Project SAFMARS

Store and Forward Mars Analogue Research System

- Compact ground stations for message based communication with microsatellites
- Platform for global simulator for proposed Mars microsatellite telemetry and communications system

First steps

- Preliminary design work done in Brisbane
- Use amateur satellites, initially build and test prototype ground station for field tests in 2002

Goals

- Provide global messaging system for remote Mars analogue field researchers on Earth
- Develop expertise in remote telemetry
- Potential for development of robust, miniature ground stations for real missions

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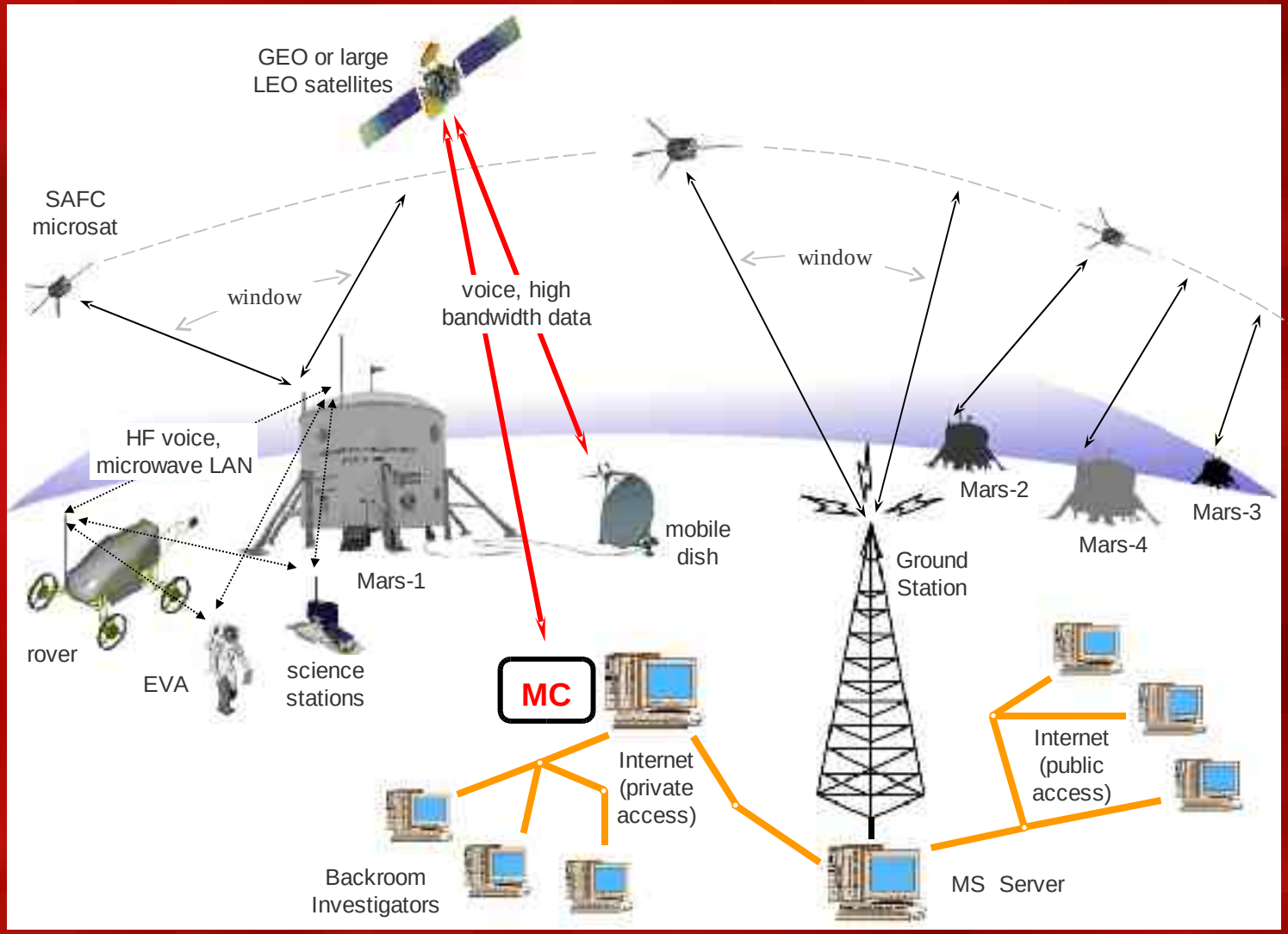
SAFMARS

