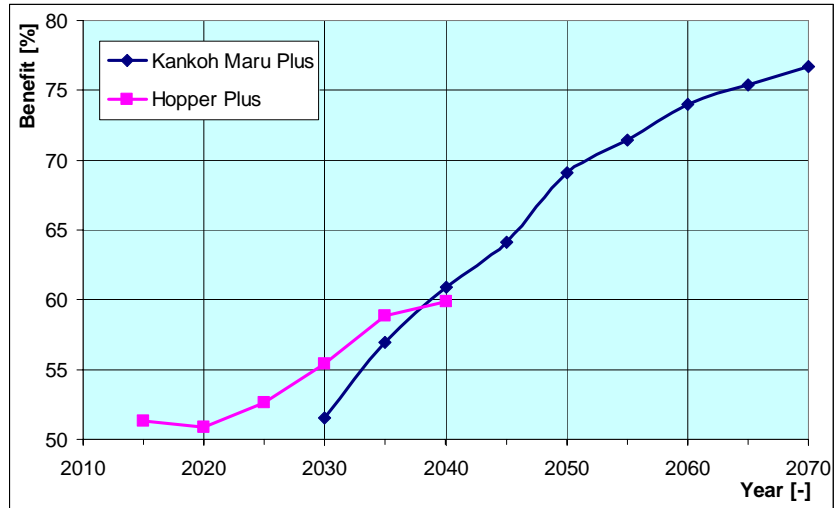
No. 24



# Benefit Performance

## Benefit of all Sub Objectives

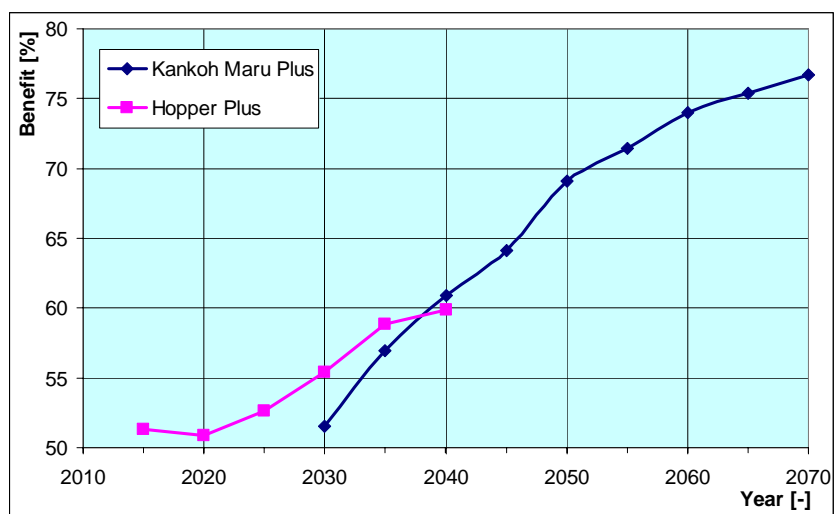
No. 25



# 利潤特性

## 付随する効果による利潤

No. 26



## Current Tests

RVT – Reusable Vehicle Test

No. 27



(JAXA)

## Current Tests

RVT – Reusable Vehicle Test

No. 28



(JAXA)