System Design



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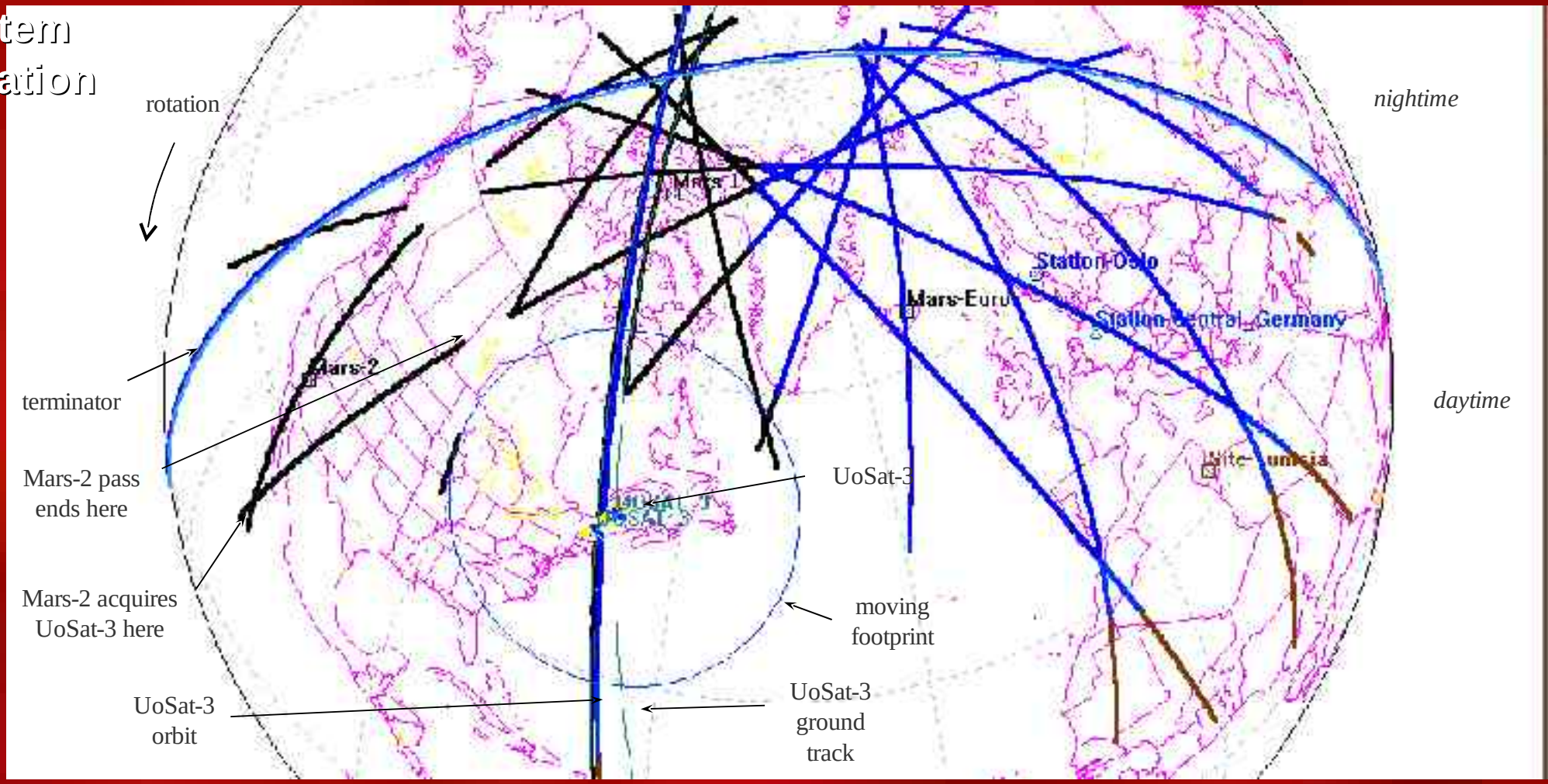
SAFMARS

Northern Hemisphere

System Operation



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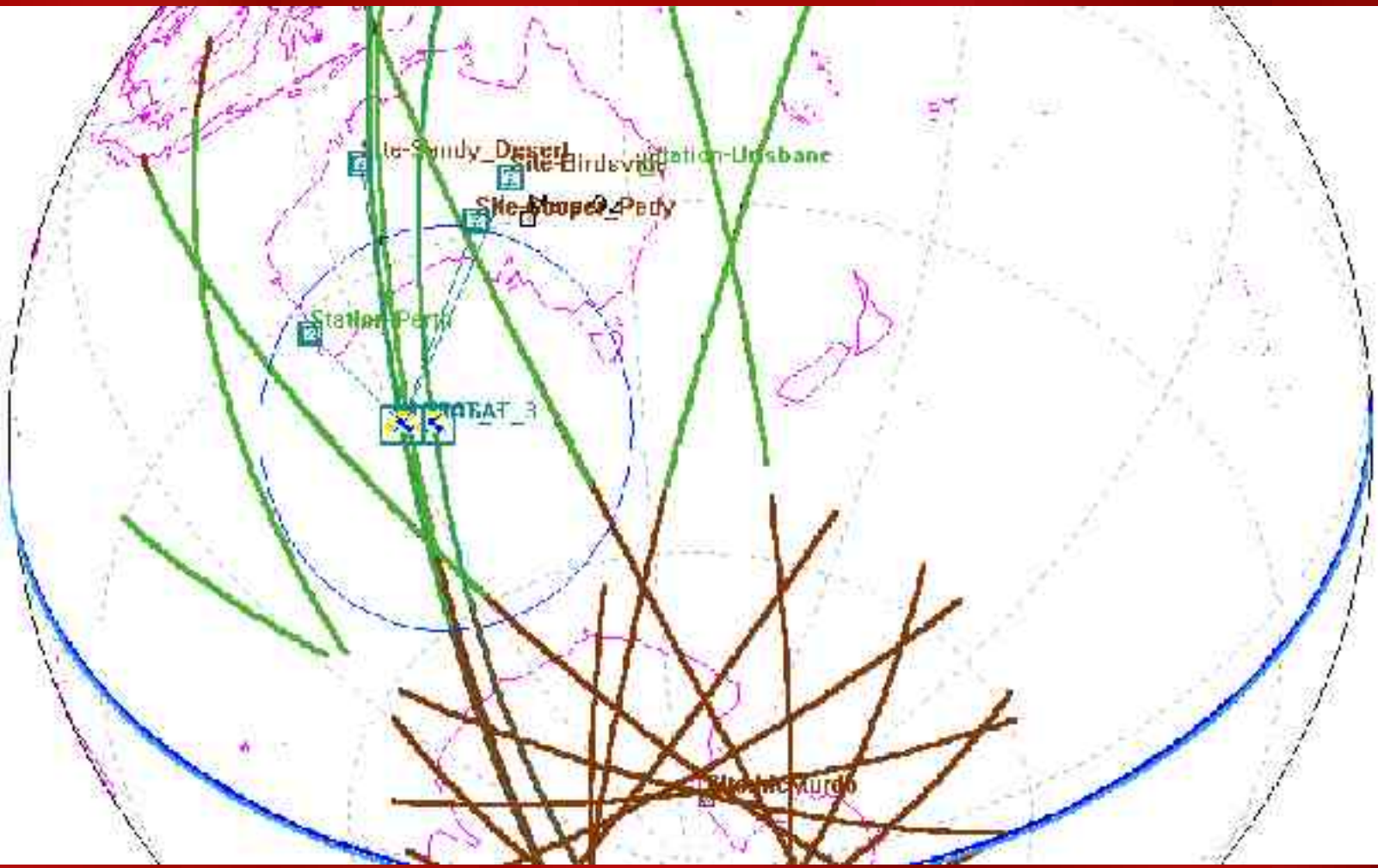
SAFMARS

Southern Hemisphere

System Operation



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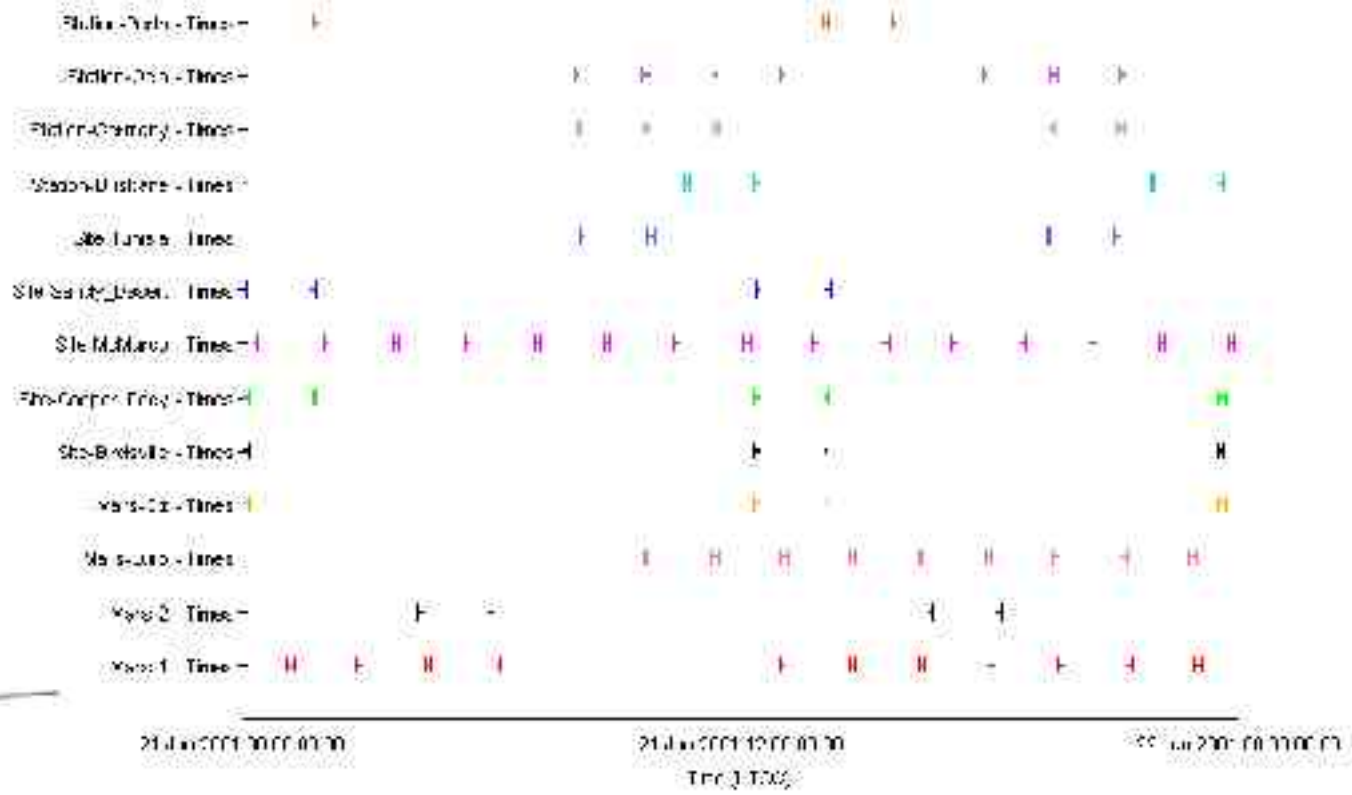
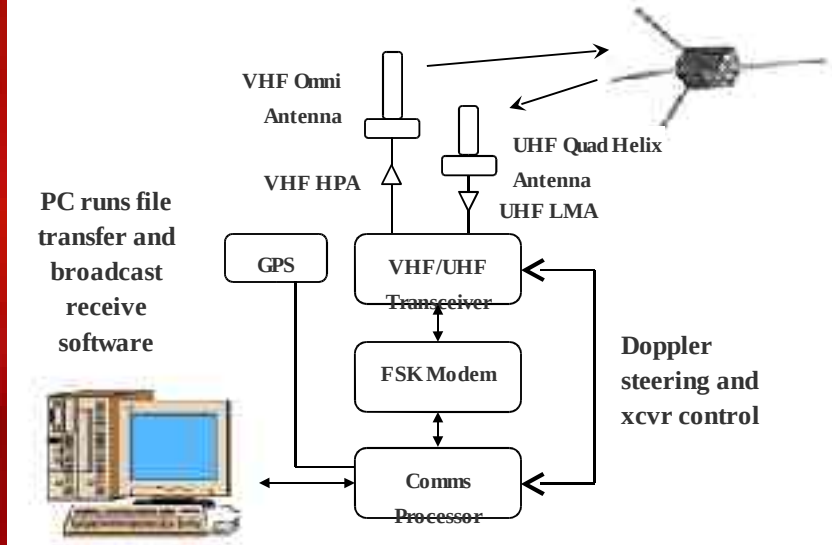
Ground Stations

Contact times during a 24 hour period





Ground station schematic

Ground station developed in UK

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Project Mars Skin

Develop real mission suit technology

- Into remote areas of continental Australia
- Mock ups to assist with operational design

Advocate alternate type of Mars/space suit

- Current suits are gas pressurised
- Stiff, lack dexterity - make crew work harder during EVA for less productivity
- Mechanical Counter Pressure suit concept has been demonstrated, recent renewed interest

Goals

- Pursue MCP suit development as an Australian “ Canadarm”
- Encourage a research group and help develop R&D facilities, possibly test flight units
- Start small (e.g. gloves and arm testing)

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MarsSkin

The MCP suit

Gas pressurised Apollo moon suit

Non-pressurised Mars suit using elastic counter-force

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MarsSkin

MCP layers

Pioneering work of Webb, Annis, 1971

Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6
					
Slip layer – light spandex	Pressurised torso breathing bladder	Partial elastic garment	Full body elastic garment	Power layer with hold down strap	Full elastic outer layer with gloves, footcovers, helmet (no backpack)

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MCP Analysis

Advantages

- Demonstrated capability for normal functioning down to 15 mm Hg,
- Skin is ideal pressure suit – gas tight, elastic, non-restrictive
- Skin only needs about 100mm Hg extra “ help” to withstand near-vacuum
- Energy cost of walking level only 1.64 times that for shirtsleeves walking, compared with 2.26 for Apollo/Gemini suits, 27% reduction
- No active cooling needed, passive thermal self regulation occurs via perspiration through elastic garment pores
- Average retention of range of motion in all joints substantially improved
- Twice as dexterous on standard pegboard test
- Nothing catastrophic about a tear

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MCP Analysis

Challenges

- Problems mainly mechanical, not physiological
- Blooding pooling resulting from difficulty in maintaining even pressure over some parts of skin, e.g. concave surfaces such as the palm
- Demonstrated by Webb and Annis, but best test was 20mm Hg for 5 minutes
- Donning and doffing time, might be reduced by minimising layers, materials research required

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MarsSkin

Analogue suits

Mars Society (US) analogue suit

Mock-up tested on Devon Island by Hamilton Standard

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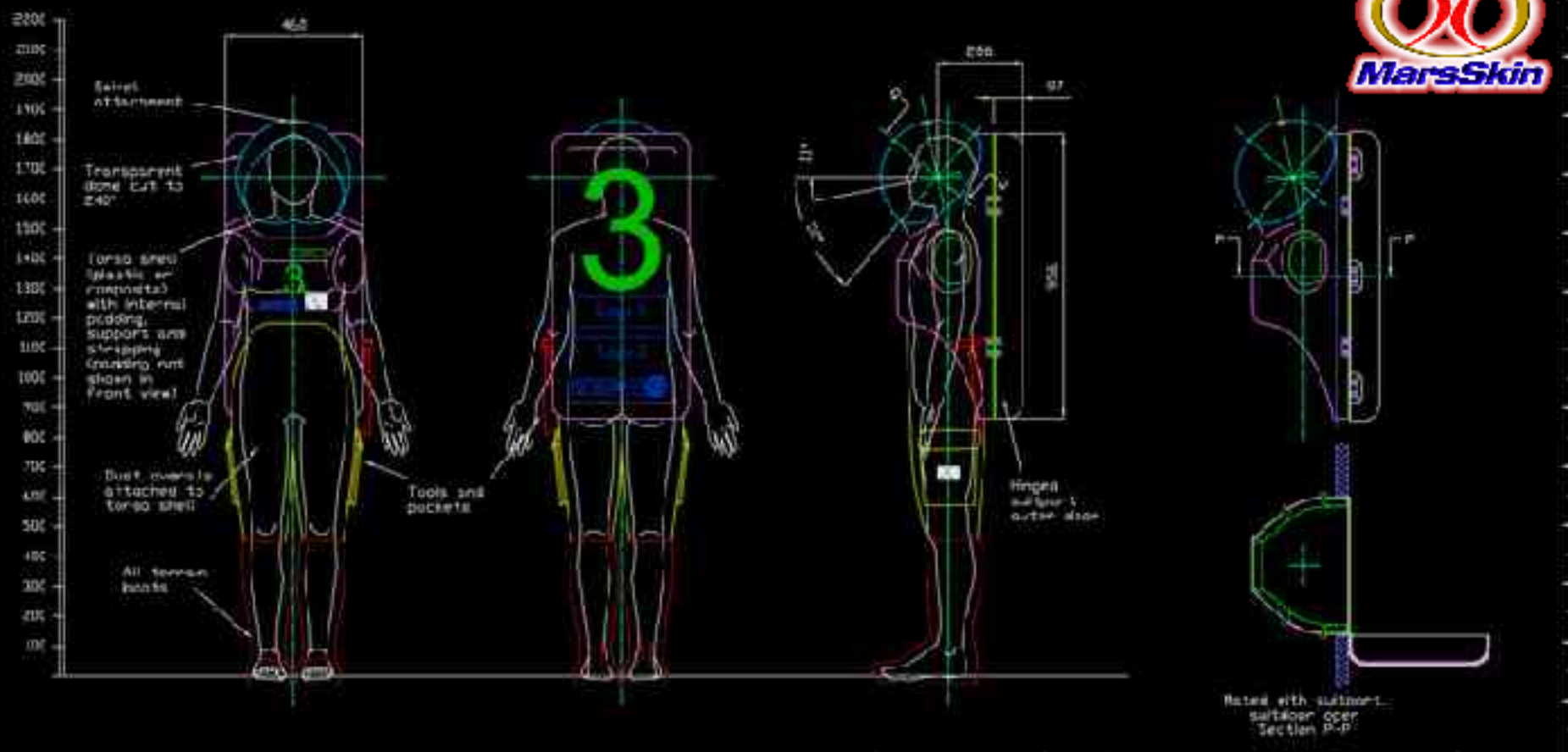
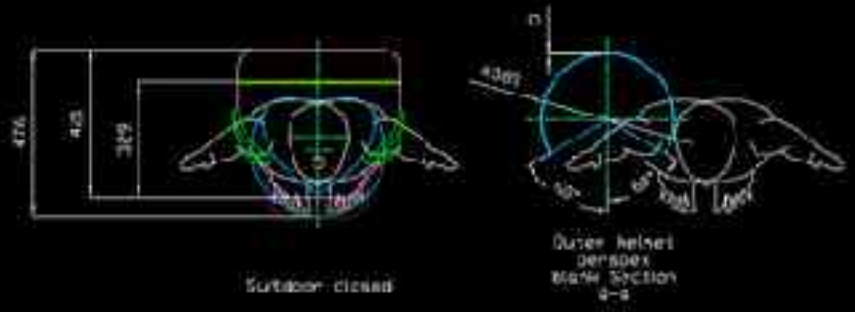




Marskin-1 Analogue Mars Suit

Inner Helmet section detail

MSA-TEC-MSK-DES-Marskin_1-ver03.dwg

03

2001-09-14

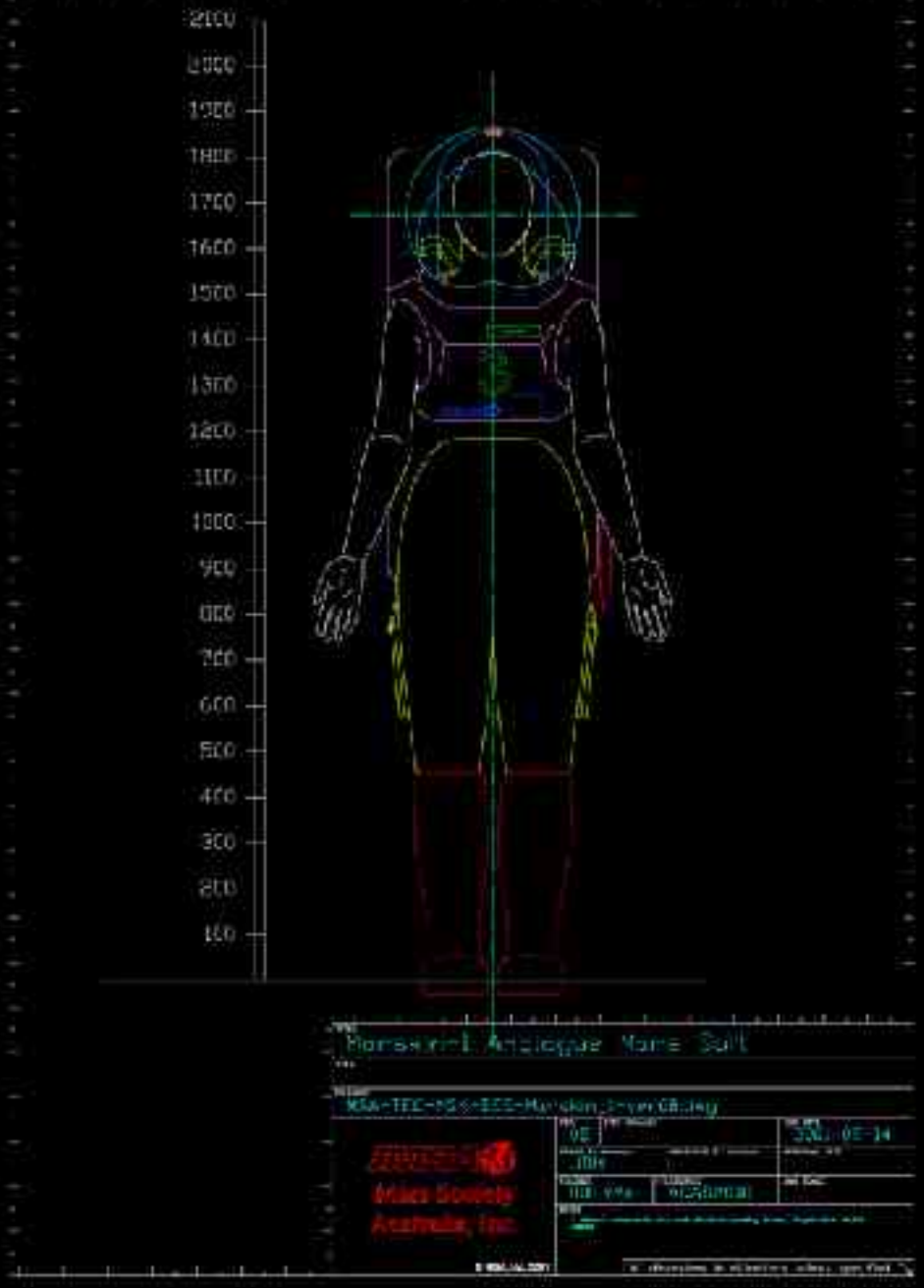
JIH

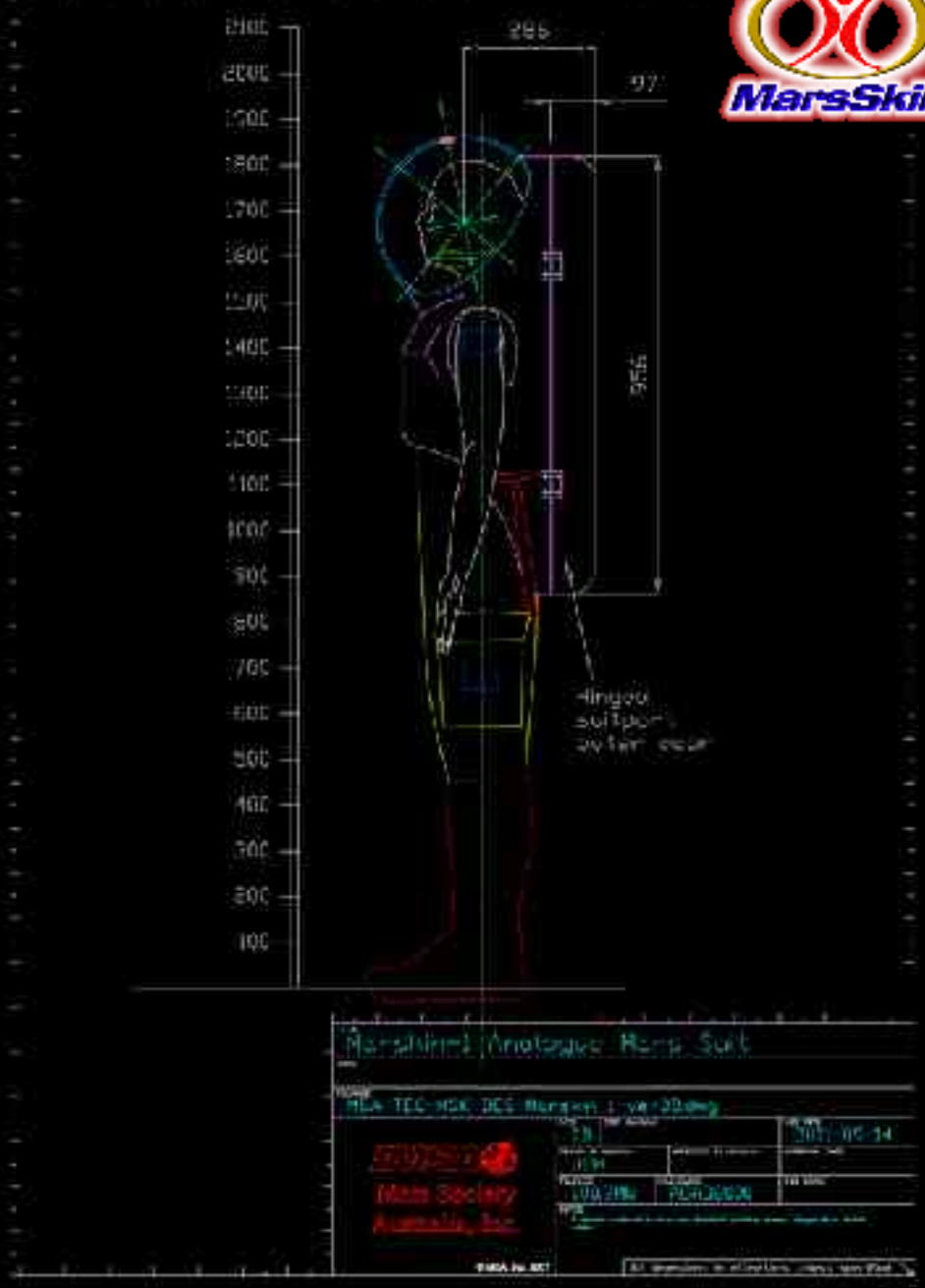
ACAD2000

12

Mars Society Australia, Inc.

All dimensions in millimeters unless specified

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956

Join us on the journey to Mars…

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	Strengths	Weaknesses
MSA Mars Society Australia	Learn from mistakes of others, clean slate Natural space assets Interest in and demand for space Resourceful	No real aerospace industry – economic rationalism Small economy, resource-based, low value-adding Lack of confidence, smallness syndrome
THE MARS SOCIETY	Gigantic publicly supported aerospace industry Space leadership Large economy, manufacturing Philanthropic	Constrained by past Size makes less nimble, less resourceful

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Jul 2000 – Jul 2001

Fundraising

~AU$60,000

~AU$1,000 per member

~AU0.3 cents per capita

MSA highly successful in relative terms!

~AU$1,000,000

~AU$300 per member

~AU0.3 cents per capita

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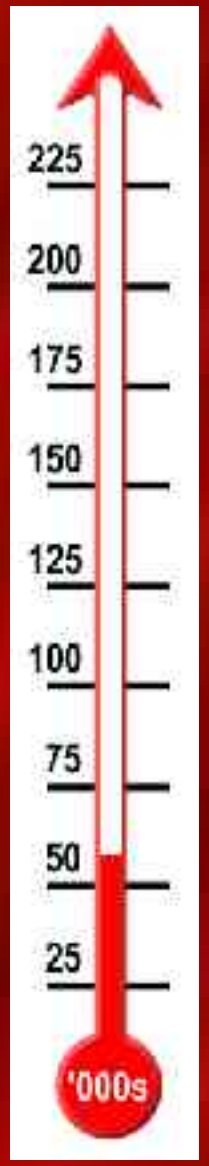
THE MARS SOCIETY

Major Sponsors

STARCHASER™ THE SKY IS NOT THE LIMIT™



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Fundraising

Sources of funding

- Commercial sponsorship
- Private donations
- Government schemes
- Bequests

Other forms of “ fundraising”

- In-kind technical support
- In-kind supply of hardware, labour

Required

- Optimise MSA tax status for donations
- People to identify funding opportunities and build contact databases
- People to co-ordinate, write and pursue funding proposals

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Member Services

Category	Annual Fee
Regular	$40
Family	$50
Student	$25

Leverage for fundraising

More members, more commercial potential

MSA is a popular movement

Group activities are at its heart

Need “ vectors” in all major cities and towns – individuals to assemble, grow, motivate and co-ordinate local groups

Opportunity

By increasing national membership from 60 to only 240, MSA becomes world’ s largest Mars Society branch per capita

Required

Member subscription management

Add value to membership through communication, services and activities

Web developers who can make website more useful, e.g. online payments

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Operations

Management of the MSA organisation

- Ensure conformance with law
- Evolve and develop the organisation for improved accountability, reduced demands on volunteers, and greater member involvement

Includes

- President, Treasurer, Secretary

Required

- Secretary
- Venue and organisers for the 2nd Australian Mars Exploration Conference 2002 (AMEC 2002) – how about Adelaide?

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Technical

Make it happen!

Involves design, scheduling, budgeting, costing, lots of “ cajoling”

Use standard document and reporting system

Includes

Planning and implementation

Required

People with technical experience

Project Managers and personnel for Mars-Oz, Marsupial (Brisbane), SAFMARS, Mars Skin, Jarntimarra and Mars Skin

Especially engineers with project experience

People who can do detailed design and CAD

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Outreach

Spread the wonder of Mars!

Develops materials in a variety of media allowing MSA to reach out to the general public, children and to target groups (such as professionals and potential funding sources)

Includes

Posters, brochures, animations etc.,

Evolution of website look and functionality

Required

People with graphic design experience and flair

People with web development skills (especially functional development)

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Policy

Win hearts and minds

- Develop strategies for changing public attitudes to space exploration and Mars
- Change political attitudes to prioritise space exploration and Australian involvement in Mars

Includes

- Research and document findings on global and regional strategic issues and statistics
- Development of an MSA policy platform
- Implement and analyse surveys of target groups

Required

- People with writing and research skills and a passion for space exploration
- People skilled in polling and statistics
- People with skills and experience to lobby politicans

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